Report

# Committee
# on
# Forests and Forestry in India

Ministry of Environment and Forests
Government of India

1990

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"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things."

Niccolo Machiavelli

PREFACE and acknowledgements.

It is regretted that it has not been possible to submit the Report within the time stipulated in Government Notification No. F.6-5/89.FP dated April 6, 1989, constituting the Committee and laying down its terms of reference. It is important to draw attention here to the fact that it was in the latter part of 1988 that Government first decided to set up such a Committee. This was however primarily to study the Ecological Role of Forests and suggest how this could be ensured and sustained. The terms of reference of the Committee were then limited to only (i), (ii) and (iv) of those listed in the above-mentioned Government Notification. For various reasons the setting up of such a Committee was delayed though the need for it continued to be one of particular concern to Government especially as the ecological role of forests had hitherto been neglected, especially in the context of the working of the National Wastelands Development Board and its ecological responsibilities. After the tribal panchas meeting held in March, 1989, Government finally decided to constitute the Committee adding to the original terms of reference, as the third order of priority, what in the above-mentioned Government Resolution is listed as item (iii). Government also made some revision to the composition of the Committee to accomodate this addition by nominating tribal representatives to the Committee. The terms of reference of the Committee as listed in the Government Notification remained as set out in order of priority stated, to ensure that the ecological role of forests should continue to be the Committee's overriding concern.

2. The Committee met six times and regrettably at each meeting the representatives of tribal interests, despite the Chair's repeated explanations that Government had set out the terms of reference in order of priority, focused their attention, to the exclusion of much else, on the third term of reference. The Chairman repeatedly appealed for Members understanding that the ecological balance of the country was of fundamental concern to the whole Nation and should therefore take precedence over any sectarian interests. Also, that in any case, the first beneficiaries of true ecological restoration would be the rural poor and tribals, apart from providing the only sound foundation on which the food security of the country could be ensured.

3. After considering the Report in draft form, two members of the Committee representing tribals, Shri Arvind Netam, M.P. and Dr. B.D. Sharma, Commissioner for Scheduled Castes and Scheduled Tribes, have placed on record their unwillingness to be party to the Report unless it was restructured to focus on the special interests of those they represented. The letters of these two members of the Committee to the Chairman are reproduced as Appendix II of the Report. Also included in this Appendix are letters received from two other members of the Committee, Shri Naresh Bedi and Shri Brijendra Singh recording their unqualified acceptance the Report. The Member Secretary, Shri A.G. Oka, has objected to the amendments made by the Chairman to his initial draft, reference para 7 of this preface, and as stated in his comments reproduced in Appendix II, that with these changes he is

unable to accept co-authorship of this Report. No comments from other members have been received. Since it was not possible to secure the desired extension of the term for the Committee to submit its report as the three members have proposed, nor would this have achieved their purpose without Government first reframing the Committee's terms of reference, the Report has been presented and structured in accordance with what was deemed to be Government's wishes and the national interest.

4. The terms of reference of the Committee placed upon it the responsibility of finding solutions to problems of extreme complexity and magnitude which made it ipso facto impossible for the Committee to complete its task within the four months period stipulated in Notification dated April 6, 1989. While the setting up of the Committee was still under active discussion, the Chairman pointed out to Government in writing how impossible it was to do full justice to its proposed responsibilities in four months and requested that six months should be allowed. It was informally agreed by the Ministry of Environment and Forests that while the extended period would not be stipulated in the formal Government Notification constituting the Committee, an extension of time would be granted later if the Committee so desired.

5. At the time the Committee was being constituted, Government also gave the assurance that the minimum support to the Committee required as set out in a D.O. letter from the Chairman, would be forthcoming. This regrettably was made available only in very limited measure, and that too only in late June, 1989, which enabled it only then to start its work in earnest. The drafting of the Report was completed on February 14, 1990.

6. The Committee wishes to express its gratitude to many for whose contributions, both orally and in writing, it is greatly indebted to, in particular the following:

Dr. Rajni Kothari, whose knowledge, insights and erudition has contributed so valuably to the Introduction to the Report. Dr. Sathis Nair, whose understanding of the ecological processes and the effect of human, particularly tribal interaction with their environment is so remarkable. Dr. Mehr Homji, who is considered the country's foremost authority on the effects of vegetation on climate. Dr. Madhav Gadgil, Dr. R.V. Singh, Shri Prabir Guhathakurta, Shri M.S. Chowdhary, Dr. P. Nag, Dr. Chinamani, Shri H.S. Panwar. The Committee is equally indebted to those many others who have not been named personally.

7. To its Member Secretary, Shri A.G. Oka, the Inspector General of Forests and his staff, who prepared the initial draft of this Report, the Committee owes a special debt of gratitude, and particularly to Shri C.S. Joshi, Deputy Inspector General of Forests, who assisted him and the Chairman, and whose personal contributions particularly by providing factual information and data for the Report and his interpretations thereof were of such value. Regrettably, the Member Secretary has found himself unable to accept the changes made to his draft by the Chairman and in any case there was no time for these to be reconsidered

since Government insisted that the report should be submitted without further delay. The Member Secretary's views are reproduced in Appendix II.

8. The Chairman of the Committee, Shri Duleep Matthai, wishes to place on record his deep sense of appreciation to those who worked closely with him through most of the tenure of the Committee and without whose support it would have been impossible to complete the Report in the time it has taken. These were the two full-time "Consultants", Shri Ashok Kumar and Km. Neelam Singh. Also Shri S.P. Jain for his valuable secretarial assistance. Shri Ashok Kumar and Km. Neelam Singh gave unstintingly of their time and energies, working well past normal working hours and over many successive weekends. But for their zeal and commitment the submission of the Report would not only have been delayed further but the Report would not have spanned the range of concerns relevant to the vital ecological role of forests that has been possible.

9. These acknowledgements would be incomplete without an expression of gratitude to Shri T.N. Seshan, former Secretary of the Ministry of Environment and Forests, and now Member, Planning Commission, who during his tenure in the Ministry was responsible for the framing of the National Forest Policy, 1988, which to all intents and purposes, for the first time in the history of forestry in the country, gave unequivocal primacy of place to the all-important ecological role of forests. A lesser mortal lacking his clear grasp of the vital ecological role of forests, his determination and tenacity of purpose would not have succeeded in successfully meeting the considerable and deeply entrenched opposition to the changes so essential at this critical juncture to the traditional role of forests and therefore to the country's National Forest Policy. Though the changes have not gone far enough, those that have been made represent a most enlightened and far sighted approach to forest policy and one that has lent great support to the radical recommendations made in this Report, which in the final analysis is the only basis on which ecological security of the country can be ensured.

## EXECUTIVE SUMMARY

The contemporary paradigm of sustainable development continues to be founded in conventional economic theories rather than in ethical imperatives rooted in the respect for nature and all its creations; equally, in compassion for the weakest sections of human societies, an extension of which is the concern for non-human forms of life that co-habit the planet and that are so crucial to human existence. A reorientation of development concepts and modes should be rooted in such a vision. The gross extravagance of Western and Japanese promoted unbridled consumerism, which is essentially over-exploitative of natural resources, is accelerating the already serious depletion of the natural resources of the "Third World". This will inevitably lead to early bio-degradation of catastrophic proportions. Contemporary technological techniques and approaches do not offer solutions which are immediate or sustainable in the long run. In India in particular, the application of science and technology should be directed primarily to harnessing nature's own regenerative processes.

2. Economic theory and practice should now stress the need to increase the Gross Natural Product rather than the traditional economic Gross National Product.

3. Ecology is a much misunderstood term, and is often misinterpreted and misapplied. This Report endeavours to explain what is the appropriate interpretation of this term.

4. International aid has regrettably been concerned so far primarily with the exploitation of natural resources than with securing and stabilising eco-systems.

5. The emerging concern world-wide is the havoc that man is wrecking upon the earth itself, which is rapidly becoming inhospitable due to attempts at large-scale manipulation of ecosystems to make these more "productive", and doing so in ways that are destructive of natural processes and are over-exploitative. The chief results are deforestation, pollution of air, water and land by toxic wastes, global warming and depletion of the ozone layer. Western consumerism now emulated by the "Third World" is excerbating the looming crisis. The world population now 5.2 billion, growing at 80 million annually according to a UN estimate, will eventually peak at 14 billion. This cannot be sustained by the earth's resources. The annual net loss of top soil is estimated at 26 billion tons. Desertification is taking place at a rate of 6 million hectares per year. The extinction rate of plant and animal species is estimated at several thousand per year which will result in one-fifth of all species disappearing over the next 20 years. Changes in photo-plankton in the sea could adversly impact the world's oxygen budget. The world's forest cover is shrinking by 11 million hectares per year. It is estimated that 31 million hectares of forests in industrial countries are damaged by acid rain. Deforestation will profoundly affect global climate and rainfall and therefore food security The world's leadership has

expressed the gravest concern and asked for urgent steps, on the basis of global cooperation, to meet the crisis.

6. In India population pressure is causing equally grave environmental problems. From 685 million in 1981, the population will cross a billion by the turn of the century. The strain is visible in all the life support systems. Land degradation has affected 175 million hectares of India's total geographic area of 329 million hectares. Top soil lost annually has been estimated at 6 billion tons. The Thar desert is advancing. Pollution of rivers and lakes has reached alarming proportions. Ground water tables are receding. About 40 million hectares are affected by floods which alternate with droughts over large areas of the country and the shortage of drinking water has reached crisis proportions. Unless checked, the combination of these factors will affect agricultural productivity, enhance poverty and escalate social tensions. Forests, which could mitigate the effects of this ecological degradation are today being lost at an officially estimated rate of 47,500 hectares annually though this figure is suspected to be much greater. Far greater concerted action to control the rising population is critical.

7. A current international study in the major tropical forest area of the world, the Amazon basin, already demonstrates distinct links between deforestation and decreased precipitation, increased albedo (reflected sunlight), rise in ground temperatures and the clear possibility that the vegetative cover, once destroyed over large areas cannot be regenerated. This in turn affects the ability of forests to moderate climate, protect soils and prevent soil erosion, reduce severity of floods, recharge underground aquifers, maintain oxygen - carbon dioxide balance, add top soil and nutrients, protect bio-diversity and gene-pools etc. and generally act as "the foster mother of agriculture".

8. In India forest lands continue to be diverted to agriculture, river valley projects, industries, townships and roads. Encroachment on forest land and its repeated regularisation, often under political pressure, has been a serious cause of diversion of forest land. The forest cover is, therefore, under severe and growing strain. Grazing, fuelwood, commercial and household use of timber continues unabated to deplete forests. Natural regeneration on which forestry has hitherto, and will continue to depend, is absent in 53 per cent of the forests. The very survival of true forests is now in serious jeopardy.

9. Contradictory and inconsistent forest policies in the past have confused the crucial role of the forests - of protecting the environment, specifically in the all important hydrogeographic systems of the country, with what is termed "production forestry". Regrettably, such contradictions in policy continue in the National Forest Policy, 1988, and should be rectified.

10. The total geographic area of the country is 328.7 million hectares of which 185.2 million hectares are mountains, hills and

plateaus. Some two-thirds of these regions are crucial hydrogeographic systems the maximum areas of which should be under optimum natural forest cover, as distinct from merely tree plantations, to provide the foundation for national ecological security. Thus 123.4 million hectares should optimally be under natural forest cover. But even based upon the 1988 National Forest Policy criteria of putting one-third of country's geographic area under forest cover, the area of such cover should be 110 million hectares as against the officially recorded forest area of 75.18 million hectares. Forests actually exist however on only 64.01 million hectares. Of this, dense forests which have a crown density of 40 per cent and over is only 37.84 million hectares, which is merely 11.51 per cent of the geographic area of the country.

11. The rapid undermining of the country's ecological balance must be checked without delay if long term socio-economic progress is to be ensured. This is possible only if the hydrological regimes in the main geographic realms of the country are restored to near optimum levels, which in turn depends on the rapid restoration of natural forest cover over all the important hydrogeographic systems of the country through promoting accelerated ecological succession and the restoration of ecological climax forests over these areas to the maximum extent possible. Eventually the entire two-thirds or more of the critical hydrogeographic areas should be placed under natural forests and designated "NATIONAL FORESTS", the management of which should be under the direction of the Central Government but conducted by the State Governments. Extraction should be rapidly phased out from these forests. The NATIONAL FORESTS besides including all existing forests in the sensitive and fragile hydrogeographic regions should include all areas of rich bio-diversity to which hitherto unidentified areas of this nature should be added, totalling 35 to 40 million hectares. Alternative sources of fuelwood, fodder and timber and other forms of sustenance derived from forests will have to be provided to persons who are dependent upon produce from the proposed National Forests areas and who would be affected by the phasing out of extraction from such forests

12. The Ministry of Environment and Forests was set up as a scientific, and not an economic, ministry to act as the Government and the public conscience keeper, watchdog and custodian of the country's environment. Forests were transferred to it from the Ministry of Agriculture in recognition of the crucial ecological role these perform. It was intended that forests would not be exploited for short-term economic and domestic needs. To have saddled the Ministry of Environment and Forests with the economic responsibilities for fuelwood, fodder and timber production, such as the Pitroda Technology Mission has ill-advisedly succeeded in doing under a National Mission for Wastelands Development, will undoubtedly undermine and detract it from its primary role. Being agricultural crops, production of fuel, fodder and timber should be the responsibility of the Ministry of Agriculture. Private farmers can raise such crops and many minor forest products more efficiently than Government on private marginal agricultural lands. The Ministry's mission above all should be ecological restoration and ensuring that the country's economic development is based strictly upon fundamental

ecological and therefore, environmental principles.

13. Forest villages should be settled on par with revenue villages, but wherever these are situated inside forests they should be relocated on the plains so that the villagers gain more ready access to civic amenities. The utmost consideration should be shown to those affected in this process.

14. The Indian Forest Service must hereafter be confined to the protection and natural regeneration of the forest cover of the hydrogeographic regions and areas of rich bio-diversity and not be involved with production activities such as so-called "Social Forestry", "Farm Forestry" and the like. Reorientation training and re-equipping is essential to enable it to fulfil this vital role. Apart from essential academic competence, aptitude and a natural disposition to work in a forest environment should be important criteria for recruitment to this Service.

15. The requirements of timber, fuelwood and fodder should be met from massive tree and fodder plantation programmes on degraded plains/lowland areas, also lowland forest areas which should be exchanged for private holdings in the hydrogeographic systems, marginal private agricultural lands, and other plains lands coming under the categories of "wastelands", degraded common and public lands. Additionally, canal banks and road and railway verges etc. should be put under the production of such crops. An area of 35 to 40 million hectares may be necessary to meet the needs of fuelwood and fodder. Another 10 million hectares of land will be required for industrial and household timber. A national land-use classification of India's geographic area should be undertaken taking these essential purposes into account.

16. Tree and fodder farming on marginal agricultural land should be the responsibility of the present Forest Development Corporations which should hereafter come under the jurisdiction of the Central and State Government Departments of Agriculture and redesignated, for instance, as "Government Agro-silviculture Corporations" to be more descriptive of these responsibilities. These Corporations would provide technical extension services to the private farmers growing these crops, also ensure sale at remunerative prices and product distribution services. The programme must provide for legislative changes where required as well as financial incentives including credit. Those Forest Service officers wishing to remain in the service of the present Forest Development Corporations (FDCs) which if assigned the responsibility for such production activities, must opt out of the Indian Forest Service for full time service with the State Agricultural Services.

17. Till these programmes become productive, steps should be taken to curb the consumption of wood and replace it by alternative materials. The Government should take the lead by stopping its purchase of wooden furniture and use for other purposes. Industry should in future obtain its raw materials

from private tree farmers through the proposed Government Agro-silvicultural Corporations. The paper industry should make much greater use of agro wastes for which the technology already exists and stop the use of raw material now derived from forests. New forest based industries should not be sanctioned till the availability of raw materials is assured from areas other than natural forests. No new saw mills should be sanctioned.

18. An apex level committee in the Ministry of Environment and Forests should be established to oversee the implementation of these recommendations and to determine the compensation to be given to the States in lieu of the loss of revenue from "National Forests".

19. The total tribal population in 1981 was 52 million and will rise to 121 million by the year 2011. It is estimated that 1.6 million identified as "primitive" tribal groups are likely to be dependent on forests. Their "tribal" existence should be protected. However as the younger generations of such groups, along with other tribal groups and the rural poor who are increasingly joining the mainstream of the market economy but live in and around forests, should be given every encouragement to move to more urban surroundings to give them access to the "development" opportunities to which they aspire. They should also be provided all facilities including residential accommodation in or near the urban centres of their choice and free or subsidized fuelwood and fodder produced by FDCs in their proposed new role.

20. Until fuelwood and fodder are available, gas and kerosene stoves, smokeless chulhas, solar cookers, as well as fossil fuels such as kerosene, LPG etc. should be supplied, initially free and later at highly subsidized prices. Such domestic fuel requirements should take precedence over the needs of Industry as should all domestic fuel requirements today. Natural gas is now being flared at the rate of 10.55 million cu.m. per day - a scandalous waste. Tribals and the rural poor should also be given preference in the allocation of lands that becomes available from a far more stringent enforcement of land reform laws.

21. It must be recognised that the tribals and the weakest sections of Society will be the first and principal beneficiaries of true ecological restoration programmes and should be given first preference in the considerable employment opportunities that this will generate. Equity and distributive justice for the greatest numbers can be ensured only through natural ecological restoration. Village panchayats should be associated with growing and distributing fuelwood and fodder and managing common property resources.

22. Jhum cultivation must be phased out (except for very limited "benchmark" representative examples) because it is no longer sustainable, and Jhumias should be settled on plains areas and rehabilitated in a carefully planned and sensitive manner.

23. India's livestock population which is 40 crores, and the manner in which it is presently sustained, is greatly in excess of the country's carrying capacity and is doing the gravest damage to the country's forests. It must be reduced to a number between 5 and 10 crores which is adequate to meet the milk and draft power requirements. This should be achieved by introducing improved breeds. Stall feeding must replace all free range grazing within the next five years.

24. The criticism of the Forests (Conservation) Act, 1980, is largely unjustified though minor amendments are necessary. The Act has helped reduce forest land diversion from 1,50,000 hectares to, it is officially claimed, 16,000 hectares per annum.

25. The important role of Minor Forest Products more appropriately called Non-Timber Forest Products should be recognised and steps taken to help tribals raise as much as possible on agricultural plains lands provided to them.

26. The Indian Forest Service should be responsible for the close monitoring of changes in the forest cover which is now so essential. The latest techniques of remote sensing etc. should be employed. A careful audit of forest inventory should be made at regular intervals considering the increasing value of forest stock, especially when charge is handed over by one officer to another. Fire fighting and communication equipment should be modernised and supplemented to increase the efficiency of protection.

27. Bio-diversity is critical to the future food security of the country and must at all costs be preserved. All possible means including Forest Seed Banks and Gene Pools etc. should be created to ensure this is safe-guarded.

28. Long-term studies should be instituted of the recession of glaciers as an indicator of climatic change as well as the extent and the effect of acid rain.

29. Adequate funds must be provided to achieve these objectives. A minimum of 5 per cent of the national budget must be devoted to the protection of the environment and forests.

30. As a preliminary to action on the ground a massive ongoing environmental awareness programme must be launched to arouse public concern at the impending environmental crisis and to accept the personal, community and national sacrifices now necessary to achieve ecological security. The message of ecological restoration must reach the remotest corners of the country.

# INTRODUCTION

The civilization of ancient Greece was nurtured within the city walls .... In India, it was in the forests that our civilization had its birth, and it took a distinct character from this origin and environment. It was surrounded by the vast life of nature, was fed and clothed by her, and had the closest and most constant intercourse with her varying aspects...

Rabindranath Tagore

This report attempts what is largely a broad over-view of its terms of reference. Because of the magnitude and complexity of the subject, the lack of detailed scientific research, and the limited time available for the presentation of the report it has not been possible to pay sufficient attention to detail and nuance. The primary purpose of the report is to provide a broad working idea of the nature and contours of the problems under examination and suggest broad based solutions, as well as highlight issues that call for more exhaustive study before detailed programmes of action can be formulated.

2. However, such study, as the Committee has been able to conduct has led it to lend support to certain general statements that have been made in public from other quarters. For example, given the deteriorating environmental situation, it is essential that current economic theory and practice in India must hereafter stress the need to increase the Gross Natural Product rather than the traditional economic Gross National Product.

3. It is of interest to recall that Mehbub-ul-Haq, a former World Bank Director of Policy and later Pakistan's Minister for Planning and Development and then the Finance Minister, whom our late Prime Minister, Mrs. Indira Gandhi, is reported to have once consulted on important economic issues, so rightly denounced the worship of "the Goddess of economic growth" and "the magic of the market place".

4. The Committee most strongly asserts that the planners and the executive agencies of Government instead of promoting, should be curbing the predatory proclivities encouraged by unbridled free enterprise and the vulgarities of consumerism of which there is now such glaring evidence in all urban, particularly metropolitan centres. This is encouraged largely by the kind of Western life styles now advertised so widely by the media. In India's tropical environment, Western standards of consumption are not required for people to be comfortable and creative, nor can the country's present circumstances sustain such standards, more so, if the constitutional objectives of the nation are to bring about equity and distributive justice for all its people.

5. On the question of International aid and support, it is the Committee's view that international philanthropy has paid

considerably more attention to date to aid that leads to the over-exploitation of natural resources than to achieving ecological security and stability that comes from restoring forest cover and preventing erosion.

6. Economic theory and practice must now take far greater cognisance than ever before of the imperatives of ecological security. Among others the corporate sector can no longer continue to pursue with the same single-minded determination their twin objectives of profitability and growth without disastrous ecological repercussions. As one wit so aptly put it - "growth for growth's sake is the ideology of the cancer cell." The time has come to cultivate an entirely new philosophy of values based upon ecological concerns. The implications and validity of the conservationist's proverb that "a stable society depending on a growth theory has a very limited life" must be recognised and accepted as the premises on which the entire process of long term planned development must rest. This can be neglected only at the gravest risk to the country and its people.

7. For the future development of the country the all pervasive emphasis on the application of science and technology must be moderated by common sense and the rational laws of nature. While science has been the source of great knowledge it has also created many doubts. It has, at least, established one certainty - that the trend of evolution is to elaborate and diversify biota. Technology invariably works to reduce this diversity. In the country's head long rush into the Hi-tech world of the 21st century let the scientists and technologists of the country not forget this basic and inalienable but largely unrecognised tenet. If the nation wishes to sustain the options open to it today and not find itself confined in the future to a dangerously straight jacketed existence, drastic decisions calling for the exercise of the strongest political will is now necessary, if the greatest possible proportion of the country's existing range of bio-diversity is to be sustained.

8. The precipitate and catastrophic loss of bio-diversity taking place today has been described by WWF so eloquently in the words "the beauty and promise of millions of years have been pitched to the edge of extinction in an evolutionary instant".

9. Since in the most important of its terms of reference the Committee is required to define the ecological role of forests in the national context and how this can be ensured, it would be appropriate to explain the term "Ecology". This is a term that continues to be widely misunderstood and is subject to increasing abuse. Its increasingly indiscriminate use has led to the same confusion as has been the misinterpretation and misnomers coined from the term "forests" and "forestry" during the last two to three decades. Terms such as Social Forestry, Agro Forestry, Community Forestry etc. are misrepresentations of what is merely the planting of tree crops and tree plantations which are related no more to true forests than any other plantation crops. The word "Ecology" is derived from the Greek words "Oec" or "Oeco" meaning house or habitation, habitat or environment, especially as a factor significantly influencing the mode of conduct of life

or the course of development. It describes the inter-relationship of organisms and their environments especially as manifested by natural cycles and rhythms. It embraces the totality or pattern of the relationship between organisms and their environment. True forests are a critical factor in the environment in which such natural cycles and rhythms can function.

10. FAO has observed that "tropical forests are the greatest achievement in ecological evolution, the largest most complex and most self-perpetuating of all eco-systems".

11. Because many of those in senior decision-making positions are so confined by their own academic, scientific or professional discipline and experience, they tend to lend credence to environmental, particularly ecological ideas that resemble more articles of faith than cannons of ecological laws.

12. Until quite recently, even as late as a decade ago, there was reluctance on the part of Central and State Governments in India and planning agencies to include the environmental dimension in their consideration of national strategies of development. Over the last decade, reluctance has given way to acceptance, and "sustainable development" has become a universal slogan but this, unfortunately, remains incomprehensible to most people. Consequently, nothing seems to have changed in terms of development policy and practice. There is no genuine acceptance by Government of an alternative perspective or initiative to development, no ethical shift that makes sustainable development a reality. "Sustainability" is adopted as rhetoric, not as an ethical principle which restructures relationship with the earth and its living creatures in the realm of knowledge and in arenas of action.

13. All too frequently experts oppose the involvement of laymen in environment work who consider the subject too highly specialised for them. As Rene Dubas and the late Barbara Ward so aptly stated "since policies concerning the human environment require both social judgement and specialised knowledge perceptive and informed laymen can often contribute as much as technical experts to their formulation. In certain cases indeed laymen may be wiser judges than experts because their overview of the complexities of human and environmental problems is not distorted by the parochialism which commonly results from technical specialisation."

14. In the absence of acceptance of an ethical imperative, what has instead happened is that environmentalism has been misdirected to a technological quick-fix, and as with all technological fixes, solutions are seen to lie once more in the hands of the manager technocrat. Economic growth, propelled by intensive technology, and fuelled by the destruction and over-exploitation of nature, used to be viewed as a major factor in environmental degradation. It has suddenly been given the central role in solving the environmental crisis. The market economy is given an even more significant role in structuring and straight-jacketing nature and society. The environmentalist

label and the sustainability slogan have become deceptive slogans used as a convenient cover to carry on business as usual based on ever-increasing exploitation. This is particularly the case with the world's privileged groups, whose privileges are tied to the status quo, and who will therefore hold to these privileges as long as they can.

15. A major means of this cooptation of possibly the most crucial demand raised by the voices of sanity and compassion has been to turn the issue of environment from the realms of ethics and politics to those of technology and management. It is important to grasp this and to reassert the primary values and norms that in the first instance stirred the human conscience to the predicament that has brought the planet to its present state.

16. Without such a grasp, sustainability is an empty term, because the current model of development is intrinsically destructive of nature's wealth and hence is essentially non-sustainable. And it is ecologically destructive because it is ethically vacuous, not impelled by basic values, and not anchored in concepts of rights and responsibilities. Thinking and acting ecologically is basically a matter of understanding nature's ethics, of respecting and supporting natural productive systems and recognising that these above all else can alone ensure the fulfilment of the rights of other beings, both human and non-human. It is these two opposing meanings of "sustainability" within two paradigms of development of which it is necessary to take cognizance. There is need to differentiate between sustainability as a narrow economistic ideal and sustainability as an ethical ideal, between sustainability of privileges and sustainability of life on earth. The conflict is all too often posed as between "environment" and "development". It would be more correct to pose it as a conflict between two meanings of sustainability, because sustainability has become the economists' and the planners' catchword, apart from many others, even while it means entirely different things to different people.

17. It is necessary to face this issue squarely if the case for a sustainable human environment is to be won and if its concerns are to genuinely inform thinking and initiate action in various parts of the world and not stop at rhetoric alone. It seems that the reasons for this divide between rhetoric and real commitment is to be found in the very manner in which important issues are posed in international fora. These get posed in a framework of misconceived and ill-informed discourse that lies at the root of the overall malaise in which the dialogue on development itself takes place, and this in turn is part of the manner in which all knowledge is generated and is dissemenated in the modern world, namely, in fragments and highly specialised capsules. Modern science, modern technology and modern communications are all subject to this fragmented approach to the human predicament.

18. Not until this view of development as a linear aggregation of a series of specialized inputs gives way to a comprehensive and holistic perspective will the case for the environment be fully established. Not until national agencies cease to operate in isolated and water-tight compartments will the environmental

concern be seen for its real worth - not as one more variable, or dimension, or even perspective, but rather as providing a new comprehension of the human condition entailing an alternative paradigm of scientific endeavour and an alternative design for development. The point at issue is not merely one of convincing policy makers of the need to build the environmental concern into development policies. They have all intellectually accepted that need; they had to; so unassailable was the basic premises. It is not even a question of perceiving the intimate interrelationship between environment and development. Even that has, by and large, been accepted (except in some diehard fortes of scientism according to which trees and forests can be replaced by electricity and computers with immense advantage and no loss). But the environmental challenge is far more fundamental.

19. At one level it involves nothing short of a new concept of development based on a clear admission of the faulty and inappropriate, wasteful and irrational, inequitous and exploitative, and in the final analysis, highly dangerous and possibly suicidal nature of the present model of development and the need to replace it by one that accedes and reinforces the realities of human existence. Furthermore, the conceptions of progress and human well-being and the definition of human needs underlying the present concepts of development, the role assigned to science and technology in it, and the relationship between knowledge and human arrangements assumed in it are all flawed and need to be redesigned.

20. But there is another and in some ways more basic level of consideration on involving a deeper terrain of both philosophical insight and ethical sensitivity. If there is to be an ethical imperative for the environment as there must, there needs to be a sense of sanctity about it which cannot be reduced to any functional payoffs of costs and benefits. Concern for nature and the environment must emanate from a basic sense of the sacred, and in the human time-scale almost immutable, of a system of meaning that is not transient but transcendental, of continuous wonder at the blessings that are still bestowed on us, of seeking after the mysteries of the cosmic order which, unrecognised by most of us, sustain our daily lives. And against all that, a corresponding modesty of the self and its claims on that order. Respect for life - for all life, animate and inanimate as it once was with our forebears, must once again be a fundamentally recognised and accepted spiritual notion that actuates all our endeavours and is embedded in an identity that is based not just on benign rationality of "rights" of humans and all other living forms but on faith in the inalienable nature of all "rights". The basic sanctions behind them are not contractual but transcendental - they are not primarily claims bestowed by law but are inherent in the very nature of life's sanctity and essence, its deeper aesthetics and organicity.

21. If there be continuing lags in fulfilling the environmental perspective and the imperatives this imposes, it is at least partly because of the vision that informs it is not that compelling. The case for the environment is still argued out within the confines of both scientism and economism still arguing that development projects of certain types involve more "costs"

than "benefits". For the majority, it is still a matter of statistics - percentage of forest cover, levels of salinity in the soil, extent of effluents. They are still identifying and elaborating the symptoms, not the essences or the disease. The large and growing cross-section of those concerned with the environment are themselves victims of this limited perspective because they lack the broader vision and insights that comes from maturity and age-old cultural traditions that bring with it the deeper understanding, and sensitivities to the ways of nature. Their theoretical and research grounding being in one of the sciences or social sciences, makes them more dismayed and shocked at the prevailing state of affairs rather than filling in them a deeper sense of tragedy of the human condition that emerged following the European "enlightenment" and transformation from a quest to the conquest of "nature". In the rupture between the sacred and the secular that the Cartesian logic has imposed on us, the issue of environment is seen as belonging to the secular domain, given its basically economic rationality rather than in a tradition of humanism that is rooted in a worldview that transcends the rational scientific paradigm. Hence the preoccupation with costs, damages, hazards, contaminations, with pollution of the air than of the airs.

22. Given all this, it is not surprising that the "system" finds it easy to accept the environmental critique of development, accomodate its claims, "make amends", and of course, through pious declarations and doublespeak, coopts professionals committed to the environment by reducing them to a "lobby". Hence the mushroom growth of committees, cells, departments and even ministries of environment within governments otherwise engaged in rapacious exploitation and loot of nature's resources and ravagement of delicate balances. Many an "environmentalist" is employed in these agencies. Some of them are accused of being sellouts by those who chose to stay out and "keep struggling". The point vis-a-vis the latter is that so long as the grounds on which they pursue their struggles are merely socio-economic and thus at base functionalist, the differences that divide them are not that basic. In short, unless environmentalism is rooted in a fundamental departure from the ruling doctrine of development from the presumed "excesses" of which its present rationale has emerged, it will not be able to acquire an ethical edge and will continue to be a lobby within the larger system, at certain times fairly successful in making its demands accepted, perhaps on occasions when environmental degradation retaliates too close to home for the comfort of "developmentalists", at other times gaining some mileage through stalling or watering down the scale of damage, at still other times getting deflected by subtle subterfuges.

23. As all this has become possible, the basic cause with which the movement had begun has entered a period of stalemate and stagnation; success has proved heady and the system has always known how to deal with successful adversaries than with persisting questioning and fundamental dissent. Increasingly, the establishment has both learnt to hijack the vocabulary of environmentalists and in turn made development - including a high growth rate - seem essential for the preservation of the environment. We are fast moving into a kind of stalemate in which while in rhetoric there is still a lot of criticism and

continued protest, in reality the environmental constituency has been losing its elan and its transformative potential. To some extent, of course, this is because those at the helm of the so-called "movement" lack the personal qualities and exemplary ethical drive of a historic figure like Gandhiji who not only had a truly alternative vision but was clear-headed on what struggles such a vision enjoined. But in the view of many the bigger reason is the one that has already been stated: the vision itself is too limited and too hemmed in by the dominant worldview of modern science - on environment, on development, on the true springs of sustainability and survival.

24. Sustainability cannot be real if the future itself is colonised. Sustainability therefore cannot be realized by those who have only learnt how to act in the short term - to short term "solutions" to problems as they arise, through a view of short term political power and its purpose, or even for short term gains of "movements" of environmentalists and other activists. For real lessons in sustainability we need to turn to peoples and cultures that have been cast in the mould of their natural environment and acted on the basis of the impact of their actions on future generations. Women, particularly third world women, who produce sustenance for their children are in intimate touch with the future through their nurturance. It is little wonder that ecology movements like Chipko in India spring from these cultural pockets which have conserved the qualities of caring. Caring for the "last man" as Gandhiji asked his countrymen to do. The American Indians, who too have a special commitment to the future, as part of understanding the natural law, or nature's ways, have conceptualised it in an even more telling way: to use and protect nature's creation "so that seven generations from this day our children will enjoy the same things that we have now."

25. Man, in particular Western technological man, has accumulated wealth by denying the rights of others to share in nature's bounty. These "others" include marginal communities (tribals and small peasants), future generations, and other species. Inequality, non-sustainability and ecological instability all arise from the selfish and arrogant stand that nature's gifts are for private exploitation, not for sharing. In contrast to this rapaciousness, diverse ancient cultures of the world have based their relationship with nature on the assumption that man is a member of the earth family, and must respect the rights of other members of the family. In India, human beings have been located in the cosmic family - Vasudhaivakutumbakam. The rights of trees and plants, of rivers, of mountains, have created the ethical constraints on human use of the environment. Prudence was the outcome of respecting the rights of other living beings. Hunters and gatherers have always apologised to nature before killing plants and animals. Women peasants offer leaves to the tree goddess "Patradevi", before collecting fodder from the forest.

26. There is a vast area of research and development that lies ahead in this field. But it will need to be based on a different philosophy than the one that usually informs the modern R & D establishments. The scientist and the administrator will need to

assume a degree of innate modesty in the role he assumes as a participant in a total system of relationships. As was stressed earlier, one of the basic postulates of the only appropriate model and philosophy of development is to treat life as a whole and not in fragments. This calls for a perspective on science that is oriental rather than occidental, feminist rather than macho, rural rather than urban, drawing on the accumulated wisdom of centuries of ancestors (each succeeding century and generation refining the inherited pool) rather than turning one's back on all that is "past" and "traditional".

27. All these shifts to an alternative and sustainable development are primarily ethical shifts. They are not a new technological fix, nor a matter of new financial investment. They are a shift in values, such that nature is valued in herself, and for her life support functions, not merely for how she can be converted into "resources", "raw materials" and commodities to feed the engine of economic growth. The respect for nature's diversity, and the responsibility to conserve that diversity, becomes the basis of sustainable development. And out of this ethics of respect for nature flows a respect for ultures. If nature is to be conserved in all her diversity, the cultures, which must necessarily include the cultures of the non-human species - that preserve themselves through the maintenance of that diversity, are naturally preserved. Respect for the rights of nature and other cultures becomes the basis not just of sustainability, but also of justice and equity, because it conserves a diversity of livelihoods and the means of sustaining these livelihoods. The ecological crisis is in large part a process of having laid large parts of nature waste - through pollution, or erosion of vital resources like soil, water and genetic resources, or forms of colonization by humans that have made so many vital life forms endangered or rendered them extinct. The dispensability of nature and of a large variety of non-human form of life has gone hand in hand with the dispensability of a large portion of the human race.

28. The scenario laid out above is acutely evident in India. It is increasingly apparent that the poor are increasingly being pushed to the brink of survival. We know that the landed interests are exploiting the landless and if the latter dare to oppose, visiting them with oppression and atrocities. We know that the urban rich are getting richer by encroaching upon the rural hinterlands and the wilderness beyond and appropriating both land and other means of livelihood of the poor and the voiceless. We know that the forests are being cut wantonly by contractors on a scale hitherto unknown. We know that there is growing greed and hunger for agricultural land and that lakhs of villagers and tribals are being deprived of their land, displaced and forced to migrate out of their original habitats. We know all this but we hesitate to act in the certain knowledge that the governments (national and state) that we have elected to power are deliberately doing all this. We tend instead to place much of the blame on the traditional "vested interests" - the zamindar, the money lender, the capitalist class, the "foreign hand" but much too little on the politician. It does not occur to us that there is a close and growing tie between them and the governments we have elected.

28. The matter is complicated by the fact that governments all over the world are becoming extremely complex in their functioning, their inner workings are not widely known to the public and they are increasingly found to advance the plea of "public interest" to keep the public uninformed or even misinformed. There is an increasing resort to official secrets, more and more documents are marked "confidential" and "secret" and even Parliament is told bluntly that it is not in public interest to provide information. Under the circumstances it is difficult to know who is "pulling strings". Speculation and rumours are rife but there is no real knowledge of what is going on.

30. More subtle than this is the opposite tendency, namely of information over-flow through the media, of a series of policy pronouncements, attractive declarations of principle and bold commitments by the Prime Minister and other senior leaders, usually in the form of slogans and metaphors that have a highly populist ring. Big business is denounced, poverty alleviation is accorded the highest priority and large schemes for providing basic needs to the people are launched. Big publicity campaigns are mounted that attempt to project the belief that the environment is being protected, the rivers are being cleaned up and the worst of all fallacies that the forests replanted on a massive scale, bringing a so-called "management focus" to bear and utilising the latest technology for all this and imploring the people to cooperate in these new ventures and recover lost ground. And as the traditional government departments and the bureaucracy are held responsible for people's deprivations and degradation of resources, more autonomous agencies and corporations are entrusted with these tasks and voluntary bodies and "people's organizations" are sought to be involved.

31. It is precisely in this "fresh" and "innovative" approach that has also adopted the jargon of the anti-establishment critics of the Indian State where lies the catch, the deceit, the doublespeak. A corporate rather than a bureaucratic structure makes it possible to create entities that are not accountable to the usual machinery of constitutional government and the Parliament. The overture to voluntary agencies and people's organizations, with offers of largesse, make it possible to coopt sources of dissent and make pretence of public involvement. And the claim of greater professionalism and management forms is really an eyewash because all that has in fact been done is to replace those with the commitment and ability to make selfless contributions to the long-term prosperity and stability of the country not by just those whose vision is circumscribed by a homo-centric perspective of prosperity, but men and women with the vision and insights into the functioning of natural systems and the capacity to conceive and direct forms of development that lead truly to equity and distributive justice for all forms of life on earth. Instead these grave responsibilities are being increasingly hijacked by, or gormlessly assigned to uncaring career bureaucrats, opportunistic and unprofessional "professional managers", glib ad men, plausible foreign foundation and international agency hands loyal to alien value systems and cultures, and well meaning but rootless NRIs incapable of the nationalistic passion so crucial to the

effective execution of such responsibilities. Together, their forays into the governing structure have undermined accountability to elected representatives and enabled industrial houses and the multinationals, hitherto suspect in India, to find direct entry, usurp resources and undermine a once more stable and less corrosive system.

32. Perhaps the most diabolical attempt in this direction has been to ascribe the worst possible motives and denigrate as anti-people those frail cries in the wilderness protesting the growing ravagement of nature despite its all pervading beneficience, and their desperate appeals for ecological sanity and restitution, claiming as they do that this is the only path to economic salvation, particularly for the poorest in this country. And further, that ecological security lies in restoring the natural vegetative cover to the large tracts of mountains, hills and plateaus that have suffered the greatest degradation from the ravagements of the affluent, aggravated by the desperate struggle for survival of those whose existence has hitherto depended upon the fecundity of natural eco-systems who have been forced to the remote fastnesses they now occupy by the economically powerful and better organised. The impoverished can no longer be left to suffer the ignominies increasingly inflicted on them by the predatory proclivities of an unjust society. An awakened public conscience and a genuine national desire to establish a new and truly egalitarian social order must now be manifest to protect the underprivilaged from total destitution to which they will otherwise be reduced. It is postulated that this will only be possible by restoring ecological productivity through supporting and strengthening natural regenerative processes. By doing so far greater equality and distributive justice can be ensured than through any other approach based upon contemporary principles and modes of economic development, including the application of virtually all known modern scientific and technological knowledge and skills. In its concepts of material progress and developement mankind is conditioned by aspirations, mental processes and systems of functioning (Management Systems) rooted so deeply and inexorably in its primordial struggle for survival through the subjugation of nature that it seems conditioned irrevocably to applying its patchwork knowledge of science and technology to the increasing efficient destruction of natural phenomena and processes.

33. In its early history and until comparatively recent times, humanity's capacity in this respect limited it to micro-level changes from which nature could quickly recover. But as scientific power and capabilities increased, the mega-distortions and destruction of natural processes humanity has brought about is resulting in undermining the very matrix of the systems of nature on which all life on earth depends.

34. What is needed today is to recognise and accept the ecological validity and soundness of what may be described as "Bio-dynamic Forestry" - a non-manipulative form of forestry based primarily on natural regeneration, by recognising the all-pervading beneficience of nature and the need to strengthen nature's own dynamics instead of the contrived and increasingly unnatural approach advocated by Western science and technology.

Nature must be given the freedom to function unfettered by the arrogance of Western science and technology with all the dangers that arise from its fragmented knowledge of a holistic system. Western science and technology, which India now so frighteningly apes, views nature as unproductive and uneconomic without human intervention, indeed perverse, and to a surprising number of those of this fraternity and their cohorts, as inanimate! Only a fundamental change in this adherence to an alien advocacy can lead to ecological sanity and forestall the devastation of nature's retributions at a time when its beneficience is so desperately required.

# CHAPTER I : ENVIRONMENTAL DEGRADATION

## 1. THE GLOBAL SCENE.

### 1.1 THE GROWING CONCERN.

1.1.1 In the last few years, as the main contestants vying for global supremacy have come close to a detente, the threat of a nuclear holocaust has receded. This could well pave the way to global peace. However, there exists another major threat to human survival. This is the prospect of an environmental catastrophe, transcending national boundaries and affecting mankind in ways as devastating as a nuclear war. The fact that the global community is increasingly becoming aware of the possibility of environmental collapse, is apparent from the anxiety expressed by a growing section of the world community and international leaders. The Soviet President, Mr. Mikhail Gorbachov, in his address to the United Nations in December, 1988, compared environmental degradation with nuclear holocaust.

1.1.2 In his meeting with the Japanese Premier, Mr. Noboru Takeshita, in February, 1989, the U.S. President, Mr. George Bush, expressed concern at the possibility of Japanese involvement in a project linking Amazon to a Peruvian Highway. Implementation of this project would have facilitated lumberers trucking their timber directly to Pacific ports to meet the tropical hardwood requirements of the Japanese furniture makers. Ecologically, however, it would have had the most serious repercussions - the catastrophe of exposing the rain forests of the western Amazon to devastation. Though the Japanese Prime Minister firmly denied involvement and assured him that Japan would not fund this road, the incident is significant as it was the first time that the United States considered an ecological issue important enough to justify opposition to one of its close allies. What would, perhaps, have been considered unworthy of a U.S. president's attention a few years ago became a subject of serious concern. This is not an isolated instance but represents an expression of increasing global anxiety.

1.1.3 Until the mid-1980s, the British Prime Minister, Mrs. Margaret Thatcher, showed no concern for environmental problems, sharply criticising environmental activists as "the enemy within". In March, 1989, however, she went so far as to convene an international meeting on depletion of the atmospheric ozone layer. Also in March, 1989, the Prime Ministers of Norway, France and the Netherlands chaired a conference that proposed the creation of an international authority with the power to draft and enforce environmental regulations around the world. At an Economic Summit in Paris of the leaders of the seven largest industrial democracies, one-third of the final communique contained an appeal for decisive action to understand and protect the earth's ecological balance. A month earlier, the Organisation for Economic Cooperation

and Development (OECD), representing the major economic powers, had called upon all relevant national, regional and international organisations of its 24 member nations to look at balancing long-term environmental costs and benefits against short-term economic growth.

1.1.4 Environmental concerns are not limited to the First World. A treaty signed in Basel, Switzerland, in March, 1989, limits dumping of industrial waste by the richer countries in the poorer countries. At the Belgrade Non-aligned Conference in September, 1989, more than a hundred non-aligned countries called for a productive dialogue with the developed world on environmental protection. Soon after this, at an international environment conference held in Tokyo, Japan's new Prime Minister, Mr. Toshiki Kaifu, as if heeding that appeal, affirmed a pledge that his country would offer $2.25 billion to tackle pollution in the Third World.

1.1.5 In his New Year message of 1990, the Pope dealt exclusively with the global environmental crisis and asked all the nations and faiths to appreciate and tackle the gravity of the crisis. As if in response to the view that uncontrolled exploitation of natural resources springs from the Judeo-Christian concept of mankind being given divine dispensation of domain over all nature's creations to use them for his own benefit, the Pope suggested that Adam and Eve, made in the likeness of God, destroyed the existing harmony by deliberately going against the Creator's plan. This resulted not only in man's alienation from himself, in death and fratricide, but also in the earth's "rebellion" against him.

1.1.6 The Green Party of West Germany is now a political force of significant consequence. Elsewhere in Europe, "Green" politicians find increasing support from the electorate. Youth in Great Britain and the United States recently picketed a well-known chain of fast food restaurants, accusing it of deforestation in South America.

1.1.7 With global attention being increasingly focused on the potential fall-outs of an ecological disaster which would devastate the rich and the poor alike, environmental issues have now become a major factor in international relations and policy-making. Concern for ecology is no longer confined to conferences and intellectual debates. This new sense of urgency and awareness, that environmental protection is a common cause, is leading to unprecedented cooperation in this area.

1.1.8 Ecological degradation in any country impinges, directly or indirectly, on the quality of life in other countries. For years, acid rain has been a serious irritant in the relations between the United States and Canada. Drought in Ethiopia and Sudan and deforestation in Haiti have resulted in waves of refugees, whose miseries and

migrations generate considerable tensions both within and between nations. Conflicts over water rights are common. The teeming megacities of the Third World can erupt with major civil unrest in the near future. Sheer numbers overwhelm social services and natural resources. The Government of Maldives is pleading with the industrialised nations to curtail those activities which produce excessive "greenhouse" gases, fearing the polar ice caps may melt and submerge this island nation.

1.1.9 Economic progress brings with it "benefits" that portend environmental peril and have the potential for causing international discord and possible conflict. Some experts estimate that today the developing world produces one-fourth of all greenhouse gas emissions, and that this could increase to nearly two-thirds by the middle of the next century. Many Third World countries have expressed reluctance to slow their economic growth to compensate for environmental depradation caused by the industrialised world. Some developing countries may oppose environmental action because they see in it the opportunity to improve their bargaining position with donors and international banks. Ecological conflicts between the industrialised North and the developing South may, unless handled with care, pose a serious challenge to world peacemakers comparable to the now subsiding Cold War. Efforts are now being made to seek unanimous support to limit the production of gases that contribute to "the greenhouse effect". The most formidable obstacles to corrective action are the vested economic and political interests of the world's most advanced nations, as well as those of the Third World who find the pain of adjustment the greatest.

1.1.10 The United States and the Soviet Union have raised the issue of ecological protection and conservation to the highest levels of bilateral discussion. Domestic pressures in both countries play a major role in raising the seriousness accorded to environmental issues and the primacy they have been given in international political fora. In response to steady U.S. Congressional pressure, the Treasury Department has adopted guidelines that require U.S. officials assigned to multilateral development banks to oppose funding of projects that would destroy tropical ecosystems.

1.1.11 At the 9th Non-aligned Summit at Belgrade on September 5, 1989, India expressed the view that much of the blame for the depletion of the ozone layer for global warming, for the dumping of hazardous wastes, and for deforestation, lies at the door of the industrialised countries. Their extravagant and wholly unjustified levels of consumption and production are not only seriously eroding the natural resources of the Third World, but have also led to an alarming emission of pollutants into the atmosphere. "The main responsibility and burden for combating pollution and environmental degradation must necessarily be theirs. The Pollutor Pays Principle must apply".

While there is a tacit acknowledgement of these facts by the industrialised countries and a reluctant owning of their responsibilities, India recognised that "sustainable development begins at home and that the costs of conservation, which if not paid now, will be exacted in far greater measure from the development process later or elsewhere. The environment is not, and should not be made, yet another issue of North-South contention".

1.1.12 Since the affluent nations rightly express such concern about the destruction of the rain forests and the extinction of species in the Third World, they must use much more of their own natural resources and do so more judiciously. More importantly, they must curb their demands on the Third World for products which are now leading to the major depletion of the Third World natural resources, both living and finite, including the destruction of forests and wildlife. It is seldom appreciated that the term "wildlife" covers all undomesticated forms of flora and fauna, comprising well over 95 per cent of all life forms that exist today, all of which are critical to the future quality of life for humankind. Only through the protection of the rapidly shrinking remaining natural forests and maintaining what is left in pristine condition, as well as adding to these areas substantially, will this be possible. This must be a major and immediate concern of the international community to prevent further exploitation by political, industrial and commercial vested interests, who must find alternative sources of energy and exercise far greater degree of regulation and control over the exploitation of natural resources besides ensuring much more frugal and efficient use of such resources.

## 1.2 POPULATION PRESSURES AND ITS CONSEQUENCES.

1.2.1 The world population, which was about 2.5 billion in 1950 with an annual growth rate of 40 million, is now 5.2 billion and the annual growth rate has increased to 80 million. Thus, during the last four decades not only has the total population doubled but the annual growth rate has also doubled. It is estimated that by the end of this century, the world population will increase by over 90 million each year. According to the United Nations forecasts, the population will increase to 6.25 billion by the year 2000 and to about 8.5 billion by the year 2025.

1.2.2 This unprecedented addition to the population has strained the relationship between people and the natural life-support systems, putting the latter under growing, indeed intolerable, stress and in ways which are still poorly understood. When annual population increments are coupled with the accentuated stress on local life-support systems, shortage of food, fodder and fuel emerge almost overnight. The growing number of poor people in the developing countries are forced to make an onslaught on

their environment, in the process depleting precious resources which could otherwise have sustained them and their families in the future. In the rural areas of developing countries, women provide the labour for collection of water and fuelwood and for much of agricultural operations. Their cumulative activities have profound effects on the world's water supply, tree cover and agricultural land. It is they who bear the first brunt of ecological degradation: walking ever-lengthening distances for a pot of water, labouring to collect fuelwood for the family hearth or to feed a malnourished child.

1.2.3 Much of the environmental damage can be attributed to the reckless use and misuse of resources in the developed countries. If environmental degradation in the rich Western countries is due to increasingly avaricious consumerism, in the poor countries it is a battle for survival, worsened by abysmal poverty, devalued traditional knowledge and skills superimposed by new value systems, and an ever-increasing population. As we progressively attempt to minimise the level of human sufferings, the instrumentalities used to bring about progress are causing widespread and dreaded calamities. Though the entire gamut of natural calamities are not under human control, their quality, their origin and occurrence today vastly differ from the nature of such calamities a few decades ago. Today, they are mostly man-made. Both need and greed have actively played a part in fostering this negative human effort.

1.2.4 The United Nations predicts an eventual population of 14 billion. It is inconceivable that the earth can sustain this population at, or near the standard of living enjoyed, and aspired to, today by middle-income countries, such as Mexico and Malaysia, let alone that of the rich West. Simply to provide food, water and fuelwood for almost three times as many people as are alive today will cause adverse changes of insurmountable dimensions. More land will be brought under the plough, dramatically decreasing current bio-diversity; seas will be scoured for more protein; urban sprawl and degradation will increase enormously and urban waste will create unmanageable disposal problems. The countries with the fastest economic growth will be mainly those with the least room for manoeuvre - those with the poorest lands and the most fragile soils will be rapidly overtaken by desertification. It is essential to lower the Third World birth rates to the level of Western countries. This will require strong political will and reallocation of resources to introduce and enforce family planning programmes unambiguously.

1.3 OVERALL DEGRADATION.

1.3.1 With the presumed accelerated economic growth in a greater number of countries, unknown to most people its environmental side-effects are rapidly increasing. The

resulting damage is becoming increasingly irreversible. To those who understand the evidence of changes taking place in the earth's physical condition, this is alarming. The forest cover is disappearing calamitously with the tropical forests shrinking by 11 million hectares per year; 31 million hectares of "forests" of industrial countries are now damaged, evidently by air pollution or "acid rain".

1.3.2 Over the last twenty years, more arable land was lost than reclaimed each year. The loss of top soil on cropland exceeds the new soil formation by an estimated 26 billion tons per year. Desertification is continuously increasing at an accelerating rate. Some 6 million hectares of new desert are formed annually due to land mismanagement. Vegetation is disappearing with fertile savannahs and grasslands getting transformed into dry scrubland initially, and subsequently turning into desert. Gallery forests are being cut down and lowland forests have almost completely been eliminated. Mountain rain forests are being destroyed, causing catastrophic floods in the lowlands.

1.3.3 Water resources are decreasing disastrously; ground water tables are sinking; previously perennial rivers are becoming seasonal or are drying up altogether; marshes and lakes have been drained, with no long-term benefits. Thousands of lakes in the industrial North are biologically dead and thousands more are dying due to pollution or eutrophication. Underground water tables are falling in many parts of Africa, China, India and North America, as demand for water rises above the subsoil water and aquifer recharge rates.

1.3.4 A wide range of biota, forming essential components of complex stable ecosystems, and, in many cases, important sources of food for the deprived sections of the Third World population, have vanished from many areas where they were in abundance. Today, a great many species are in danger of extinction. Extinction rate of plant and animal species together is now estimated at several thousand per year and it is now predicted reliably that at this rate one-fifth of all species may disappear over the next 20 years.

1.3.5 Toxic chemicals are continuously being released into the ecosystems in ever increasing quantities, making pest species more resistant and wiping out a large number of others, many of which are important benign species. The extent of contamination world-wide is unknown but is clearly reaching dangerous proportions in and around industrial and agricultural areas, portending dire biological consequences. Biomagnification of many of the toxic persistant chemicals is a source of health hazards to man. Many ecosystems and processes within ecosystems, particularly marine habitats, transport and concentrate toxic chemicals at sites thousands of kilometres away

from the point of application. Biological communities over extensive areas are also threatened due to the phenomenon of "acid rain" as has been observed in some parts of Europe.

## 1.4 DEGRADATION OF TERRESTRIAL, MARINE AND AQUATIC ECO-SYSTEMS.

1.4.1 Biospheric linkage entwines all living things and the non-living substance, energy and processes - collectively called the life support systems. Substances and cycles course through the land, sea and air. Processes occurring in one system inevitably impinge upon other systems with varying intensity.

1.4.2 Degradation of habitat through human intervention has been observed not only on the land but also on the seas, fresh water bodies and atmosphere, directly and indirectly. Over-exploitation and injudicious use in one system has repercussions in others. Man is solely responsible for polluting the oceans by oil spills, dumping chemical waste as well as garbage, conducting under-water nuclear tests, over-exploiting living species ranging from whales to algae to the point of extinction, dredging the sea bottom for minerals and reclaiming shallow seas.

1.4.3 Oceans, being the end point of all terrestrial fluid movement, become the receptacle of all substances reaching the hydrological cycle, ranging from silt to pesticides and organic nitrogen to heavy metals. There has been thermal pollution by coolant waters from industry and reactors. Biomagnification and selective concentration in oceanic food webs have resulted in many of these chemicals accumulating to extremely toxic levels in marine organisms. Physico-chemical changes due to human activity have resulted in oxygen depletion, eutrophication, multiplication of pathogenic bacteria etc. Changes in phytoplankton population would have serious repercussions on the world's oxygen budget as these microscopic single-celled plants contribute a substantial portion of the atmospheric oxygen through photosynthesis. Disruption of the equilibrium between atmospheric gases and dissolved concentration of these in the sea water could modify the composition of the atmosphere. The seas are buffers retaining reserves of dissolved gases, giving out or absorbing gases from the atmosphere to keep the composition of the latter steady.

1.4.4 Changes in the energy budget on land through deforestation could radically alter the behaviour of oceans as they are vast energy sinks. And global climate is nothing but the magnification of the energy flow. Increasing amount of silt that is being carried to the tropical seas is destroying corals and adversely affecting the entire oceanic food chains.

1.4.5 One inch of soil requires 200 to 1000 years to form, but 20.3 billion tons of top soil is washed away every year to the sea through streams and rivers. The disastrous consequences of erosion are increasing dramatically in both lowlands and high lands, and through sedimentation in rivers, lakes and the sea. Although detailed information on soil erosion at the local level is available for only a few countries, data on the sediment load of the world's major rivers and on the wind-borne movement of soil over the oceans do provide a broad-overview of soil erosion at the continental level. The figures on river sediment flow show the world's major rivers carrying heavy loads of soil to the oceans. Data compiled in 1980 by three Chinese scientists working for the Yellow River Conservancy Commission in Beijing indicated that the river was carrying 1.6 billion tons of soil to the ocean each year.

Sediment load of selected major rivers:

| River | Countries | Annual Sediment Load (million metric tons) |
|---|---|---|
| Yellow | China | 1,600 |
| Ganges | India | 1,455* |
| Amazon | several | 363 |
| Mississippi | United States | 300 |
| Irrawaddy | Burma | 299 |
| Kosi | India | 172 |
| Mekong | several | 170 |
| Nile | several | 111 |

* 6,000 million metric tons, according to another estimate.

Hydrologists estimate that, on an average, one-fourth of the soil lost through erosion in a river's watershed actually reaches the ocean as sediment. The other three-fourths is deposited on foot hill slopes, in reservoirs, on floodplains of the rivers, estuaries and other low-lying areas, or in the riverbed itself, often causing major shifts in the river channel and floods.

1.4.6 Similarly large-scale destruction of mangrove forests and littoral forests along the shores is disrupting nutrient pathways, particularly elements like phosphorous which limit algal productivity and disturb nutrient cycling, thereby retarding the biomass potential.

1.4.7 The coastal stretches, which form a sensitive, complex and productive interface between the sea and land, are being subjected to increasing human interference and are being destroyed in the process. Downstream processes are disrupted, as inland dams trap silt, which reached the sea and performed a number of complex physical, chemical and biological functions. Apart from other subtler chemical and biological impacts, the obvious disbalance

between accretion and erosion results in the destruction of beaches.

1.4.8 As terrestrial non-replenishable resources are exhausted and technological aggression compels man to breach the borders of inaccessibility, the seas and sea beds will become an arena for competition to be polluted, plundered and left as massive wastelands and destroyed. As global climatic and other physical circulations get more disrupted, the repercussions will be far reaching in the oceans.

1.4.9 The fresh and brackish water bodies including wetlands, lakes, lagoons, estuaries, back waters, rivers and even the subterranean water reserves are perhaps the most severely disrupted and damaged part of our biosphere. Being the most essential repository of chemical and biological processes vital for life, demands on them are in excess of availability. There has been injudicious interference with all natural processes of water purification and storage. Intervention by man in hydrological cycles on land, in particular those measures which regulate the rate of flow of water starting as a rain drop till it reaches the oceans, has been accelerated due to deforestation, soil loss and enhanced evaporative loss. Rivers are dying, silting and function increasingly merely as drains for surface run-off. Whatever water flow persists is simultaneously polluted by urban waste, industrial effluents and agro-chemical run-off. Discharge of hot water (after use as a coolant) from industries and in particular thermal power plants and nuclear power plants has disrupted temperature regimes of rivers affecting all biota. Most of the rich and varied life in the rivers are being lost.

1.4.10 There is increase in intrusion of sea water upstream, starting from their mouths, due to the curtailed downstream discharge of fresh water. Rising levels of sub-soil saline water, which seeps into land, reach the stream channels in the river valleys and affect the quality of water. Both agriculture and urbanisation have hampered ground water recharge and reduced percolation. The accelerating surface run-off is causing increasing damage downstream. As surface water resources are reduced or contaminated, further tapping of deeper ground water sources causes further contamination with every conceivable type of chemical pollutants, ranging from common salts to fluorides and persistent organo-chlorides and radio-active wastes.

1.4.11 The plight of the lakes and other fresh water bodies is even worse. These extremely productive ecosystems are sources of edible animal foods and plants; have properties for purifying the water; act as rain water reservoirs; recharge ground water and recycle nutrients. However, their potential productivity has been seriously affected.

1.4.12 The shallow tropical wetlands are either being filled in or are being reclaimed. Their rich wildlife and aquatic plant diversity has been jeopardised in a manner in which no other ecosystem has been damaged. The excessive concentration of nitrogen and the drastic reduction of dissolved oxygen, due to decomposition of organic material, has resulted in eutrophication. This has converted these once fresh water bodies into toxic cess pools with highly acidic waters and even the bottom sediments have been affected with concentrations of sulphurous lime which is poisonous for life forms.

1.4.13 Land degradation, inevitably, has had a negative impact on crop production. In the short-term this adverse impact is offset by technological innovations, higher inputs and expansion of irrigated land without regard to the long-term consequences. This, however, cannot be a lasting solution, certainly not for the developing countries, as has been amply demonstrated in the case of 14 countries where foodgrain yield fell by 3.44 per cent during a period of 32 years between 1950-52 to 1982-84.

1.4.14 About 4.5 billion hectares of land (35 per cent of the earth's surface), inhabited by one-fifth of humanity, is now threatened by desertification. Paradoxically, irrigated lands are equally threatened. About 40 million hectares of irrigated area has been damaged by salinization.

1.4.15 Human activities are now altering the hydrological cycle on global, regional and local scales in ways that have profound implications for future food production and sustainable productivity of the land. Hydrological balance hinges on how the land and its vegetation cover are managed. Scientific opinion, especially between plant physiologists and meteorologists is, at times divided about the precise role of plant canopies in the maintenance of water regime. Yet, there appears to be a consensus on the facts that:

(a) the removal of vegetation in dry regions causes rainfall to diminish because of increased albedo;

(b) plants play an important role in recharging atmospheric moisture through evaporation and transpiration;

(c) vegetation, especially over large contiguous areas, plays a crucial role in sustaining rainfall;

(d) infiltration and sub-soil moisture is considerably increased by root systems and organic matter;

(e) vegetation plays an important role in preventing soil erosion and steadying river flows;

(f) a degraded area, deprived of vegetation, feeds on itself, becoming ever more desert-like and incapable of sustaining biomass.

(g) there is a relationship between the extent of forest cover and convectional rainfall, the number of rainy days and dew formation, all three of which are important for vegetative growth.

## 1.5 DEGRADATION AND THE LOSS OF FOREST COVER AND ITS ECOLOGICAL CONSEQUENCES, INCLUDING THE LOSS OF BIO-DIVERSITY.

1.5.1 The impact of the excessive demands on forests has been the most telling. No recent change in the biosphere has been as dramatic as the denudation and fragmentation of forest cover due to human interventions. Loss of forest is almost universal, occurring both in the developing and the developed world, though the immediate causative reasons are somewhat different:

(a) The world's tropical forests are disappearing at a rate of 2 per cent per year. The rate of depletion is far more in West Africa, South Asia and South-East Asia which contain valuable moist tropical forests.

(b) Forests in the temperate zone now suffer more from growing air pollution and acid rain than from clear felling. Dead and dying forests are conspicuous in West Germany, Scandinavia, Czechoslovakia and Poland.

(c) Excessive pressure on grasslands has led to deterioration of these areas, degradation being most acute in Africa and the Middle East.

1.5.2 In addition to its serious impact on the environment, loss or degradation of forest ecosystems is threatening precious genetic resources. It is estimated that the total number of species that exist today range from 5 million to 30 million. However, only about 1.4 million species have so far been identified. Biological diversity is most conspicuous in tropical forests which cover only 7 per cent of the land surface, yet hold at least half the world's species. According to reliable estimates, there are about 2 to 5 million species in the humid tropical forests alone. Human activities have hastened the rate of extinction of species by thousands of times. It is estimated that 10,000 species now become extinct in tropical forests every year. About one per cent of the biome is being deforested each year and, additionally, more than one per cent is being significantly degraded. It will be a great pity that numerous species will become extinct due to deforestation, without ever being identified by man.

1.5.3 Forest degradation/decay is the cumulative effect of a number of socio-economic factors. Some of these are easy to decipher; for example, improvidence of rural/tribal families which resort to shifting cultivation as their means of livelihood. But some other factors are more complex and involve a number of variables such as the state of national economies and international trade, the ultimate burden being transferred to the Third World countries causing them to wipe out their forests. Irrespective of their immediate compulsions, ultimately the developing countries are also the most precariously placed from the point of view of their ecological dependence on forests as well as the rapid annihilation of forest resources.

## 1.6 GLOBAL CLIMATIC CHANGES.

1.6.1 The climate of the earth is determined, primarily, by the rate at which the earth's terrestrial surface, oceans and atmosphere absorb, redistribute and dispose of solar radiation. Basically climatic changes are governed by cyclic natural phenomena. It is now recognised that these changes are being significantly influenced by human activities. The loss of forest cover reduces the net absorption of solar radiation.

1.6.2 Of late, climatic change and global warming has been engaging the attention of the world communities. The growing "hole" in the earth's ozone layer over Antarctica suggests that a gradual depletion could be starting. There is evidence that another hole is developing over the Arctic. Triggered by short-sighted technological and industrial processes, sustained by the terrorism of current global model of development and fuelled by poverty and population growth, these changes can lead to increasing atmospheric concentration of "greenhouse" gases. Some of the findings and predictions based on global climatic models are:

(a) doubling of the pre-industrial level of carbon dioxide in the atmosphere between now and the year 2050, which will raise the global temperatures by 1.5 to 4.5 degrees Celsius;

(b) global warming could cause shifts in ocean currents;

(c) spells of extreme climates could prolong the occurrance of strong atmospheric and oceanic currents due to temperature differential;

(d) rainfall distribution could become extremely erratic;

(e) global warming may lead to a rise in sea levels by 1.4 metres to 2.2 metres by the year 2100 and consequently submerge coastal regions, resulting in permanent loss of currently most densely inhabited land;

(f) climatic changes affecting ecosystems could result in the drastic reduction of biological diversity leading to the extinction of a large number of species.

1.7 MEGA-ECOLOGICAL CHANGES.

1.7.1 It is increasingly and responsibly predicted that growing ecological problems, instead of resulting in gradual deterioration, are likely, instead, to cause a "flip-over effect," which is a sudden change, totally unforeseeable. It is argued that the ozone hole is a sudden, not a gradual, phenomenon caused by the release of more than a million tons a year of chloro-fluoro-carbon. It was unpredictable, but now it exists, and grows every year. Similarly in the case of rain forests, by destroying just a part of it, a sequence of events is precipitated which results in the total collapse of the system, perhaps irretrievably. The loss of forest itself changes rainfall and temperature patterns. These climatic changes, in turn, can lead to the death of the remaining forests.

1.7.2 Some environmental changes are likely to affect the planet at both the regional and global levels. It is predicted that global warming will affect virtually all aspects of the life support systems. The consequences of the following, in particular, are going to be more profound than what has been felt or observed so far:

(a) melting of polar ice-caps;

(b) inundation of low-lying countries and land mass;

(c) upwelling and rise in the level of seas and oceans;

(d) global warming due to the "greenhouse effect", and consequent increase in world-wide precipitation (7 to 11 per cent);

(e) higher evaporation rates, changes in circulation patterns and reduction in soil-moisture available for plant growth;

(f) regular recurrence of severe droughts;

(g) changes in weather and seasons;

(h) increase in intensity and frequency of hurricanes, cyclones and storms;

(i) changes in geographical distribution and intensity of rainfall;

(j) increase in relative humidity.

1.7.3 It is also apprehended that the above changes will affect terrestrial and aquatic life, as well as human

settlements, besides disrupting water resources, agricultural production systems, animal husbandry practices and other economic activities. The geopolitical consequences of climatic change, including the geopolitics of food, are enormous. More than 50 per cent of the world's population and much of its productive capacity are concentrated in coastal areas. These areas are under tremendous growth pressures from population, investment for urban and industrial growth, pollution, flooding and upland water diversions. According to one report, the consequences of rising sea levels in these areas will generally outweigh those of temperature increases. Most importantly, high tides and storm surges will penetrate even further inland. The effects of these direct consequences on food security include impact on fisheries and aquaculture resources, erosion of coastal land margins; loss of wetlands; damage to port facilities and water management systems (for example, drainage and irrigation systems and salt water intrusion into ground water, rivers, bays and agricultural land). Among the most serious consequences are accelerated deforestation, major loss of bio-diversity, terrestrial and atmospheric pollution, exhaustion of water resources and trade and debt problems.

## 2. THE NATIONAL SCENE.

Ecological afflictions of our country are, in many respects, much more serious than the global ones. There has been a complete breakdown of some of the ecological systems, including grasslands, semi-arid/arid lands, coastal zone and wetlands, saline/alkaline lands and mountainous regions.

### 2.1 POPULATION PRESSURES AND ITS CONSEQUENCES.

2.1.1 India has the dubious distinction of being the second most populous country of the world, with a population of over 685 million persons, according to the 1981 Census. However, it is estimated that it stood at 761 million in 1986. Of this huge population, 51.6 million people were categorised as scheduled tribes alone in 1981, constituting more than 7 per cent of the country's population. According to the International Institute of Population Sciences (IIPS), Bombay, even with a downward trend in the growth rate (from 20.1 per cent during years 1986-1991 to 15.2 per cent during years 2001-2006), the country's population is likely to exceed one billion by the year 2006.

2.1.2 The report, "Impact of Alternative Growth Trends of Population on Selected Social and Economic Sectors in India", by K. Srinivasan et al, of the IIPS, Bombay, records that if the most desirable path of the feasible replacement level, of net reproductive rate of one, is achieved by the year 2001 or 2011, or even by the year 2021, that is, maintaining the constant age specific marital fertility rates as observed in 1986, the population is likely to increase to 969.2 million in the year 2001, to 1.2 billion in 2011; and in the latter case to touch 1.25 billion by the year 2021.

2.1.3 If the population is allowed to grow at the present rate of 20.1 per cent each decade, it will cross 1.48 billion by the year 2021, causing enormous pressure on the country's resources. These population projections offer some distinct directions for remedial action to conserve our natural and domestic biomass resources so that the balance of supply and demand is maintained, especially with regard to forests, and in terms of ecological security.

2.1.4 The increasing population and depleting forest cover calls for the greatest possible care in planning a strategy to meet human needs. The population projections for scheduled tribes alone reveal that from the base of the 1981 census where the total population is estimated to be 51.6 million, it is likely to grow rapidly to 129 million by the year 2011 and may exceed 175 million by the year 2021. In other words, there will be a three-fold increase, if not more, in the present population of the country now dubiously described as tribal. This

population projection alone indicates a scenario where, unless drastic measures are taken to conserve and increase forest cover, the country will be confronted with a disastrous situation in which there will be an enormous human population on the one hand, and on the other virtually no forests to provide them the ecological foundation for socio-economic development.

2.1.5 Maintaining a national ecological balance calls for stability in both the internal and external pressures exerted on India's and its neighbours' ecosystems. The existing human population of the country and its rising levels of material aspiration is already exerting far greater pressure than can be withstood by the present carrying capacity of the ecosystems. With the continued population increase, these pressures are becoming intolerable. The immediate consequence will inevitably be a rapid and calamitous depletion of the limited existing biomass followed by increasing tensions and unrest. As the population grows this would inevitably lead to further internecine aggression among various social groups, social disorder and the breakdown of social structures with all the consequent widespread and increasingly uncontrollable law and order problems. Such circumstances would put our national unity and integrity to increasingly greater risk. A strong central authority which is able to exert the influence necessary to maintain the country's ecological balance in addition to containing such disorder is unavoidable. A realistic reappraisal of contemporary policies and practices of development, which permit unrestrained and unregulated conversion of natural resources into cash, goods and services and which cannot be equated with progress, points very clearly to such a prognosis.

## 2.2 CHANGES IN ATMOSPHERE.

2.2.1 There are indications that the atmospheric changes are now becoming evident even in our country. Around the Gangotri glacier there has been an increase in the percentage of carbon dioxide in the atmosphere which has led to a rise in the mean temperature by about 2 degrees Celsius. It is reported that the Gangotri glacier is receding by about 2 to 3 metres per year. The problem of air pollution and "acid rain" is no more confined to Europe and the northern parts of America. Instances of the adverse effects of "acid rain" on forests have been observed in some parts of the Himalayas in Nepal. Since there is a close parallel between the Himalayas in India and Nepal, it can be concluded that acidification eventually may increasingly affect the coniferous forests of India.

## 2.3 DEGRADATION OF TERRESTRIAL, MARINE AND AQUATIC ECO-SYSTEMS.

2.3.1 The physical, chemical and biological health of soils, which is an important factor in the ability of land to fulfil socio-economic needs, is deteriorating. The country can no longer afford to neglect this most important natural resource. This is not simply an environmental problem but one which is basic to the future of the country. The stark question confronting the country is whether its soils will be productive enough to sustain a population of one billion by the end of the century. Present indications are that this is doubtful because the terrestrial ecosystems are so seriously and increasingly afflicted, as is evident from the following:

(a) Out of the 329 million hectares of land mass, as much as 175 million hectares, or 53.3 per cent of the total geographical area of the country, is affected by various soil erosion and land degradation problems.

(b) Satellite imagery has indicated that the country lost 47,500 hectares of forest cover per annum between 1981-83 and 1985-86 (FSI). A further considerable area is going out of biologically productive use through unsound agriculture and irrigation practices, road building in fragile hills, mining practices, wind and water erosion leading to soil erosion, landslides and ravine formation, water logging and salinisation, urbanisation and industrialisation. Marginal lands and even steep slopes are being used for agriculture by the poor, leading to further land degradation.

(c) An estimated 6 billion tonnes of soil is lost annually along with the massive loss of plant nutrients (N.P.K.) estimated between 5.37 and 8.40 million tonnes. With deforestation, especially in the hydrogeographic systems, soil erosion has increased enormously.

(d) Each year ravines encroach upon approximately 8,000 hectares of productive table lands, resulting in a loss of 3 million tonnes of food grains valued at Rs.500 crores.

(e) About 7 million hectares of land is afflicted with salinity.

2.3.2 Increasingly it is being alluded that the Thar desert is advancing towards other parts of North India and South-Eastwardly. This is inferred from the growing evidence of aridity in the adjoining areas. It is reported that the number of rainy days, in this region, decreased from 101 in 1973 to 58 in 1989, and that drought spells increased noticeably. In the ten-year period from 1978 to 1988, there were eight years when drought was

experienced in the adjoining areas. The adverse effects have also been observed in the rainfall pattern of places like Delhi.

2.3.3 Expansion of the desert and increasing aridity would inevitably result in declining foodgrain production in the nearby areas, including parts of Eastern Rajasthan, South-West Punjab, South-West Haryana, Western Uttar Pradesh, Malwa and the Kutch region. In addition, it will directly affect the communities which are living in the Aravallis, thereby threatening the life of about 14 million people and 24 million cattle. Hitherto, the advance of the desert was effectively prevented by the green belt on the Aravallis, but continued degradation of vegetation has threatened not only these ranges but the adjoining fertile lands.

2.4 LOSS OF FOREST COVER.

2.4.1 The spatial distribution of forests in the country is now so uneven as to be justifiably described as patchy. If forests occupy over two-third of the land area in the North-East (though this is now doubtful), they account for less than 5 per cent in the Indus plains. On the basis of a visual interpretation of the Landsat imagery covering the period 1981-83, the Forest Survey of India estimated that the actual forest cover extends to only 64.2 million hectares, which comprises 19.47 per cent of the geographical area (FSI, 1987). In a later assessment, based on 1985-87 imageries, the total tree covered area has been reckoned as 64.0134 million hectares (FSI, 1989) or 6,40,134 sq.km. The details of the Forest Survey of India's assessment are quoted below:

| Category | Area in sq.Km. | % of the total geographical area of the country |
|---|---|---|
| 1. Dense Forest (Crown density 40% and over) | 3,78,470 | 11.51 |
| 2. Open Forest (Crown density between 10% to 40%) | 2,57,409 | 7.83 |
| 3. Mangrove Forest | 4,255 | 0.13 |
| Total Forests | 6,40,134 | 19.47 |

2.4.2 The official recorded area of the country named as forests is about 75.19 million hectares or 22.8 per cent of the country's total geographical area. The National Forest Policy lays down that one-third of the country's geographical area or 110 million hectares should be brought under forest cover. The National Remote Sensing Agency estimates that 9.17 million hectares of forest cover was lost during the period 1975 to 1982, which is at variance with the FSI estimates for subsequent years.

Between 1951 and 1980 about 4.33 million hectares of forest land was diverted to non-forest uses. About 4.35 million hectares of forest is estimated to be under some form of shifting cultivation. Approximately 7 lakh hectares of forest land was reported to be under encroachment about five to eight years ago. It is probable that these figures have greatly increased since then.

2.4.3 Tropical forests are stated by one authority to form more than 80 per cent of the total forest cover of the country and occupies 15.9 per cent of the total land area. This authority also states that true natural forests, that is, forests which are formed by primary succession, and have continuously stayed wooded from pre-historic times, undisturbed by man or his livestock, do not exist in India except for some patches in the Himalayan Alpine belts. However, it is understood from other knowledgeable sources that such forests do exist in the Eastern Himalayas, South-Western Ghats and the Andaman and Nicobar Islands.

## 2.5 EFFECT OF ECOLOGICAL DEGRADATION ON HYDROGEOGRAPHIC/ HYDROLOGICAL SYSTEMS.

2.5.1 The face of the land is constantly being moulded by elemental forces, and life and over time give it its identity. Human culture bears the imprint of it. The elemental forces of weathering and transformation, as well as living things, are reciprocally influenced by the topography of the land. Geomorphologically, its most dominant aspect is the high rising features of the continents. Exposed more to the weathering action, they are more sharply etched, with more complex surface designs. They are also more capable of interfering with incident solar radiation and atmospheric processes, such as wind, rain and snowfall over extensive command areas. Mountains and high rising plateaus naturally intercept more of atmospheric energy and also influence down-reach weathering. Sediments coming down from them decide the shape and quality of land all along the river channels to distant sea beds. As they ascend to greater heights, gradients of pressure and temperature, climate and ecological conditions are recreated exactly, simulating the tropic to polar latitudinal shift in short linear measures.

2.5.2 Although the uplifted parts of the earth's surface influence everything on earth in very many ways, the most widely perceived control for human beings is the control they exert on running water. Affecting wind patterns and incident solar energy, they have a pivotal role in controlling atmospheric moisture distribution, hydrological cycle, and energy and direction of fluvial water. Water controls life and the destiny of human civilization. Only now is the mankind beginning to

comprehend how disruptive its actions have been on the hydrological cycle, or evaporation, condensation, run-off, recharge and water availability for plant life in particular, through degrading stable vegetation systems and soil. It is not that the value of forests or the need to safeguard the upper reaches of rivers - the hydrogeographic systems - was not known all this time. Cultural perceptions of survival values were not always subject to the narrow confines determined by Western science and culture. In the interim period of devaluation of an established culture and before adequate assimilation, and subsequent development of a new culture (which has come to be accepted alone as scientific), mankind was left without conviction in either.

2.5.3 Those reaches in the country's higher hill ranges and plateaus, from which all the major drainage basins originate, are defined as the "hydrogeographic zones". This term is coined to distinguish in particular those parts of the country which have an important functional role for river and stream flow. It is not only the mountains and the hills but also the slopes of plateaus (but not all mountainous regions defined on the basis of altitude) are relevant to the control of river flow. Even fairly low reaches of the country with a crucial role in the hydrological systems fall within it. They are not only ecologically valuable, but are also the economically most decisive regions and must be treated with the utmost respect as through controlling the distribution of water they control the viability of agricultural and urban, as well as rural human existence.

2.5.4 Not only has there been degradation of arable land, the country's hydrological systems have also been drastically affected by ecological degradation. The rivers Ganga, Brahmaputra, Indus and Kosi, in the Indian subcontinent, figure as the second, third, fifth and twelfth among the sixteen rivers of the world which experience the most severe erosion in their catchment areas and carry the heaviest sediment load. The Ganga alone is estimated to carry 6,000 million tonnes of sediment. The silt load of the upper tributaries of the Ganga in India range from 8.5 ha.m./100 sq.km. to 14.25 ha.m./100 sq.km. Data obtained from guaging of 187 watersheds in 6 catchments of river valley projects and 4 catchments of flood prone rivers reveal that peak silt loads range from 9.50 to 273.61 ha.m./100 sq.km. per year.

2.5.5 The total amount of soil eroded in the Ganga Basin is estimated to be around 6 billion tons per annum. Since this basin drains around 25 per cent of the country's surface, including some of the most erosion-prone areas, it is estimated that the soil erosion in the country is of the order of over 12 billion tons a year. Even assuming a ton of top soil to be worth only Rs. 5, which is a fraction of the price of ordinary sand at the site where it is collected or mined, the value of 12 billion tons works out to Rs. 6,000 crores. A similar exercise

for water would reveal even bigger unreported and unquantified losses.

2.5.6 It is estimated that many of the reservoirs in India are losing storage capacity at a rate of 0.5 to 1.5 per cent per year, and this is undoubtedly under-estimated. The estimated annual loss of one per cent of the storage capacity results in lack of irrigation for 0.3 million hectares of the existing irrigation potential of 30.8 million hectares under medium and major projects. Compensation for this loss would call for an investment of Rs.800 crores in the creation of an equivalent additional irrigation potential calculated at the rate of Rs. 27,000 per hectare.

2.5.7 About 40 million hectares in the country is now affected by floods, and 11.9 million hectares of land is inundated annually. This includes 5.4 million hectares of cropped land. The magnitude of floods in the country is evident from the fact that in 1985 alone these caused damage worth Rs. 2,539 crores, resulted in loss of 1,826 human lives and 53,353 cattle, damaged 26 million houses, destroyed crops over 7.4 million hectares, affected 65.6 million people, that is, nearly one-tenth of the rural population and damaged Rs.816 crores worth of public utilities. An assessment of the extent of the enormous damage suffered by downstream Bangladesh has not been published.

2.5.8 Two-thirds of the country's cropped land is rainfed on which depends about 42 per cent of the country's food grain production. About 260 million hectares, or 70 per cent of the total geographical area of the country, is estimated to experience water stress and drought conditions of varying degrees. About 70 per cent of India's ground water is polluted with sewage and toxic wastes. Deforestation and irrigation projects are said to have left an estimated 23,000 villages without drinking water.

2.5.9 The above facts and figures reveal the overall and potentially growing ecological crisis unfolding in the country. The causes are many and varied and deforestation is both a major cause as well as an effect in the vicious cycle of this ecological degradation.

# 3. ENVIRONMENTAL AND ECOLOGICAL ROLE OF FORESTS.

## 3.1 ECOSYSTEM AND THE ECOLOGICAL BALANCE.

3.1.1 The thin living mantle of the earth called the biosphere extends less than a dozen kilometers above the surface of the earth and about an equal depth into the deep ocean trenches. This alone permits life, as we recognise it now, to survive. Here all physical material and processes and living things are inter-connected in extremely complex inter-relationships. The dynamic processes of change or evolution affecting the physical world whether in the scale of geological evolution, climatic cycles, or weathering of material, or in the biological world in the evolution of biota or species population changes, or adaptations of individual animals or plants to their constantly changing physical and biological surroundings, together blend into a eurhythmic evolutionary harmony of animate and inanimate material in time. All the independent processes and components integrate into a complex tapestry in perfect dynamic balance. Its comprehension is attempted either in an almost spiritual vision - the oneness in nature or in the approach of Western scientific analysis. The systems approach helps modern science to comprehend its apparently chaotic complexity. Analysing its scaffoldings and structures to identify and catalogue its components, and experimentally manipulating them to find out their functions have engaged the students of Natural Sciences for many years. The functional and compositional hierarchical structure of the biosphere is outlined below.

3.1.2 The biosphere is classified as consisting of sub-units, of a very large number and variety of ecosystems which are the largest functional units of the biosphere. Each ecosystem is composed of the sum total of mutually interacting physical processes or biological communities. Each biotic community in turn is composed of interdependent plants and animals in a composite area and each biotic community is composed of species populations, another crucial element of organisation. A species population is composed of animals or plants belonging to only one species. Each of these individual animal or plant is yet another crucial element of organisation. The individual plant or animal in turn is composed of organically composed systems, that is, organs, tissues and cells in an interlocking matrix of an order.

3.1.3 In the living world, at all levels from molecular biologic to biospheric, the functional pathways have built-in feed back control mechanisms. Enzymatic activity can be speeded up by substrate accumulation while accumulation of end product can depress the activity. In species, population growth rate is controlled by food scarcity or high population density. The same equilibrium can also be traced everywhere in the interactions between non-living and living systems. The natural forest plant community in the catchment area of a river which stores up the excess moisture obtained during an unusually

plentiful monsoon and prevents peaked discharge resulting in floods downstream while letting it out in a regulating manner during the drought year, when rainfall is below normal, is a simple example of ecological balance.

3.1.4 The cycles of elements, such as carbon, oxygen, nitrogen, phosphorous, calcium, etc. which are only partially understood, indicate the complex system of buffers and sub-circuits, triggers and feed-back arresters. Any such cycle gets disrupted when it is taxed beyond the limits of recovery. The various cycles of elements, natural, geochemical, biological and physical processes, are interconnected and counter-balanced in ways which we do not suspect, and the ways they influence each other we do not even comprehend. Today, there exists not even the faintest notion of how to repair them once things go perceptibly wrong. Yet they are going wrong, one after the other. One such instance is the depletion of the ozone layer and another is the global warming up or the Greenhouse Effect. Yet another is the shifting of climatic cycles. There are only very superficial, incomplete and often conflicting predictions regarding the actual course of events. The end result is so frightening that none dares to voice it. Yet with blindfold complacency humankind continues on its suicidal course.

3.1.5 Perhaps less complex to comprehend is our interference with the independent assembly of the world's biota referred to as genetic diversity. Each plant and animal, from the minutest to the largest, occupies specific functional slots, distinct for each species, called "Niches" in ecological science. Extermination of species leaves their slots vacant. Each of these species has evolved into their slot over millions of years of adaptation and co-evolution, and with other species forming the web of life. As the rate of extinction accelerates uncontrollably, as is happening now, what happens to the web of life is not known exactly but it is certain that the human species is not going to survive on its own as the only inheritor of this planet.

3.1.6 An ecosystem consists essentially of living organisms - both flora and fauna - their environment and their interrelationship. Broadly, two components are discernible in any ecosystem - the physical environment and the living organisms, namely, the flora and fauna, including man. Forests, with their phytomass and zoomass components and the land that sustains them, constitute the most important components of any ecosystem. Human activity has, from historical times, caused a linear retrogression of ecosystems. These could have been mitigated by forests. The major ecological functions of forests are to restore and secure the following natural regimes of the land.

(a) Protection of the hydrological systems: Restoration and maintenance of the hydrological regime, water

availability and controlling run-off, soil fertility and oxygen and carbon dioxide levels in the atmosphere.

(b) Sustaining biotic diversity: Protecting the habitat of wild flora and fauna in National Parks, Sanctuaries and other natural areas by sustaining the optimum diversity of species of fauna and flora, particularly those that are endangered.

(c) Preventing soil erosion: Natural vegetation in protective wind and water breaks, Shelter-belts function to stabilise dunes and in the reclamation of eroded lands.

3.1.7 The spin-off benefits of forests are often less apparent and difficult to quantify. Certain studies have attempted to quantify these benefits and estimate that the indirect benefits of a single tree are 300 times the benefits derived from timber, fruits, etc. It is estimated that the total environmental benefits flowing from one hectare of tropical forests are of the order of Rs. 126 lakh.

3.2 THE INFLUENCES OF FORESTS ON CLIMATE AND ATMOSPHERE.

3.2.1 The vast complex processes of global climate, its energetics and its controlling factors, its counter-balances and feed-back regulators, are all very poorly understood. There are often contradictory data. The long time-scale of the processes, as opposed to the extremely short time span within which alone data has begun to be collected, make even the understanding of climate and weather in the present level of our knowledge almost impossible, not to mention of making predictions with any reliability.

3.2.2 The influence of forests on weather and climate is an even less clearly understood aspect with many controversial issues, with vested interests attempting to bias data to justify exploitation. There are practically no long-term studies on humid tropical forest's influence on micro-climate or macro-climate levels. However, a recent study presented at the Indian Science Congress in Cochin in February, 1990, on the interrelationship of deforestation and change in climate in Amazonia conducted by the Centre for Ocean - Land - Atmosphere Interactions, University of Maryland, has reported that deforestation and conversion to degraded grass (pasture) led to a significant increase in surface temperature and a decrease in evapotranspiration and precipitation. The mathematical model simulation showed that the length of the dry season also increased. It pointed to the danger of such increase which could make the re-establishement of the tropical forest following massive deforestation particularly difficult. This study, indeed, has relevance for India. (Appendix XII)

3.2.3 The area critical for human welfare, where we need to understand the role of forests and define strategies of environment management is the modulation of the hydrological cycle by vegetation. Herein the role of forests can conceptually be broadly classified as falling within three categories:

(a) The role of forests in precipitation of atmospheric moisture (both dew as well as rain) interfacing between vapourous and liquid phases of water.

(b) The role of forests in the dynamic equilibrium of lower atmospheric moisture, that is, generating a gentle gradient of moisture extending from soil to higher atmosphere.

(c) The role of forests in balancing soil moisture, that is, essentially their insulating capacity.

3.2.4 The enormous surface area within much smaller ground area presented by a multi-tiered closed canopy forest with its mass of leaves through which water courses constantly in considerable volume along capillary pores and passages available for energy exchange, is the underlying reason for its influence on atmospheric processes. The capacity of forests to control weathering of rock and soil formation, in particular controlling soil organic content, decides the soil storage of water. The balancing of percentage distribution between surface run-off, surface evaporation and soil percolation, determines water availability for human kind beyond the duration of actual rainfall.

3.2.5 Some of the influences of vegetation cover and its interaction with atmosphere, of importance in climate and weather, are generalised below. None of these relationships are linear one way, but cyclic feedback systems, and various circuits interlink.

(a) The insulation provided for the land surface and capacity of plants to disperse heat energy inflow is nullified by deforestation and contributes to the albedo effect, that is, warming up of lower atmospheric layers due to reflected, converted and conducted heat. The greater quantum of heat energy existing in the lower atmosphere disperses atmospheric moisture and leads to aridification.

(b) Extensive dense vegetation cover over an area has an important positive effect on inducing rainfall, modulating the intensity of rainfall, extending the duration and optimising the rain droplet size due to its influence on energy cycling, slowing down of wind (and cloud) movement, providing organic pollen and dust media for rain droplet condensation, mixing up air streams by creating eddies, etc.

(c) Evapo-transpiration of plants plays a crucial role in

maintaining atmospheric humidity.

(d) The multi-tiered vegetation cover insulating the soil from wind and solar heat retains as much moisture within the air column as in the soil and helps prevent loss of litter moisture and soil moisture back to the atmosphere. In fact often enough on hill slopes with thin soils, the air column within the forest reaching up to 45 metres or so retains more moisture than the extremely shallow soils.

(e) The exposed surface area of a multitude of cool leaves (through which plant sap circulates, constantly conducive to condensation of atmospheric moisture) presented by a forested tract of unit spatial extent, is many thousand-fold more than the same unit area devoid of vegetation. In the orographic rainfall induction, this is of critical importance. This is also important in the condensation of dew from mist.

(f) In countries such as India, where rainfall is seasonal (monsoonal), during the rainless winter months, when the atmosphere is cooler, in particular in the hills, the effect of vegetation in condensing atmospheric moisture as dew-fall is critical for lean season water availability in soils.

(g) Equally important to the role of forests in the condensation of atmospheric moisture as rain droplets, is the ability of forests to regulate run-off. More than the total rainfall, the duration of moisture availability in soils for plant growth is critical from the agricultural point of view. The ability of soils to take up and retain moisture depends primarily on soil organic content and soil structure. In both of these, in particular the structural aspects of particle size and porosity, which decides the quantum of soil moisture and its vertical and horizontal movement, natural vegetation, particularly forests, plays a crucial role.

3.2.6 The amount of rain water any soil can absorb depends also on the intensity and duration of rainfall. Less intense the rainfall, the longer it takes a unit amount of rainfall (e.g. 1 cm.) to reach the soil, more water seeps into the soil and less is lost as surface run-off, or as evaporation loss back to atmosphere. The multi-tiered canopy forest arrests the impact of rain droplet further and the drip lasts longer than the actual rainfall duration. The network of roots and the interstices between soil particles left by dead and decaying roots permit deep percolation of stem flow and infiltrating rainwater from the soil surface. The litter layer on the forest floor and the humus with hygroscopic organic colloids and capillary spaces soak up the rain water reaching the forest floor and permit its slow absorption by the underlying soil. The enclosed spaces in between leaves in the litter layer saturated with moisture prevent the evaporative water loss from the soil. Soil

organic content, with its absorbing and adsorbed water content, buffers soil temperature from oscillating widely and helps prevent soil moisture evaporation.

3.2.7 In short, natural multi-tiered forest vegetation reduces the evaporative and run-off loss of rainfall and keeps as much water for as long as possible and as high up in the catchment slopes as possible, helping to enhance or retain perenniality of rivers. Cooling the higher orographic features of the landscape has an overall cooling effect on the micro and meso-climate which in turn positively reinforces the tendency for moderate intensity regular rainfall and suppresses evapo-transpiration rate of plants which in turn prevents physiological drought in soils.

3.2.8 Studies in Brazil have established that rainfall in the Amazon region is recycled from five to seven times. Of the rainwater that falls on the rainforests, about 75 per cent is returned to the atmosphere by way of evapo-transpiration forming new clouds within the first 48 hours. The copious foliage of giant evergreen trees absorbs about 25 per cent of the total precipitation and recharges it into the atmosphere through evaporation. About 75 per cent of the total precipitation that reaches the ground, only one-third, that is about 25 per cent of the total, ends up in the streams and rivers and goes back to the ocean where it came from. And even on its way much of that water is re-evaporated into the atmosphere. The balance, that is, 50 per cent of the total precipitation permeates into the ground and it is recharged into the atmosphere through evaporation and transpiration. The sum of transpiration and evaporation is as high as 75 per cent.

3.2.9 Apart from rainfall, forests induce precipitation in the form of fog and dew. It is estimated that about 25 per cent of the water requirements of agricultural crops in India is met through dew. Further it is estimated that about 4 hectares of well-protected forests can cater to the water requirement of one hectare of rainfed agricultural crop in India.

3.2.10 Scientific studies ascribe an array of other beneficial effects, besides the hydrological role, to the forest ecosystems, the most important of which are:

(a) Soil: formation and protection of soils against erosion; maintenance of nutrient cycling; enrichment of soil through biological and chemical processes;

(b) Atmosphere: regulation of concentration of oxygen and carbon dioxide; absorption of atmospheric pollutants through the forest canopy, that is, providing a filter effect; steadying air circulation.

3.2.11 Forests are seen as one of the biggest reservoirs of carbon compounds on land. These compounds are fixed in plants and soils and it is estimated that such reservoirs exceed atmospheric carbon dioxide by a factor of 3. To absorb one billion tonnes of carbon dioxide, about two million square kilometres need to be reforested. Scientists argue that the level of oxygen in the atmosphere has remained, more or less, constant. Nevertheless, forests play an important role in replenishing atmospheric oxygen. It is estimated that one hectare of well-stocked forests produce 10 tonnes of oxygen and absorbs 30 tonnes of carbon dioxide annually.

3.3 CARDINAL ROLE OF FORESTS FOR FOOD SECURITY.

3.3.1 According to the eminent agricultural scientist, Dr. M.S. Swaminathan, food security and nutrition security are the two most important challenges facing mankind in the 21st century. He states that most countries are eroding their production base. Global water use, which doubled between 1940 and 1980, is expected to further double by 2000 A.D. Two-thirds of it is expected to be used for agriculture. Already 40 per cent of the world's population is experiencing serious water shortage. Land is a shrinking resource for agriculture. Our water resources are also not being used in a judicious manner. How can we impart a dimension of ecological sustainability to agricultural production? Much of our agriculture is rainfed. How can we manage both the South-West and North-East monsoons better, so that we can enhance the benefits from good monsoons and minimise the adverse impact of an unfavourable monsoon on the rural population as well as on farm animals and crops? According to Dr. Swaminathan, a "symphonic" agricultural system is required which is harmonious with nature at all stages of the production - marketing - consumption chain. It involves concurrent attention to issues relating to ecological sustainability, economic viability, and equity. To ensure ecological sustainability, agro-ecological rehabilitation, monsoon management and long-term commitment must be essential components of the Government's policies.

3.3.2 It is incontrovertible that forests are the foster mother of agriculture, and unless the forest ecosystem is maintained in a protective and productive state, the future of agriculture itself would be at stake. Forests, through their off-site effects, reduce soil erosion and help enhance agricultural production. The annual losses of foodgrains resulting from erosion of top soil are estimated to be around 30 to 50 million tons valued at Rs. 6,000 crores. Forests maintain nutrient flux, an on-site effect. In addition, they help reduce nutrient losses through erosion - the annual loss of N.P.K. through soil erosion has been estimated to be of the order of Rs. 700 crores at 1972 prices.

3.3.3 Forests play a significant role in ameliorating drought

conditions. Substantial areas of India, particularly the States of Rajasthan, Gujarat and Andhra Pradesh, regularly face drought. Drought prone regions represent 19 per cent of the entire geographical area of the country and affect nearly 12 per cent of the population. The two-third of the cropped lands in the country that are rainfed depend entirely on the natural hydrological systems, both atmospheric and sub-soil. Approximately 47 per cent of the managed rural areas produces only 20 per cent or less of its biological potential. The most important benefit of all is that degraded forests when protected rapidly raise natural biomass productivity which benefits mainly tribals and the underprivileged classes. There is no better way of ensuring equity and distributive justice than optimising the production of natural biomass.

3.3.4 The bio-diversity of forests acts as a crucial assurance of food security. Three-quarters of the world's food comes from a mere seven species, that is, rice, wheat, barley, maize, sweet potato, potato and cassava. Forests act as an insurance against possible crisis in food supply which depends on these few select species, which are susceptible to disease and pests through wide-spread use. In developing countries, 3.5 to 4 billion people depend on plants for drugs obtained from about 90 species of plants only. The growing vulnerability of modern high-yielding agricultural crops to pest and pathogen epidemics can be reduced if they are cross-bred with their wild or semi-domesticated progenitor or counterparts. Such cross breeding improves yield, quality and adaptability to different soil and climatic conditions. The supporting relationship of endemic flora and fauna and optimum bio-diversity strengthens the resilience of ecosystems in the face of drought conditions. There is a direct connection, through the destruction of bio-diversity, between environmental degradation and poverty, as well as between poverty and famine.

3.3.5 The National Forest Policy, 1952, states that the protective and productive role of forests in the national economy entitles them to lay claim to an adequate share of the land. The importance of forest lands to the rural economy can scarcely be over-emphasised in a region where agriculture constitutes the mainstay of the vast bulk of the population.

3.4 FORESTS AS GENEPOOL RESERVES.

3.4.1 Forests act as a repository of genetic resources. Tropical forests are the richest in terms of bio-diversity as is evident from the fact that the tropical rain forests cover only 7 per cent of the earth's surface but contain 50 per cent of its species. India is endowed with forests which:

(a) are rich in variety with 16 major types comprising

221 minor types (according to the Seth and Champion system of classification);

(b) consist of over 45,000 species of plants. The vascular flora, which forms the conspicuous vegetal cover, itself comprises about 15,000 species;

(c) are unique in the richness and variety of its fauna supporting about 350 species of mammals, 1,200 species of birds and more than 20,000 species of insects;

(d) have immense structural variability, especially in tropical moist forests over an area of 30 million hectares;

(e) are dominated by broad leaved species which are invaluable in improving soil structure and maintaining nutrient fluxes.

(f) are invaluable for a multiplicity of products derived from living natural resources.

3.4.2 The importance of genetic diversity has been highlighted in the Report of the Committee for Recommending Legislative Measures and Administrative Machinery for Ensuring Environmental Protection (GOI, 1980) which led to the setting up of the Government of India, Department of Environment. The Report states that "India is endowed with an immense variety of natural living resources in its rich animal and plant heritage, which sustains millions of its people. While the maintenance of the country's basic biological productivity through proper land and water management is of vital ecological concern, the preservation of its genetic diversity and conservation of its species and ecosystems for sustainable utilisation is of crucial importance for the future survival and development of our people".

## 3.5 AESTHETIC AND CULTURAL ASPECTS OF FORESTS.

3.5.1 Human cultural diversity in many parts of the world directly reflects the region's biological diversity. India has an extraordinary spectrum of biological resources. Until the global "multinational culture" fuelled by the Industrial Revolution began to dominate the world, each culture - in India, as much as in the rest of the world - evolved and flourished as the result of people endeavouring to survive within their immediate environment and, indeed, attempting to optimise the use of their natural resources, particularly the natural living resources of its forests.

3.5.2 Lifestyles and production systems developed steadily through experimentation and observation over centuries till they were so culturally assimilated that they became the equivalent of "Genetic Knowledge" - knowledge that is

coded into each one of us and which we practice every day, but of which we rarely know the basis.

3.5.3 Traditional land-use and occupational structures have invariably been locale-specific and ecologically sound. Today, however, all these systems are either being negated or directly destroyed by modern development programmes, largely in the name of scientific and technological progress. Modern science is usually logical and rational, but its application has become the new superstition and phobia. It has become the constant refrain that to progress modern science must be applied. Unfortunately, this is done with scant regard to the ecological or social context and consequences.

3.5.4 Role of religion in India has largely failed to be used to worthwhile effect in forest conservation and protection and the need to restore and enlarge areas of forests. The intellectual has come to regard religion as a retrograde aspect of society and this has come about from the deliberate attempt of the State to establish secularism. This has resulted in muting the role of religion in fostering those aspects which strengthen reverence for nature and the need to avoid actions that destroy its basic foundations and functions. Secular education and the adoption of strong Christian ethics that followed the Western, and particularly the British invasion of the country and proselytisation by missionaries, and their systematic penetration of the education system, has undermined the religious traditions of the country and elevated Western ideologies and value systems in the minds of the Indian intellectuals, to heroic proportions. While religion continues to be a major influence in the lives of the majority of our people, there is a pervasive and growing dichotomy between precepts and practice prompted by consumerism of the industrialist world stemming originally and now constantly fuelled from the West.

3.5.5 The larger world community, including the international scientific fraternity is now beginning to think of long-term ecological security in terms of strengthening fundamental life support systems, rather than seeking short-term palliatives that treat the human symptoms instead of the fundamental bio-chemical disease caused by a process of development, population growth and rising levels of expectation and extravagant consumption, all leading to over-exploitation, which can now no longer be sustained.

3.5.6 It is interesting to note that the West is now turning increasingly to this point of view as exemplified by the Gaia hypothesis. This theory, named after the ancient earth goddess of the Greeks, postulates that the earth is alive and functions as a superorganism in which living things interact with geophysical and chemical processes to maintain conditions suitable for life. In its newest

concept, Gaia has inspired a flood of research into the interaction between living systems and the atmosphere, earth and oceans.

3.5.7 Western scientists have begun to regard the Gaia hypothesis more seriously as greater understanding of the bio-chemical functioning of the earth and its relationship with living organisms has made this inevitable. To understand such pressing environmental problems as the greenhouse effect or the consequences of mass extinctions, Western scientists and those who draw their inspiration from them in India are increasingly compelled to look beyond their own areas of specialisation; nature does not necessarily respect the arbitrary boundaries established for scientific disciplines. By focusing on entire systems, Gaia provides the West with a framework through which marine biologists, geochemists and geophysicists can integrate their work.

3.5.8 According to the Gaia hypothesis, earth's atmosphere would be unstable for life if it were not regulated by the biosphere. There is now a theory which argues that life forms determine earth's temperature and without the cooling effects of living things, earth would be 80 degrees Fahrenheit warmer!

3.5.9 Scientists have yet to discover the actual mechanisms by which life processes regulate earth's climate and atmosphere. But if there is validity in this theory it makes it all the more imperative that man halts the mass extinctions threatened by the destruction of tropical forests, because he does not know what creatures are essential to his own survival.

3.5.10 Despite its critics, Gaia appears to be gaining in influence among both scientists and theologians in the West. To some, Gaia's appeal is that it promises to end the long estrangement of Western science and religion. Even if the biosphere regulates the planet by feedback. Gaia still integrates living things and inanimate forces into a unified system, allowing both science and religion to look at life as something more than a mere accident.

3.5.11 The basic tenets of this hypothesis are ones that India recognised much earlier in its ancient scriptures and which have in more recent historical times stimulated much of its cultural and religious empathy with environmental principles and respect for all forms of life. Science today provides us with tools to analyse or to establish the relationship between the biota and the geophysical condition within which it exists. These tools are being increasingly employed, regrettably so far only in the West. But this is perhaps understandable since it is a western concept to treat nature as an adversory rather than as a benefactor, stemming as this

concept does, primarily from the Christian theology of Creation as conceived in the Book of Genesis of the Old Testament of the Bible (Appendix II), which is distorted in its concept of nature by being too anthropomorphic. This has been so systematically imbued into the educational systems adopted by India under the tutelage of its erstwhile colonial masters that it is now deeply, and evidently irrevocably ingrained in the economic processes, and the development psyche of contemporary economic planners.

## 4. RECOMMENDATIONS.

4.1 The first step towards a lasting solution to the problem would be an awareness on the part of the "haves" of the world to curtail their conspicuously outrageous consumption levels so that increased assistance by them to the "have-nots" becomes possible. Millions in India, and the Third World as a whole, lead a life of abysmal poverty and squalor. It is such poverty-stricken conditions, combined with an increasing majority of the middle-class and the poor aspiring to the extravagant and wasteful standards of the rich, that forces them to degrade the environment without regard to its future or their own. International debt has handicapped the ability of many nations to afford the immediate costs of ecological prudence. Protecting the global environment is now directly and irrevocably linked to eliminating extravagance and adopting modest, indeed frugal, lifestyles and standards of consumption. From the ecological point of view, Gandhian philosophy appears to lend itself best to the achievement of this objective. India would do well to set an example by adopting it nation-wide through much more systematic, thorough and concerted advocacy than has been the case to-date, as well as propagate it, with missionary zeal abroad.

4.2 Mankind can no longer afford to run up unpaid bills with nature. This can only be avoided if people are made to pay as they go along, to make certain that the prices of all natural resources, be they clean air or irrigation water, take full account of their long-term scarcity and of the environmental effects of their use. At this moment of time, the human race is not merely failing to repair the environmental damage it is causing, but is actually encouraging such damage through subsidising the destruction of the foundation. In every country over-exploitation and wasteful use of natural resources is deliberately encouraged in many ways. Agricultural price protection and subsidies lures farmers into intensive monoculture with all its catastrophic consequences. Fertiliser subsidies lead to excessive use which washes nitrates into the water supply. Insecticides and herbicides cause serious contamination problems. State subsidised electricity drives up energy consumption. Putting an end to such subsidies is a matter of common-sense economics. Farm protection and subsidized production only hurt consumers. Fertiliser, insecticide and herbicide subsidies help chemical companies more than

farmers, cheap irrigation and electricity only inflate fiscal deficits. If subsidies were scrapped, much environmental damage and health hazards to human beings and most other life forms would stop.

4.3 The nations of the North with a high consumption rate must invest in environmentally compatible and efficient technologies, which lead to safer and healthier consumer products. They should also make such technologies available to the Third World countries to encourage ecologically viable economic development so that the onslaught on the environment may be halted. The growing detente between the super powers and the consequent de-escalation of the arms race, in which they have hitherto been engaged, must be seized upon by the international community as an opportunity to commence a process of systematic discouragement of Third World countries from investing in arms. Today, this is costing the developing countries an estimated $ 200 billion in military hardware and establishments, the very production and existence of which is contributing so greatly to environmental damage and to unnecessary and undesirable exploitation of natural resources and forests in particular. In an act of statesmanship, India could initiate this process through the appropriate existing international fora and set an example at home by lowering tensions with its neighbours and demilitarising its national postures. By doing so, at this point of time, it could only earn accolades for itself, both within the country and outside. Every effort should be made to curb the arms race which forces the poorer countries to expend their resources on military establishments, instead of applying available resources to protect the environment.

4.4 The first time that a sizeable body of people began to concern themselves with the environment, it was the economic and intellectual elite, who in the early 1970s, caught the headlines of the media by their expressions of concern for what was happening to the environment. The more articulate among the so-called intelligentsia in the less affluent countries have now stopped referring to the issue as a bogey raised by privileged sections of society and the West, for they came to realise that it is by the natural environment that such countries live. Typically, primary economic production such as farming, forestry, fishing and mining accounts for more than a third of their GNP, more than two-thirds of employment, and over half their export earnings. The ecological productivity of their natural systems is their main asset. From this, they must sustain a teeming human population that has doubled since 1950 and is presently increasing annually by 80 million. In some of the less affluent or Third World countries, including India, the burden of an excessive and growing livestock population maintained to supply milk, draft power, food, and fuel in the form of cow dung, greatly aggravates the problem of sustaining optimum ecological productivity. If the productivity of the natural systems of a country is damaged by the over-use or abuse of the crucial working components of the

systems, the less affluent countries have far more to lose than the rich.

4.5 Just as environmentalism began as a local movement, it must continue to grow at the grassroots even as it gathers force in international deliberations. Individuals and nations alike must learn to take a holistic overview of their needs and their interests before global catastrophies compel them to do so.

# CHAPTER II : BIO-DEGRADATION

"The land where we are born and which is our source of livelihood demands our service in return for what it yields us. If only each person observes this rule the Earth will be a place of unalloyed joy. But how self-aggrandisement is rendering it uninhabitable!

No, O men of honour, let the big trees, the lords of the woods, evermore stand firm. It is these which yield fruits, flowers, leaves, etc. as a free gift. Guard these, your life source, well."

Atharva Veda, Hymn XII, I.27

## 1. MAJOR CAUSES OF ECOLOGICAL DEGRADATION - THE SOCIO-ECONOMIC COMPULSIONS.

1.1 In recent decades, ecological considerations have never been given the importance these deserved in the formulation of economic policies and development programmes. Even when such concerns were expressed, they were subordinated to immediate and often unjustified demands. Immediate socio-economic compulsions, compounded by political expediency, have proved to be the final arbiter in the planning process. This has resulted in the immediate utilitarian rather than long-term ecological concerns being given precedence in the process of policy formulation. Individual or group interests have prevailed over the larger national interests, a characteristic feature of public lands policy in a democratic polity. Immediate returns to individuals have outweighed the less direct, but essential, benefits accruing to society, the nation and future generations.

1.2 For these reasons, misconceived government policies are accelerating the rate of ecological degradation in the country. The exploitative policies of the First Five-Year Plan were continued in linear progression to the Sixth and Seventh Five-Year Plans, and now into the Eighth Five-Year Plan, though the realisation of an impending ecological disaster has begun to be discerned and ecological concerns are now ephemerally being considered in the formulation of some of the development policies. This does not, however, radically alter prevalent thinking and is belied by the principles that influence the formulation of development policies of all sectors. Ecological concerns are not reflected in the policies that guide the implementation of projects and programmes, though a weak and peripheral attempt is being made to restructure our developmental policies in recognition of ecological imperatives. However, this change is far from being introduced to the extent warranted by ecological degradation taking place in the country.

1.3 Narrow socio-economic compulsions continue to obscure and overwhelm ecological concerns, largely because of an ever-increasing human population and environmentally unsound economic policies and practices and the lack of political will and strength to stem these forces. The increase in consumption levels is no longer confined to the essentials of daily life. The material goods and services provided by industrialisation are straining to breaking point the equilibrium that once existed between man and nature.

1.4 The earlier evolving social structure in India did not abandon traditional social beliefs and practices while adopting the new dogmas of materialism which characterise industrial society. The over-exploited natural resource base is further burdened with an enormous and increasing livestock population and free range grazing of unproductive animals, leading consequently to rapid retrogression of natural ecosystems, especially in the absence of developed pastures or cultivated fodder. The number of livestock and not necessarily the quality, continues to be an indicator of social status in the rural areas. Agriculture is still the backbone of the country's predominantly rural economy. The limited availability of land cannot sustain its teeming population. Where the ownership of land has always represented a uniquely important social dimension, the increasing fragmentation of land holdings has led to lower income generation. Approximately 58 million hectares of land is under subsistence agriculture in the country and unemployment and under-employment aggravate the problem of dependence on limited available land.

1.5 Criminalisation of politics has been a major contributing factor to bio-degradation. Short term economic gains are unabashedly used by politicians who adopt populist slogans and measures to attain seats of power, even if implications of such declarations run counter to the longer-term ecological security. The display of insincere sympathy for the downtrodden masses has become the shibboleth of the quest of political power. And any decision which does not yield immediate tangible results, however "pro-people" is anathema in the immoral all-consuming quest for power.

## 2. GOVERNMENT DEVELOPMENT POLICIES AND THEIR CONSEQUENCES.

2.1 The leadership of the country, at the time of Independence, visualised the future of the nation in terms of industrialisation, big hydel power projects and dams, fertiliser plants and a scientific temper which would be the basis of all development endeavours. Though India claims today a highly developed and broad based scientific and industrial infrastructure, its

contribution to the welfare of its people and a sustainable environmental base is now increasingly open to debate. The scientific institutions in the country have generally aped Western technologies, contributing little to the needs of the poorest sections of society and to the Indian reality.

2.2 Though Government policies and programmes have hitherto been focussed on modernisation and simultaneously bringing a major proportion of the population above the poverty level, the country today faces greater abject poverty, increased environmental degradation, floods, droughts, desertification, unemployment and civil unrest. While the Western liberal mode of development has introduced a consumerist cash economy, it has drawn heavily upon on the natural resources of the country without provision for its rejuvenation.

2.3 Edward Goldsmith, editor of "Ecologist", offers the interesting and thought provoking hypothesis that economic growth is but another word for biospheric destruction - the other side of the same coin. Economic growth, he points out, involves the systematic transformation of the world of living things and the biosphere into a totally different world, the world of human artefacts, the technosphere, and that such a process is anti-evolutionary. Technological developments, he suggests, can only grow at the expense of the biosphere from which they derive their resources and to which they consign their wastes.

2.4 Discharge of toxic effluents from industry has been responsible for contaminating drinking water, destroying aquatic life forms and creating health hazards. Open cast mining has degraded large areas of land since rehabilitation is rarely of the concern to those responsible. Big hydel power and irrigation projects have led to the submergence of prime forests and have rendered millions of people destitute. Tehri, Narmada Sagar and Sardar Sarovar projects have been justified in terms of the development needs of the country - for electricity generation, industrial development and irrigation, even though it is realised that thousands of hectares of forests will be submerged and millions of people displaced. The rehabilitation process of these displaced people becomes difficult and is often at the expense of further forest lands. Compensation given to such people is also unsatisfactory since existing legal and administrative constraints come in the way of adequate and equitable compensation.

2.5 In the current model of development, exploitation of natural resources is accounted for as "income", instead of as the erosion of the capital base. This blinkered view applies particularly to forests, which are termed as a renewable resource. It is not realised that beyond a certain level of exploitation, forests cease to be

renewable. Since the current quantum of legal and illegal extraction far exceeds the annual growth rate, that is, the harvestable surplus, there is a steady and accelerating depletion of the capital stock. The arithmatic invariably points to the prospect of the virtual disappearance of forests within the next 20 years, unless fundamental and far reaching changes take place.

2.6 As Gandhiji so perceptively pointed out "the colonial system is still practiced in its essence by countries aspiring to effect a quick entry into the modern era ... and nobody thinks of it. On the contrary, it is justified and even glorified in the name of 'progress', national prosperity and so on."

2.7 Modernisation, industrialisation, big dams, nuclear energy and other such projects can create an illusion of grandeur and progress, while undermining the very basis of human existence. The "limits to growth" will depend upon the limits to which sustainable natural resources that can either renew themselves or be recycled. Gandhiji was sceptical of the indiscriminate and thoughtless imitation of the Western civilisation, based on the assumption that Asians are fit only to copy everything that comes from the West. Observing the direction in which industrialised countries were moving, he said "I must not fear if the world is going in the wrong direction, and like the proverbial moth burn itself eventually in the flame around which it dances more and more fiercely. It is my bounden duty, to my last breath, to try and protect India, and through India, the entire world from such a doom." Gandhiji visualised India as a federation of self sufficient village republics providing the essential needs of the community without large scale industrialisation. Such an ideology ensured sustainable development without over exploitation of natural resources. The relevance of his observation that the earth has enough for everyone's needs but not for everyone's greed is far more obvious now as faced as we are with the frightening evidence of an escalating environmental crisis. However, there is no doubt that national integrity at this juncture of the country's history is an essential, though possibly transitory, process through which the country must progress if it is to attain, and thereafter sustain, ecological and therefore economic viability. For this, a national overview of the inter-connected ecosystems of the Indian sub-continent and of the country is essential and concomitant action at Central Government level, therefore, necessary. The scientific means as a preliminary for such action is available, and must be used even while the political will and strength required for the purpose is not.

2.8 For the biosphere to survive, the current mode of industrial development must end sooner or later. The life support systems of the planet are being rapidly

exhausted to serve the insatiable demands of a increasingly all-pervading consumer society. There is growing awareness of the implications of this ecological destruction, but the will for action seems paralysed, for it would mean the renunciation of the existing way of life for the affluent section of the society.

2.9 Gandhiji believed that if India became industrialised, beyond the sustaining capacity of its natural resources, it would inevitably be driven to over-exploitation and become the "curse for other nations, a menace to the world." The tendency to over-production and over-consumption is inherent in the industrial mass production system itself. He repeatedly emphasised the moral principle of development, and his priorities focussed on "the poorest of the poor". The essence of Gandhian thought was that the man should rest content with what were his real needs and become self sufficient. "If he lacks this self-control, he cannot save himself." Above all, Gandhiji's concern was that people needed to control their appetites and material wants.

2.10 The ecological movement in the West is essentially a movement to preserve nature against the onslaughts of industrialisation. There is growing realisation in national and international fora that poverty, environment and development are interrelated; that economic and environmental concerns cannot be separated from ethical concerns; that poverty is a major cause as well as effect of global environmental problems; that the international balance of payments is as much a problem that causes environmental degradation. There is need today for a new ethic or an age-old ethic which Gandhiji emphasised. If the world is to survive the impending environmental catastrophe, then development must be in harmony with nature, of which forests are so crucial a component, and not at the expense of it.

## 3. LOSS OF FOREST LAND.

### 3.1 AGRICULTURE.

3.1.1 Considerable additional land of the country was brought under cultivation during the period 1950 to 1986 as is evident from the following table:

| Year | 1950-51 (in m.ha.) | 1985-86 (Prov.) (in m.ha.) |
|---|---|---|
| Net Sown Area (total cropped area & area sown more than once) | 118.75 | 141.06 |
| Uncultivated land | 49.45 | 31.24 |
| Fallow land | 28.12 | 24.89 |
| Barren and unculturable lands | 38.16 | 20.15 |

The increase in cropped area has, undoubtedly, contributed to increased agricultural production which was further increased by the so-called "Green Revolution". This may have led to self-sufficiency in food grain production despite the doubling of the population during the last 30 years, but the full impact of enhanced agricultural production on the ecological stability of the country is as yet unknown. However, there is growing evidence that the ecological degradation is on the increase.

3.1.2 Agricultural expansion is rapidly increasing the pressure on forest lands. Marginal and uncultivable agricultural lands are deteriorating and enlarging. Many of these are now seen as fallow or so-called "wastelands" in villages. About 4.3 million hectares of forests were lost during the 30 year period from 1951 to 1980, by diversion for the following purposes:

| Purpose | Area (in m. ha.) |
|---|---|
| Agriculture | 2.623 |
| River valley projects | 0.502 |
| Industries and townships | 0.134 |
| Transmission lines and roads | 0.061 |
| Miscellaneous | 1.008 |
| Total | 4.328 |

3.1.3 Since 1950-51, the recorded forest area in the country increased with the takeover of private forests and also due to forest settlements, which essentially lead to a change in the legal classification of land and nomenclatures rather than a change in land-use practices. On the other hand, the claims of agriculture were considered more important than the claims of forest conservation. The Forest Policy of 1894 stated that whenever there was an effective demand for cultivable land which could be met only from forest areas, the land was to be relinquished ordinarily without hesitation; and if this principle applied to the valuable class of forests under consideration, it applied a fortiori to less valuable classes of forests also.

3.1.4 Cultivable land per capita has declined from 0.48 hectares in 1951 to 0.26 hectares in 1981. By the year 2000, it will be around 0.11 hectares per capita. The pressure on land is enormous, so is the hunger and the crime committed to gain possession of land. Illegal occupation of revenue and community lands as well as land-grab in urban areas has become a widespread and seemingly irrepressible evil.

## 3.2 ENCROACHMENTS.

3.2.1 Encroachments continue to pose a serious threat to the forest lands. About 7 lakh hectares of forest land was estimated to be under encroachment in early 1980s. But the actual area under encroachment is probably now considerably greater. This is particularly noticeable in the drought-prone tracts of the country. For instance, the area bare of tree cover in the tribal hilly parts of Dhule district according to the National Remote Sensing Agency (NRSA) was 30 per cent, but this has now increased to 55 per cent. Most of this is due to encroachment. Lack of proper demarcation of forest boundaries, which is quite common in protected and unclassed forests, results in under-reporting of encroachments. The problem remains unresolved despite a categorical edict in the National Forest Policy, 1988, that encroachments on forest land must be arrested; effective action must be taken to prevent their continuance and existing encroachments must not be regularised. Contrary to this clearly stated policy, the Governments of Madhya Pradesh, Maharashtra and Kerala have submitted proposals to the Government of India seeking prior approval of the Government of India for regularisation of past encroachments. The area involved is substantial - as high as 2.4 lakh hectares in Madhya Pradesh alone.

3.2.2 About 9 lakh hectares of forest land is characterised by periodic conflicts between forestry and the interests of the local tribal communities. These include lands of forest villages, encroachments in forests and informal/formal occupation. State-wise these comprise the following:

| State/U.T. | Forest area under irregular occupation by tribals and others | Remarks |
|---|---|---|
| Andhra Pradesh | 38,691 | Sometimes resulting from rehabilitation in one form or the other |
| Andaman & Nicobar Islands | 698 | - |
| Arunachal Pradesh | 7,457 | - |
| Assam | 1,19,568 | 95,854 hectares illegally occupied |
| Bihar | 3,913 | Includes forest villages and Core areas of Tiger Reserve |
| Dadra & Nagar Haveli | 698 | - |
| Gujarat | 97,632 | - |
| Karnataka | 1,121 | - |
| Kerala | 17,070 | - |
| Madhya Pradesh | 3,11,700 | Includes encroachments |
| Maharashtra | 1,50,696 | Includes encraochments |
| Nagaland | 4,328 | |
| Orissa | 49,855 | Includes forest villages |
| Rajasthan | 9,735 | Includes encroachments |

| | | |
|---|---|---|
| Tamil Nadu | 1,990 | - |
| Uttar Pradesh | 58,446 | Includes some areas used for rehabilitation |
| West Bengal | 15,151 | - |
| Total | 8,88,749 | |

3.3 SHIFTING CULTIVATION.

3.3.1 Estimates of areas under shifting cultivation are more alarming than the encroachments. In many instances the cycle of shifting cultivation has decreased from 10-12 years to 4-5 years and serious bio-degradation of such sites has and is resulting. The total area affected by shifting cultivation, in one or another form, could be as high as 9 million hectares. The forest area affected by shifting cultivation is assessed to be about 4.35 million hectares. The State-wise figures are shown below:

| State/U.T. | Total Forest Area sq.km. | Annual area under shifting cultivation (& % to forest area) sq.km. | Fallow period (in years) | Minimum area under shifting cultivation one time or other (& % to forest area) |
|---|---|---|---|---|
| Andhra Pradesh | 63,971 | 500 (0.78) | 3 | 1,500 (2.34) |
| Arunachal Pradesh | 51,540 | 700 (1.35) | 3-10 | 2,100 (4.07) |
| Assam | 30,708 | 696 (2.20) | 2-10 | 1,392 (4.53) |
| Bihar | 29,232 | 162 (0.55) | 5-8 | 810 (2.77) |
| Madhya Pradesh | 1,55,414 | 125 (0.08) | 10-15 | 1,250 (0.80) |
| Manipur | 15,154 | 900 (5.93) | 4-7 | 3,600 (23.75) |
| Meghalaya | 9,477 | 530 (5.59) | 5-7 | 2,650 (27.96) |
| Mizoram | 15,935 | 630 (3.95) | 3-4 | 1,890 (11.86) |
| Nagaland | 2,876 | 192 (7.17) | 4-9 | 768 (28.7) |
| Orissa | 60,224 | 5,298 (8.79) | 5-14 | 26,490 (43.95) |
| Tripura | 5,922 | 223 (3.76) | 5-9 | 1,115 (18.8) |
| | 4,40,453 | 9,956 (2.26) | | 43,565 (9.77) |

3.3.2 Many of the age-old agricultural practices, in particular jhumming system, were not merely appropriate but represented highly sustainable systems. However, given the present demographic and socio-ecological circumstances, the jhumming systems practiced today in most parts of the country are exerting intolerable pressures on the land and leading to serious erosion and degradation. This is not to say, however, that traditional knowledge and expertise represented by the range of traditional jhumming systems should be discarded. On the contrary, the agricultural lore represented by such systems needs to be carefully documented and pilot-scale representative examples

sustained in the hope and expectation that a time will come when a modicum of ecological security will have been established, when the nutrient recycling system will not merely allow the reintroduction of certain jhumming systems but, indeed, that these systems will come to represent, in specific biogeographical zones, the most appropriate and sustainable agricultural systems required in limited well-demarcated areas for specific social communities, probably the remnant populations of true tribals now classified as primitive tribes.

3.4 FOREST LAND TRANSFER FOR DEVELOPMENT PROJECTS.

3.4.1 Between 1951 to 1980, on an average, about 1.5 lakh hectares of forest area was diverted annually for a variety of uses, including agriculture. Since then, it is claimed, that this has been reduced to about 16,000 hectares per year, mainly because of the enactment of the Forest (Conservation) Act, 1980. But this gain is illusory. The Central Government continues to receive requests to allow diversion of forest land for rehabilitation of people affected by various mega-projects. Often the State Governments express their helplessness in acquiring non-forest land either for the project itself or to raise what is mistakenly claimed to be "compensatory afforestation" in lieu of excised forest area.

4. LOSS OF NATURAL VEGETATION AND REGENERATION.

4.1 GRAZING.

4.1.1 The restoration of the country's forests depends entirely on natural regeneration supplemented, where necessary, by ecologically compatible scientific techniques to accelerate this process. Areas planted under so-called Social Forestry, Agro-Forestry, Community Forestry and the like to which the appellation of forestry is now so deceptively added, are not forests at all but merely silviculturally established tree plantations. Natural regeneration of vegetative cover invariably fails where excessive and unregulated grazing resulting in trampling and browsing of seedlings takes place. Over 95 per cent of the country's forests are continually subjected to this and other unrelenting forms of biotic pressure. This can be allowed to continue only with disastrous national consequences.

4.1.2 The country's livestock population in 1951 was 292 million. This increased to 416 million in 1982. The increase was the greatest during the period 1972-1982, compared to the previous two decades. Similarly, the goat population increased by 40.3 per cent during the period 1972-82 against an increase of 7 per cent for cattle and 20 per cent for buffalo. Conservatively applying the same rate of increase of the livestock

population, the current population could be estimated to be of the order of 441 million. There is, consequently, a serious qualitative deterioration in the nature of the biotic pressure to which the country's forests are now subjected.

4.1.3 The problem is compounded by the free-range grazing of the country's vast herds of scrub cattle which, despite assertions to the contrary, are a major burden on the rural economy. The increase in livestock population can no longer be justified for the mere production of dung. The land degradation caused by these animals through the loss of vegetative cover and regeneration, soil compaction, etc. have major ecological repercussions that seriously affect all socio-economic aspects of the country as a whole.

4.1.4 In 1982-83, the country had only 12 million hectares of permanent pastures, leading to the forest areas being extensively grazed. The biotic pressure is compounded by an ever-increasing grazing intensity. The National Commission on Agriculture estimated in 1976 that 88 per cent of the forest area was open to grazing. The total number of animals, which grazed the forests increased from 35 million in 1956 to 54 million in 1972 and 90 million in 1986. This increase in cattle pressure has been responsible for the rapid degradation of grazing land throughout the country.

4.1.5 To the grave detriment of the country's ecological balance and therefore its economy, forests today are abused by being made the single largest grazing grounds of the country, comprising as these do about 75 million hectares as against 12 million hectares of permanent pastures, 16.7 million hectares of cultivable wastelands, 9.8 million hectares of fallow lands and 3.5 million hectares of tree crops and groves.

4.1.6 The incidence of grazing is far beyond the carrying capacity of the available land. For instance, the hill districts of Uttar Pradesh are subject to grazing intensity of 2 to 8 cattle heads per hectare. According to Prof. K.P. Valdiya, the eminent geologist, "Overgrazing is literally eating away forest vegetation without giving it a chance to regenerate. In Kumaun Himalayas, for example, the grazing pressure is 2.5 to 4.5 times greater than the carrying capacity of the forests; the soils of the over-grazed area are left with only 8 to 36 per cent clays (compared to 50 to 69 per cent in unaffected soils of the area where entry of cattle is restricted) so that the stability is impaired owing to the deficiency of binding material". In Himachal Pradesh alone, 97 per cent of sheep and goats, 83 per cent of cows and 11 per cent of buffaloes are taken to the forest areas for grazing.

4.1.7 The arid land of Rajasthan (Thar Desert) has expanded primarily due to pressure from grazing. The livestock population here is very high - there are 25.5 units of cattle trampling and defoliating every hectare of grazed land.

4.1.8 Natural regeneration is virtually absent in about 53 per cent of the forest areas. The impact of biotic pressure on forests is documented in a study conducted in Udaipur Forest Division, Rajasthan. The findings are summarised below:

| Distance of habitation from forest boundary (km) | Growing Forest "Stock" cu.m./ha |
|---|---|
| Below 0.25 | 16.80 |
| 0.2 to 0.50 | 27.66 |
| 0.50 to 0.75 | 29.54 |
| 0.75 to 1.00 | 31.84 |
| 1.00 to 1.50 | 32.93 |
| Above 1.50 | 34.27 |

The correlation between biotic pressure and loss of growing forest "stock" is evident from the above table.

4.1.9 The National Forest Policy, 1952, stated that cheap forest grazing leads to a vicious spiral of indiscriminate increase in the number of cattle. The notion that a farmer's wealth must be reckoned in terms of the cattle he owns, regardless of the quality, is apart from being the cause of India's uneconomic cattle "wealth" contributes greatly to ecological degradation. The problem of unregulated grazing and its consequences has been reviewed extensively in the Report of the Committee for Review of Rights and Concessions in the Forest Areas of India, the Government of India, 1984. The Report observed "... It is pathetic, however, that though State Governments are aware of this destruction, yet precious little has been done to control grazing in accordance with the carrying capacity of the forest area in the country. In fact, actions were directed mostly towards the appeasement of the local population through liberalising the concessions by waiving grazing fees and removing the restrictions on number of animals to be grazed"!

4.1.10 The policy of cheap or free grazing has encouraged promiscious breeding of uneconomic scrub cattle in the villages bordering the forests; the grazing incidence has, consequently, increased as has the degradation of the grazing grounds, while many areas are devoid of all vegetation.

4.2 FODDER SCARCITY.

4.2.1 The Report of the Committee on Fodder and Grasses (National Wastelands Development Board) has made an assessment of the availability of fodder vis-a-vis the projected demand. Future requirements are based on the standards of feeding adopted by NCA and the projected population of the livestock. The figures are as under:

| Year | Requirement of fodder per year (in million tonnes) Green Fodder | Dry Fodder |
|---|---|---|
| 1985 | 590 | 483 |
| 1990 | 640 | 516 |
| 1995 | 701 | 554 |
| 2000 | 780 | 601 |

4.2.2 As against the above future demand the estimated production of fodder in the country is given in the table below:

| Type of fodder | Estimated Production (in million tonnes) Dry fodder (air dry) | Green Fodder |
|---|---|---|
| Agricultural crop residues | 236 | |
| Grass | 205 | |
| Green Fodders: | | |
| (i) Cultivated green fodder | | 208 |
| (ii) Top feeds including sugarcane tops | | 4 |
| (iii) Weeds | | 14 |
| Leaf fodder from trees | | 24 |
| Total | 441 | 250 |

4.2.3 The Report further observes that the fodder production in the country falls very short of the requirements; the shortage of green fodder is more than that of the dry fodder. In view of the continuing deterioration of the forest area and grasslands, dry fodder production from these sources will decrease while the requirement will increase. The possibility of increasing dry fodder production in the form of agricultural crop residue is also limited. The position with respect to green fodder is not expected to be very different as, on the basis of present policies, there would not be any increase in the area devoted to green fodder production. The gap between the demand and supply of fodder will continue to widen if fodder production for livestock is not given more attention. Recommendations in this regard are provided elsewhere in the Report. However, by far the best solution is to reduce rapidly and drastically the existing cattle population.

4.3 FUELWOOD SCARCITY.

4.3.1 In 1987, the Forest Survey of India estimated the demand for fuelwood in the country to be about be 235 million cu.m. As against this, the recorded production was of the order of 40 million cu.m. only. A more recent estimate has been presented in the report of the Study Group on Fuelwood and Fodder, set up by the Planning Commission. According to this report, the current demand is 367 million cu.m. or 245 million tonnes. This report projects the future growth of the demand to be as under:

| Year | Demand for Fuelwood |
|---|---|
| 1990 | 459.69 million cu.m. or 306.46 million tons |
| 1996 | 514.20 million cu.m. or 342.80 million tons |
| 2001 | 575.37 million cu.m. or 383.58 million tons |

In order to meet the escalating demand for fuelwood, forests have been indiscriminately destroyed and the rights and concessions have provided an added impetus to this destruction. About 4 lakh hectares of forest land is being destroyed annually under the guise of concessions, fuelwood collection being one of the most important causes.

4.3.2 In the State of Madhya Pradesh alone, "headloaders" collect nearly six lakh tonnes of fuelwood every year from forest areas for sale in towns and cities (exclusive of wood collected by rural people for domestic use), which implies that this is the cause of the annual destruction of about 70,000 hectares of forests. In Rajasthan, it has been reported that 4 lakh families are engaged in the extraction of fuelwood from its sparse and negligible forests.

4.3.3 The demand and supply imbalance for fuelwood is much more acute in some States. A study conducted in West Bengal reveals that as against the recorded annual production of 0.7 million cu.m., the estimated consumption is 16.85 million cu.m., which means that consumption is about 24 times the supply. The same study further postulates that amongst the traditional renewable resources, fuelwood is the most widely used in rural areas (about 93.2 per cent). It is stated that of all the non-commercial energy consumption, fuelwood constitutes 77.1 per cent compared to 14.97 per cent of agricultural waste, 7.48 per cent of dung cakes and 0.45 per cent of bio-gas. Of the total energy consumption (commercial and non-commercial) the share of fuelwood is 42 per cent.

4.3.4 It is estimated that the production of fuelwood, as reflected in the records of harvest of the State Forest

Departments, forms scarcely 10 per cent of the total output. The remaining 90 per cent is obtained by the local people through the rights/privileges/concessions granted to them for forest produce, harvest from non-forest lands and unauthorised removal from forests.

4.3.5 Nearly 40 per cent of the entire energy consumption in India is for cooking. Fuelwood constitutes 68.5 per cent of the total rural household energy consumption. In the rural sector, only 12.7 per cent of firewood is procured through market purchases. Of the rest, 64.2 per cent is collected and 23.1 per cent is home-grown.

4.3.6 The Report of the Advisory Board on Energy (ABE), in 1985, estimated the future demand of fuelwood in the country. Simultaneously, it made an assessment of the availability of different types of lands to raise fuelwood. The future demand and total availability of land (2004-2005 A.D.) from Board's projections are as follows:

| Region | Estimated fuelwood consumption in the year 2004-5 (million tonnes/ year) | Fuelwood needed to substitute use of dung cake (million tonnes/ year) | Total of 2 and 3 (million tonnes/ year) | Estimated fuelwood requirement to be met through plantation (million tonnes/year) | Total land available for plant-ation (million hectares) |
|---|---|---|---|---|---|
| Northern | 81.0 | 32.0 | 113.0 | 106.5 | 19.258 |
| East and North-East | 60.0 | 8.0 | 68.0 | 63.5 | 9.327 |
| Southern | 106.5 | 8.0 | 114.5 | 110.0 | 12.535 |
| Western | 68.0 | 12.0 | 80.0 | 73.0 | 21.455 |
| Total | 315.5 | 60.0 | 375.5 | 353.0 | 62.575 |

4.3.7 Land availability of different types (million hectares)for fuelwood/fodder plantations:

| Region | Open/ degraded forests | Cultivable waste land | Barren & uncultivable land | Permanent pastures & other grazing lands | Farm periphery | Total |
|---|---|---|---|---|---|---|
| Northern | 0.992 | 8.587 | 4.664 | 3.326 | 1.679 | 19.248 |
| East & North-East | 2.220 | 0.858 | 4.202 | 0.863 | 1.184 | 9.327 |
| Southern | 1.790 | 1.903 | 5.123 | 2.413 | 1.206 | 12.435 |
| Western | 3.466 | 4.869 | 6.514 | 5.319 | 1.337 | 21.505 |
| Total | 8.468 | 16.217 | 20.503 | 11.921 | 5.406 | 62.515 |

4.3.8 The ABE feared an increase in the use of animal dung and crop residue in future for fuel. Although the extent of degraded lands ("wastelands") in the country is estimated to be 175 million hectares, the ABE report assumed that only 62.5 million hectares (including degraded forest lands) would actually be suitable for tree planting from details given in the above table. However, this does not mean it would be unsuitable for revegetation/afforestation. The ABE further estimated that only half of this area, that is, only 31 million hectares could be put under fuelwood/fodder plantations. It is believed that on account of the acute pressure on the land, the availability of degraded lands for fuelwood production would be severely limited.

4.3.9 It is estimated that the States with considerable areas of degraded lands like Rajasthan, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Gujarat, and perhaps Maharashtra, could become self-sufficient in fuelwood, if tree plantations were created through intensive silviculture by private farmers on marginal agricultural lands in the plains. However, States with inadequate degraded lands like Uttar Pradesh, Punjab, Haryana, West Bengal, Bihar, Orissa, Andhra Pradesh, Kerala, Karnataka and Tamil Nadu will continue to suffer from fuelwood deficiency. It is clear that in all the States if forests are to be saved from irretrievable degradation and ecological security thereby progressively ensured, alternatives to fuelwood such as Natural Gas, Biogas and non-conventional sources of energy must be provided and developed as a matter of highest priority.

4.4 TIMBER SCARCITY.

4.4.1 Regrettably, wood from forest resources continues to be required for a number of commercial uses. Precise figures of the demand are not available. A number of sources have calculated industrial and commercial demand for timber but there is no common methodology or unanimity in their estimates.

4.4.2 In the organised sector, wood is used for paper, paper board, newsprint, rayon grade pulp, ply and veneer, fibre board and matchwood industries. Estimates of demand for these uses, are likely make scarcity more accurate. However, the unorganised sector is a major consumer of wood but the demand from this sector is difficult to assess. Some estimates for the period 1980-90 are tabulated below:

| End Use | Estimated demand (in million cu.m. per annum) | Remarks |
|---|---|---|
| 1. Decorative veneer and plywood | 0.983 | Estimated for 1990 (Report of the Raw Material Sub-Committee; Development Panel for Wood-based Industries, 1988) |
| 2. Particle board | 0.087 | |
| 3. Fibre board | 0.108 | |
| 4. Packaging | | (Report of the Task Force on the Use of Wood for Packaging and Fruits and Vegetables, 1986) |
| (a) Fruit and vegetables | 6.000 | |
| (b) Tea | 0.200 | |
| (c) Tobacco | 0.150 | |
| (d) Textiles | 0.200 | |
| (e) Other industrial products | 0.300 | |
| Sub total: | 6.850 | |
| 5. Agricultural implements/tools | 6.000 | (Report of the Inter-Ministerial Group on Wood Substitution, 1986, Ministry of Environment and Forests, GOI) |
| 6. Matchwood | 0.441 | |
| 7. Sports goods | 0.003 | |
| 8. Furniture & Panelling | 0.250 | |
| 9. Housing | 3.000 | |
| 10. Miscellaneous (bobbins, Pencil, shoe laces | 0.355 | |
| 11. Railways: | | |
| (a) Sleepers (approx.4 lakhs) | 0.070 | |
| (b) Coaches, etc. | 0.054 | |
| 12. Paper, Paper board newsprint & rayon-grade pulp: | | (Informal Notes from Shri S.C. Jain, Chairman, Indian Paper Makers' Association, 1989) |
| (a) Paper & paper board | 3.742 | |
| (b) Newsprint | 1.154 | |
| (c) Rayon grade pulp | 0.900 | |
| Sub total: | 5.796 | |
| TOTAL | 23.997 | |

(Note : Conversion factor - 1 tonne = 1.5 cu.m.)

4.4.3 From these figures, the total requirement of wood for various commercial uses (including agricultural sector) is estimated to be about 24 million cu.m. per annum. Another estimate of demand for timber (wood other than firewood) is 27.58 million cu.m. As against this demand, the current permissible cut of timber from forests is only about 12 million cu.m. The gap is of the order of 15 million cu.m. and continues to grow. This gap, in some instances, has forced even official felling of timber in forests to exceed the silviculturally permissible limit, let alone the unauthorised felling by private individuals, companies and firms.

4.4.4 However, this does not reflect the total timber demands of the saw milling industry, which according to the Forest Survey of India (FSI), had an installed capacity of 27.18 million cu.m. in 1978. This installed capacity must have since increased considerably. The FSI had indicated that the availability of wood for saw milling was of the order of 13.28 million cu.m. per annum. Saw milling is an intermediate processing activity. Currently, the availability of timber for saw milling is not even 50 per cent of the installed capacity of these mills. A substantial portion of the present illegal removal of timber is therefore, the direct result of saw mills operated by unscrupulous elements.

4.4.5 There are other estimates available showing the timber demand for various uses. Informal sources (Ministry of Environment and Forests) indicate that the total demand for wood is about 19.52 million cu.m. The Forest Survey of India has estimated the demand to be about 27.58 million cu.m. The erstwhile Central Forestry Commission (Ministry of Agriculture) had estimated the demand to be about 23.3 million cu.m. All the above figures, by and large, pertain to the probable demand from 1980 to 1990.

4.4.6 The National Commission on Agriculture in 1976 had projected commercial demand for wood for the years 1985 ans 2000. Their estimates were based on two levels of consumption, namely, a "low" and a "high". For the "low" level of consumption, the estimated demands range between 30.03 million cu.m. and 47.18 million cu.m. for the years 1985 and 2000, respectively. At the "high" level of consumption, these are between 35.18 million cu.m. and 64.45 million cu.m.

4.4.7 The estimated demand during the 1980s, as the above figures indicate, was in the range of 20 to 30 million cu.m. If a linear growth rate of 5 per cent is taken (based on the growth rate of 5.5 per cent projected for the paper and pulp industry), the demand would range between 30 to 45 million cu.m. by the turn of the century. Thus, as far as the industrial/commercial needs are concerned, about 45 million cu.m. of timber would be adequate to meet the annual demand, at least till the year 2000.

4.4.8 The recorded production of timber from forests was about 13.5 million cu.m. during 1978-80. Over the years, this will have decreased due to restrictions on felling of trees from natural forests. In future, the extraction of timber from natural forests must be phased out altogether and the resultant shortfall in the supply of timber for commercial sector should be met by establishing tree plantations in non-forest areas. By and large, the demand for various end-uses can be met from short rotation tree crops, the exception perhaps being the veneer and plywood industry. It should be

possible to raise enough raw material for the commercial/industrial sectors from plantations over an area of 10 to 15 million hectares of agricultural land. But for the foreseeable future, the answer lies in rapidly curbing the consumption of timber to unavoidable end uses and substituting existing normal uses by alternatives.

4.4.9 About 58 million hectares of agricultural land is considered either unproductive or at best marginally productive for the cultivation of annual crops. The required area of 10 to 15 million hectares could be readily set aside from this marginally productive agricultural land. Since ownership of this land rests with private individuals, it will not be possible to effect the change in the present land-use pattern unless tree cultivation is made financially attractive. The recent slump in prices of Eucalyptus trees and poor off-take by paper mills is serving as a disincentive to farmers from growing tree crops. The farmers should be encouraged to undertake tree cultivation on such lands through financial and other incentives on "soft" terms. This would also mean providing adequate marketing and price support. Both, providing the motivation to farmers and marketing of their produce, could be made the responsibility of the existing Forest Development Corporations, and if agreed, their present nomenclature be changed to be in keeping with their proposed agro-silvicultural activities. Reference to this is made at greater length elsewhere in this Report.

## 4.5 THEFT OF WOOD FROM FORESTS.

4.5.1 Among the various forms of exploitation to which the forests in India are subjected, the most insidious is the continuing large-scale theft of timber. This takes place in various ways. Even though the contract system has been abolished, theft of timber from the forests is still rampant. The general lack of enforcement of law and order and criminalisation of politics has contributed greatly to the increase in the incidence of thefts from forests. As the price of a single truckload of fuelwood is over Rs.5000, the temptation and takings are substantial. In case of timber species like teak, the value of a truckload can exceed Rs.50,000.

4.5.2 Today, in very few States is there an effective vigilance system to stop this evil. Heirarchical controls from within the State Forest Departments of the Centre have failed to prevent thefts. In earlier years, the Divisional Forest Officer was required to camp in the forests for a minimum of 15 days every month so as to keep in close touch with field operations in the forests under his charge. Today, they hardly spend three or four nights a month, if that, out in the forests and are desk or city bound for most of their working hours. Vigilance Departments of the State and Central Governments have not

in the past considered forest areas and State Forest Departments to be worth investigating. It is recommended that special wings should be created in vigilance agencies which should be given special training to equip them to perform this role, and the public, particularly NGOs, encouraged to bring such malfeasance to the attention of those in authority so that strong deterrant action is taken against offenders.

4.5.3 It is also necessary that whenever a Forest Officer is transferred, he must hand over to his replacement a properly documented inventory of the growing stock which must be checked regularly by external auditors. Now that the value of even a common commercial tree of 150 cm. girth can be around Rs.5,000, this is fully justified. In case of the more valuable species like sal and teak, the value of each mature tree is Rs.50,000 or over. Removal of fuelwood by rights and concessions holders can render proper inventory control very difficult, but there is no reason why this cannot be organised in such a way as to prevent theft, if there is genuine will to do so.

4.5.4 The State of the Forest Report (FSI, 1987) estimated that the total growing stock of wood in Indian forests to be of the order of 4,196 million cu.m. This equals 2,797.33 million tons. Even if we take the average price of wood to be Rs.1,000 per ton, which is a modest estimate, the total value of the growing stock will be Rs. 279,733 crores. Surely national wealth of this magnitude needs to be guarded far better than it is today.

4.5.5 The current punishment for theft of timber is no deterrent to thieves, amounts as it does to a mere fine of Rs.500 in most of the States. This is so lenient that it makes it worthwhile for a timber thief to pay the fine and continue his trade. If there is to be any hope of protecting the country's remaining forests, this state of affairs can no longer be allowed to continue. The law and its enforcement must be strengthened greatly and the penalties for theft made much more severe. Above all, as referred to elsewhere, there must be no further ambiguity in the role of the Indian Forest Service which must hereafter be devoted wholly to the protection of existing forests and the ecological restoration of forests over the hydrogeographic area of the country - a stupendous task which alone will tax the capabilities of the Service to its limits. It is worth observing that in Thailand, felling a teak tree is punishable by death.

4.6 FOREST FIRES.

4.6.1 Controlled fires have in the past been used as one of the management techniques of forestry practice. When vast areas of forests existed in the country, regulated or controlled fire might have been justified in certain circumstances to fulfil specific purposes.

Unfortunately, in more recent times in India, forest fires are frequent and uncontrolled. Even the NCA Report states that forests are damaged substantially due to fires, including those in comparatively wet zones. Coniferous forests in Uttar Pradesh, Himachal Pradesh and Jammu and Kashmir are also susceptible to fires. It is now realised that forest fires are a major factor leading to degradation and loss of biological diversity throughout the country.

4.6.2 It is apprehended that the extent and damage due to forest fires in India is grossly under-reported. The reported loss of forest area for some of the States and Union Territories is shown in Appendix XI. These figures represent only a fraction of the full extent of loss of natural biomass that has actually occured.

4.6.3 Fires damage forest ecosystem both directly and indirectly. The obvious loss is damage to standing vegetation, loss of regeneration capacity, die-back effect, certain loss and deterioration in genetic diversity and vitality, ecological succession retardation and knock-on effects. The less apparent but much more serious effects with wide ramifications are those that result in impoverishment of soil, erosion and retrogression of the total ecosystem with dire biological and environmental consequences.

## 4.7 UNREGULATED RIGHTS AND CONCESSIONS.

4.7.1 The process of settlement of forests had an inbuilt mechanism to ensure that the rights of the local people to forest produce on the land in question were protected. These were treated as prescriptive rights. Normally these were confined to forest areas other than Reserve Forests and the beneficiaries were villagers inhabiting forests or those situated in the peripheral regions. Often the quantum of these rights and concessions in a particular area was determined by the type and intensity of forest management that could be introduced in such sites. On the other hand, the efforts of the State Forest Departments to bring forests under stricter silvicultural management were limited by the rights and concessions enjoyed by the local communities in such forests. Large areas of ex-Zamindari, ex-Malgujari forests and other Protected and Unclassed Forests were burdened with such rights and concessions.

4.7.2 Rights and concessions have gradually burgeoned, sometimes as a result of informal populist measures and in other respects as the inevitable consequence of the increase in population. During many settlement proceedings under the Indian Forest Act, 1927, rights and concessions were sometimes conceded liberally without regard to the carrying capacity of the forests. The Report of the Government of India Committee for Review of

Rights and Concessions in the Forest Areas of India (1984) observed that the settlement officers, while conceding or granting rights and concessions, did not always take into account the carrying capacity of the forests. In fact, it noted that there was hardly any meaningful coordination between the Revenue Settlement Officers and the Forest Department in this regard. As a consequence, the entitlement of rights of each village were determined without an evaluation of the resource base or the requirements of the local population. The fact that the forests in the neighbourhood of villages had disappeared or were so badly depleted that they were unable to bear the burden of the required quantum of rights and privileges, or the fact that the population had increased, was not taken into consideration at all. This resulted in a complete breakdown of all systems of rights and concessions, which in turn seriously contributed to undermining attempts at forest conservation.

4.7.3 In retrospect, it can justifiably be argued that the Settlement Officers were under pressure or were compelled to admit even the rights and concessions claimed by the local inhabitants which were never likely to be reasonably exercised. Similarly, the customary rights and concessions enjoyed by local people were considered to be in need of complete protection. It is evident, however, that the admission of such rights and concessions without judging the ecological consequences, the carrying capacity, or ensuring that available forest resources were adequate for this purpose was a totally unworkable proposition. Measures should have been taken to enhance supply and production from other sources wherever there was a deficit. Besides a mechanism was essential to ensure that people enjoyed the agreed privileges without permanently impairing or totally eroding the forest's capacity to sustain its resources. Nishtar bamboo forests of Central India, vividly demonstrate how seriously a resource can be destroyed. Indeed, the general health of common property resources like community lands, revenue degraded lands, unclassed forests, and to a substantial extent, protected forests, clearly testify to the fact that rights and concessions can no longer be guaranteed or are justified. By merely admitting these is courting ecological disaster and the only logical answer now lies in meeting people's requirements from wholly different sources.

4.7.4 Unregulated rights and concessions have inevitably resulted in bio-degradation of forests. In Uttar Pradesh, the Reserve Forests which are claimed to be managed scientifically are believed to be in somewhat better condition, while the Civil Soyam forests of the hills have almost completely been destroyed because of excessive exploitation through rights and concessions. In Bihar, while the well managed reserved forests are in a better conditions, large areas left outside the purview of restriction, present a bleak picture.

4.7.5 Another instance of the total destruction of forest cover, when it was given over as common property to villages is described by M. Madan Pant in "Harvesting of Water from Ravaged Siwaliks in India". "The Siwalik foot hills of Western Himalayas use to be covered by a bush growth of acacias and pines with a prolific undercover of shrubs and grasses. The forests contained several commercial species and supported a wide variety of wildlife. Perennial streams rising in the hills supported agriculture in the plains below. However, ... after the Sikh wars in 1845-49 ... the hill forests were annexed to villages as additional common land. In less than two generations, the unrestricted practice of tree felling and overgrazing destroyed the verdant cover. In turn, rain eroded the exposed soils of the upper catchments and transformed fertile mountain tops into rugged ridges that drop steeply into gaping canyons. The formal perennial streams have turned into seasonal torrents carrying large amounts of sand and gravel to the plains below. Over the years, the vicious process of silting ... (caused) gushing waters to spill over fertile fields subjecting them to flooding and sedimentation."

## 5. ECOLOGICALLY INCOMPATIBLE FOREST MANAGEMENT PRACTICES.

### 5.1 INADEQUATE NATURAL REGENERATION.

5.1.1 Many species like Sal, (Shores robusta) in Uttar Pradesh, Teak in Melghat (Maharashtra) and Deodar in Himalayas, etc. were found to be difficult to regenerate naturally. Intensive operations for this purpose were considered expensive. Natural regeneration of fir failed in areas worked either under shelterwood or selection systems.

5.1.2 Generally, due to the difficulty in bringing about regeneration, there was a tendency to merely work these forests by adopting such ad-hoc measures as removing mature trees and leaving concerted efforts at regeneration to the future. The regeneration of tropical rain forests were the least understood and, therefore, almost entirely neglected.

5.1.3 The tardiness, the uncertainty and the totally inadequate regeneration resulting from various silvicultural systems in vogue, instead of providing full protection, has led to more and more trials with planting.

### 5.2 LIMITED ECOLOGICAL VALUE AND HIGH FINANCIAL COSTS OF TRADITIONAL SILVICULTURAL PRACTICES.

5.2.1 In the initial stages, forest management concentrated on

regulatory measures and harvesting operations. Survey, demarcation and consolidation of forest areas was often hampered by inadequate provision of finances and manpower. Some efforts, indeed, were made to raise plantation crops as early as 1845. However, these were confined to small pockets and concerted efforts to raise plantations to improve growing stock were not made till the beginning of the Five Year Plans.

5.2.2 Generally forestry practices in India have been extensive and have depended upon natural regeneration. Since the forests have been under growing, and now extreme biotic pressure, and the requisite funds have not been available to protect regeneration, it has not so far been possible to ensure the development of growing "stock" through natural regeneration.

5.2.3 During the mid-seventies efforts were made to mobilise institutional finance to raise tree plantations. However, such plantations were confined to select areas in selected States. After 1980, the "Social" Forestry programme was intensified during the Sixth Plan to increase fuelwood, fodder and other small timber for the needs of the rural people. The programme was meant to be a people's movement, to empower the rural poor to generate their fuelwood, fodder and small timber requirements. Again the lack of appropriate policies regarding access of land to the poor for afforestation purposes, defunct Acts and laws which hindered rather than motivated people, resulted in vested interests controlling the "Social" Forestry programme. Instead of fuelwood and fodder, the "Social" Forestry programme has largely provided raw material to Industry - to the paper, pulp and building industries, bypassing the rural poor. Moreover, such programmes were undertaken largely in non-forest areas and degraded forest lands. Natural forests, however, suffered increasingly from the absence of understanding of their value and therefore concern, adequate protection and financial support.

5.2.4 The ignorance and therefore the lack of concern of decision makers/authorities in the past of the crucial ecological and environmental role of forests has resulted in their failure to assign the far higher priority that forests deserve and to provide adequate resources for their protection and regeneration. The National Commission on Agriculture (1976) stated that "Investment in forestry has been inadequate. Even for the forest production programmes, financial allocation so far had been very meagre. This has resulted in low production from India's forests. Lack of funds had also prevented programmes of increasing production by clearfelling forests and their replacement by plantations for attaining higher production per unit area. The main cause was that forests had been looked upon as a source of revenue without realisation of the need for investment". The NCA Report further observed that expenditure for forest improvement, such as, cultural

operations, construction of roads, etc. was mainly guided by the revenue earning potential of forests in a particular region, and not towards ensuring the overall development of the country's forests to meet a national ecological objective.

5.2.5 The Estimates Committee (1968-69) of the Fourth Lok Sabha in its 76th report observed that there was a need to provide adequate funds on a continuous basis to achieve the desired results from the development of forests. The uncertainties of budgetary allocation has always greatly impeded the growth of the forestry sector in India. Even after the inception of the Five Year Plans, there has been little improvement in the allocation of resources for this sector as is evident from the following table:

Outlay in Forestry Sector in Five Year Plan

| Plan/Period | Investment in forestry as % of total public sector expenditure/outlay |
|---|---|
| First Plan (1951-56) | 0.39 |
| Second Plan (1956-61) | 0.46 |
| Third Plan (1961-66) | 0.53 |
| Post Third Plan (1966-69) | 0.63 |
| Fourth Plan (1969-74) | 0.54 |
| Fifth Plan (1974-79) | 0.51 |
| Annual Plan (1979-80) | 0.54 |
| Sixth Plan (1980-85) | 0.71 |
| Seventh Plan (1985-90) | 1.00 (approx.) |

However, it appears that wisdom has now dawned and the Steering Group on Forests, Environment and Wastelands of the Planning Commission has recommended that the allocation for the Eighth Five Year Plan should be of the order of Rs.7,450 crores as compared to the outlay of 1859 crores for the Seventh Five-Year Plan. It is to be hoped that this will be devoted almost entirely to protecting areas, assigned for regenerating forests and stimulating natural regeneration so that the ecological role of forests can be greatly strengthened. However, the seriousness of the degradation of forests demands an even higher outlay.

## 5.3 CONTRADICTORY AND INCONSISTENT FOREST POLICIES.

5.3.1 Forest policies have undergone considerable changes within relatively short periods. This was understandable in the context of the earlier lack of appreciation of the fact that a living dynamic natural forest was of far greater value to people than merely the dead produce derived from intensive manipulation and harvesting of it. The frequent changes of policy affected management decisions, the successful implementation of which depended essentially on the specificity and consistency in the mandate or objectives of the policy.

Contradictory forest policies have led to considerable confusion at operating management levels. In terms of practical interpretation this has resulted in pursuing diametrically opposite orders. To quote an example from the early history of Indian Forestry:

> The Forest Policy of 1894 envisaged the benevolent paternalism of the district officials acting as arbiter between the Forest Department and the people. Closer co-operation and constant consultation between the Forest Department and revenue officials was urged, the maxim prescribed for the Forest Officer was of festina lente (hasten gently) even if this involved a deviation from the prescribed course for regeneration or extraction of trees for local use over and above that laid down by the record of rights.

5.3.2 The initial 50 years of the British regime in forest conservation in India were marked by hesitation in the introduction of effective protection largely because forests existed in such abundant measure. This ended with the Forest Policy of 1894 based on Dr. J.A.Voelcker's report who was commissioned to examine the condition of Indian agriculture and to suggest how it could be improved. The policy stipulated, as mentioned earlier, that wherever an effective demand for cultivable land existed and could only be provided from forest areas, the forest land should ordinarily be relinquished without hesitation.

5.3.3 After Independence, though the National Forest Policy has been formulated/revised only twice, each time the forest policies have undergone important changes. Some of these are ridden with contradictions:

(i) During the 1970s, the entire thrust was on production and extraction from forests. It was considered necessary that about 48 million hectares, including 2.7 million hectares of coniferous forests, should be identified immediately and dedicated for use as "production forests".

(ii) The Third, Fourth and Fifth Five-Year Plans also emphasised the need for concentrating upon forestry inputs to increase yield. In the Fifth Plan (1974-79), the primary objective was to adopt a concentrated programme of "production forestry", based primarily upon clearfelling of natural forests to create large-scale tree plantations with the support of institutional finance.

(iii) In 1987, within 10 years of the expiry of the Fifth Plan, the Central Board of Forestry, realising the crucial ecological role of forests, rightly took a diametrically opposite decision and resolved that:

(a) For the conservation of forests, the extraction

of wood from forests should be stopped.

(b) The requirements of wood for the country would be met by imports and "farm" forestry.

(c) The resultant reduction in State revenues, would be compensated, the quantum of compensation to be determined by the Eighth Finance Commission.

(iv) In the very next year, following the above resolution of the Central Board of Forestry, this was most regrettably contradicted by the National Forest Policy, 1988, which once again reintroduced the production aspect of forests. Increasing the productivity of forests to meet needs traditionally supplied from this source has, most surprisingly, and through lack of foresight, again been identified as one of the objectives of forests. It further states that in order to meet the increasing consumption of traditional goods and services which the forests provide, it is necessary to enhance the forest cover and the productivity of the forests through the application of scientific and technical inputs. It fails, however, to recognise that the effect of reintroducing the exploitation of the existing limited forest cover will inevitably lead to undermining whatever little ecological security this provides, to the long-term serious detriment of the entire socio-economic structure of the country. It also fails to recognise the most important role of natural regeneration and to spell out the means by which this can be achieved. Production forestry (Tree planting) programmes, while mistakenly presuming to enhance the forest cover in the country, fail to emphasise sufficiently the overriding national role that true forests perform of providing ecological security for the country. It emphasises, instead, the need to narrow the present growing gap in fuelwood and fodder requirements by increasing production by the turn of the century - an independent area of basically agricultural concern but of strictly limited ecological importance though of course of vital significance in meeting immediate essential needs of the poorest sections of the population.

5.3.4 While recognising the national goal of maintaining the minimum of one-third of the total geographical area of the country under forests, the policy regrettably perpetuates the confusion between forests and tree plantations, which are not the same. Empirical evidence indicates the justification of the adoption of the objective of establishing one-third of the geographical area of the country under true forests as the soundest foundation for ecological security. This being the case, production of fuelwood, fodder and timber to meet the country's requirements should, as stated elsewhere in this report, be secured from non-forest lowland areas now

under marginal cultivation and this is a responsibility that must be assumed by agriculture at Central and State level.

5.3.5 The above illustrations clearly establish how inconsistent and confusing forest policies and objectives have been upto the present time. Forestry in India has been plagued by a history of oscillating policy direction. This is understandable, however, because of the widespread environmental, particularly ecological illiteracy that has and continues to prevail in the country, especially at the decision making levels of Government. The absence of sustained sense of direction that has resulted has left a legacy of unresolved issues and unsolved problems which can finally only be settled once the overriding importance of the ecological role of forests is accepted, and this becomes central to all Government programmes concerned with ensuring ecological security and stability.

5.3.6 From an ecological point of view, the uncertainty and confusion that arose from past forest policies and practices possibly had its advantages, for had this not been so far more extensive clearance of Natural Forests and the establishment of extensive monoculture and polyculture tree plantations would have occurred, as has happened in China and therefore far greater ecological degradation than is the case today.

## CHAPTER III : DEPENDENCE OF TRIBALS AND NEIGHBOURING COMMUNITIES ON FORESTS.

### 1. THE EFFECT OF CONTEMPORARY CONCEPTS OF DEVELOPMENT ON MARGINAL COMMUNITIES.

1.1 Poverty, which is reinforced by rapid population growth, puts severe, and often irreversible, strains on the environment. The enormity of the pressure to which the country's natural resources have constantly been subjected, can be visualised from the fact that the country had 200 million people below the "poverty line" in 1988. Paradoxically, the very processes of economic development and poverty eradication programmes often prove counter-productive, marginalising the poorest of the poor, enriching the rich and accelerating the very process of environmental degradation. The Seventh Plan document states that "the problems encountered in the field of environment in India arise due to conditions of poverty and under-development as also the negative effects of development programmes which have been badly planned or badly implemented." It further states that another class of environmental problems has arisen as the unintended side effect of the very attempts at development, primarily on account of mismanagement of natural resources, large scale deforestation, the unplanned discharge of residues and wastes, the handling of toxic chemicals, indiscriminate construction and expansion of settlement activities. However, with the growing understanding of the nature and causes of environmental degradation, not all the earlier perceptions of causes and effect are sustainable. For instance, it is now clear that those better-off are contributing increasingly to the accelerating environmental deterioration in the country and that a number of the earlier notions have been borrowed from the West.

1.2 A large section of rural society depends on public lands to meet its domestic biomass needs. Even though these lands are mostly marginal and sub-marginal, the poorer sections of the community are rarely in a position to find alternatives to live off. Such lands, therefore, represent the confluence of the people at the margin in our socio-economic system and the demarginalised natural resources. In thickly populated rural areas, even the day-to-day needs of the local communities, namely, fuelwood, fodder, household timber, have burgeoned far beyond the sustainable production of the existing resources. The large scale diversion of traditional agricultural land for commercial crops, backed by the money power of the organised sector, has further worsened the situation. The pace of growth in the secondary and tertiary sectors has not been fast enough to absorb the additional manpower. The size of the landless population in rural areas is increasing at an alarming rate. The

underprivileged are forced to migrate farther along with a receding tree-line or into urban areas adding to the urban sprawl with all its consequences, and to their own suffering and frustrations.

1.3 The benefits of modern science and technology is accruing almost entirely to the organised sector. The articulate and the influential sections of society have increasingly usurped the ownership of resources, thereby dispossessing the mute and the feeble. "The processes of deprivation of the rural economy in general and agricultural sector in particular are affecting most adversely members of weaker sections, particularly members of the Scheduled Castes and Scheduled Tribes who are facing a severe backlash of development of all varieties as their areas are being opened up and the tentacles of the organised sector are gradually spreading out to the remotest areas now." (28th Report of the Commissioner for Scheduled Castes and Scheduled Tribes, 1986-87). Development processes try to transform those resources, which were freely available to all, into commodities which can be bought and sold in the market, thereby making these inaccessible to the bulk of the populace.

1.4 Agriculture is the mainstay of rural economy in India, yet the ownership of agricultural land is highly skewed. About 20 per cent of the farmers own nearly 80 per cent of the agricultural land, while the remaining 80 per cent subsist on a mere 20 per cent of such land. The land owned by the poorer sections of the society is marginal and often unirrigated. The bulk of the poor in rural areas comprise those who have been dispossessed of land holdings under economic pressure, marginalised by the increasing pressure of population, deprived of their traditional community resources and evicted from their lands on payment of cash compensation.

1.5 Self-sufficiency in foodgrain production through the "Green Revolution" is hailed as one of the major achievements of the country. But the benefits have accrued largely to the affluent and the influential. The chronic problem of malnutrition still continues. "The Green Revolution has intensified rather than helped alleviate the problems associated with feeding the world's rising members." Critics call it a flagrant example of a "development solution" that has brought nothing but misery to the poor. Adoption of modern capital intensive agricultural methods often leads to growing indebtedness and bankruptcy. The increase in yields achieved by the use of fertilizers is grossly exaggerated. It is said that in India the "miracle strains" developed in the Green Revolution have increased yields of wheat at most by 50 per cent and that of rice by a mere 25 per cent, though the consumption of fertilizer increased by more than 20 times between 1960-61 and 1982-83. According to one opinion, chemical fertilizers are not suitable for agriculture in the

tropics since their use gives rise almost immediately to rapidly diminishing returns due to soil degradation. But the "Green Revolution" is totally dependent on the massive use of fertilizers, pesticides, agricultural machinery and considerably greater irrigation.

1.6 During the last decade or so, Government has launched a number of special programmes for the economic upliftment of Scheduled Castes and Scheduled Tribes. Despite massive investments, the achievement of such programmes "fall far short of the expectations and are inadequate compared to the tasks ahead to secure members of these communities a place of equality in the national economy, particularly in the context of the emerging situation in which the relative position of these communities in the national economy has not improved, but, has deteriorated, especially for the Scheduled Tribes." (28th Report of the Commissioner for Scheduled Castes & Scheduled Tribes). Often the Tribal Sub-plans remain a notional exercise in mechanical disaggregation of sectoral outlays without any relevance to the socio-economic environment of the tribal communities. The poverty alleviation programmes and rural employment schemes suffer from professional bias. The concept of "employment", which is essentially borrowed from urban, industrial and formal sector economy, is applied to the rural sector. What is more relevant to the rural sector is provision of a means of livelihood, characterised by an adequate and secure stock and flow of cash and food for the household and its members throughout the year, and the means to meet contingencies. Similarly, eradication of "poverty" is often measured in terms of increase in consumption whereas the rural poor are confronted with "deprivation" characterised by poverty, physical weakness, vulnerability, powerlessness and isolation which are seldom quantified in terms of the professional definition of "poverty".

1.7 A large number of industrial, irrigation, hydro-electric, defence and other development projects have been taken up since Independence, mostly under the Five Year Plans. Though their main objective was to achieve "stable economic growth" and to "remove poverty and backwardness", these have caused incalculable miseries to a large section of the society. The immediate fallout of such projects has been the displacement of human habitations and destruction of life-support systems of the local communities. Such projects have also resulted in land degradation through water logging, salinity and alkalinity and pollution of water and air. The extent of misery has been aptly described in the 28th Report of the Commissioner for Scheduled Castes & Scheduled Tribes in respect of the Narmada Valley Project. The report notes that "if the past experience is any guide, one cannot but conclude that the people here are destined to pay the prices of development and face disorganisation and destitution while the Constitution would remain a mute witness to that great tragedy." Commenting on the overall process of economic development, the Report

states that "if economic processes are allowed to have a free play without reasonable constraints necessary in the interest of equality, the backlash of developmental processes will become increasingly severe which will affect members of the Scheduled Castes and Scheduled Tribes the most. The renewed faith in a higher growth rate is misplaced in the context of growing inequality, soaring aspirations and uninhibited consumerism..." The deprivation of marginal communities can be reduced only by restoring the optimum functioning of ecosystems through restoring the natural vegetative cover as quickly as possible to ecological climax condition rather than by adopting high investment and high input technology.

## 2. TRIBAL MAN, TRIBAL DEVELOPMENT AND FORESTS.

2.1 There can be many ways of defining the tribal identity - physical, cultural, anthropological, genetic, bio-medical, legal, constitutional and so on. There could be a functional ecological one too, which distinguishes tribals from the so-called cultural mainstream by the extent to which they have adapted to live in harmony with the natural ecosystems. The functional integration of a human being into a natural ecosystem will be reflected in the non-disruptive way human species blend into, that is, survive in the ecosystem of a locality. It is, of course, a question of degree that distinguishes the variety of human societies. A totally maladapted specie or community just does not survive. Similarly, the time-scale of observation is also crucial in distinguishing between the adapted and the maladapted. It is possible for a shift to take place from one to the other, as is now happening so quickly. In a philosophical vein, it can be said that what distinguishes an ecologically harmonious individual/society from an ecologically maladapted individual/society is a state of mind. Biologically, there may not be any distinguishable difference. It is the cultural inclinations that make the crucial difference. Cultural patterns change far more rapidly than shifts in the gene pool of a species. An adapted community/culture can become maladapted far more quickly than its genetically controlled evolution of biological traits.

2.2 The external manipulation of the habitat is one indicator of the degree of adaptability; the less the environment is changed the more ecologically adapted or more "tribal" that society is. Once the capacity or inclination to survive without irreversibly modyfying the habitat is lost that society can no longer be described as a truly tribal society.

2.3 There is at present in the tribal world of India, a wide range of tribal societies, from the true hunter gatherers or gathering communities in the wet evergreen forests of the Andaman and Nicobar Islands, who do not practice agriculture at all, through a whole spectrum of gradually

increasing dependence for food on manipulated and irreversibly modified habitat, to fully "culturised" societies whose only "handicap" is numerical inferiority or occupation of an ecologically less favourable, that is, less productive habitat.

2.4 The tribal identity is partly due to cultural insularity. Cultural insularity often stems from physical isolation due to the topographic conditions of the habitat. Inaccessible terrain and inhospitable land were not so much sought after earlier by mainstream civilisations. But the thirst for resources (even tourism demands on a landscape is a form of resource exploitation), increasing destruction or depletion of resources and changing definition of what constitutes a resource itself, is creating areas of conflict between tribal societies and mainstream society. Tribal lands are needed for mining, river valley development, forestry and agricultural land use by the more powerful main cultures dominating the polity of the land. While the natural balance would have encouraged and actively sought to perpetuate cultural heterogeneity as a survival option, modern civilisation has attempted, for management (that is, exploitative) conveniences, to homogenize the cultural diversity. Hence the tribal development measures adopted, simultaneously proclaim the need to bring the tribal into the mainstream of natural culture for which all the cultural trappings of the country's economically dominant societies are handed out in liberal measures, which only corrupts tribal identity and at the same time attempts to preserve some adornments of the culture and reserves some rights without considering the totality of their identity.

2.5 The tribal identity, at least in some minds, has attained a romantic aura. While it is true that the only way to save humankind and the living world for all is to adopt the identity of a true tribal, that is, by living in harmonious dependence on the natural habitat, it is equally true that the vast majority of those who are identified in Constitutional Schedules as "tribal" are no longer any different from the mainstream Indian.

2.6 The earlier physically insulating factors of their habitat only adds to tribal deprivation and degradation. Moreover, potential future areas of conflicting interests are also fast developing. Forest conservation is one such area. When the extent of vegetative degradation of this sub-continent was far less than it is today, the ecological role of forests was overlooked. But now the devastating plundering of natural resources for urban and industrial consumption and the unbearable human population pressure on the land have threatened the very foundation of the country. In ruthless competition the urbanite and semi-urbanite has dislocated and driven tribal societies into the most ecologically sensitive, and hence what in ignorance is considered "marginal" lands. Cultural aggression has contaminated, diluted or

even made irrelevant their adapted cultures and they have inadvertantly become destroyers of their habitat.

2.7 When the ecological crises comes home to roost, we look around for solutions and understand for example, that deforestation is so rampant that the country is increasingly becoming a desert. Because of urban aggression, the retreating micro-cultures have occupied the most sensitive lands and have lost their adaptedness or they are in involuntary retreat into ecosystems too sensitive to support any human society. Jhumming, which continues to be practiced in the remaining forests of Eastern and Western Ghats, provides such examples.

2.8 A close detailed first hand study of many hill forest tribal societies brings out the extremely precarious condition many of these societies are faced with today and the seriousness of the havoc caused to the critical hydrogeographic forests. Dispassionate decisions are called for and in a sound land-use plan for the country, atonement for past sins cannot be evaded. Those tribal societies pushed into unviable practices or locations must be rehabilitated. Lands usurped by the plains people or the so-called outsiders for their cash economy land-use practices must be returned for the subsistence economy of tribal cultivation. It may appear superficial that there is conflict between forest protection measures and tribal protection measures. Not only for the long-term survival requirements of the country must this have the highest priority but also even for ecological and cultural rehabilitation this is unavoidable. The execution of such a radical decision must be worked out in the most careful detail and be based upon the needs of specific communities, areas and even individual settlements. There can be no uniform prescriptions. The tribal leadership and others concerned might consider it inhuman, the political leadership might consider it too volatile and sensitive, and the rural/urban communities outraged at the prospects of being dispossessed. The financial implications might frighten the planner. But there is no escape. The earlier the decision to collect all the relevant information and plan in systematic detail the execution of the required measures, the less damaging it will be for these societies and for the country as a whole.

## 3. TRIBAL POPULATION AND ITS DISTRIBUTION.

3.1 According to the 1981 census, based on the official definition of the term "tribal", the population of Scheduled Tribes in the country was 52 million, representing 7.8 per cent of the total population of the country. Official records stated that there are over 256 Scheduled Tribe communities spread over 21 States and four Union Territories. About 55 per cent of the Scheduled Tribe population is concentrated in the Eastern and the Central tribal belt including West Bengal, Bihar,

Madhya Pradesh, Orissa and part of Andhra Pradesh; about 28 per cent is in the Western tribal belt covering Gujarat, Maharashtra, Rajasthan, Dadra and Nagar Haveli, and Goa, Daman and Diu. Only about six per cent of the Scheduled Tribe population is found in the South - in parts of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu; about 10 per cent is in North-East India; 0.83 per cent is in Himachal Pradesh; and 0.10 per cent is in the Lakshadweep and Minicoy Islands and the Andaman and Nicobar Islands.

3.2 The census of the tribal population does not distinguish between tribals within and in the immediate vicinity of forests and others. The number of tribals living within and in the immediate vicinity of forests, in truly symbiotic relation with it, officially described as primitive tribes, and, therefore, wholly dependent on forests for their survival, is believed to be 1.6 million. However, there is reason to believe that the present number may be significantly less. An unofficial list of important tribes is provided in the Appendix XIII.

3.3 About 70 per cent of the country's mineral resources and the major proportion of forests and water and hydel power sources are located in the areas predominantly inhabited by the tribals. Where these are worked, tribals should have prior call on employment opportunities available.

3.4 The following table provides statistics related to the occupation of tribals and non-tribals. These figures reveal that a much larger section of the tribal population as compared with the non-tribal population is dependent on agricultural land:

Dependence of Tribals and Others on Agricultural Land:

| | 1981 | | 1971 | |
|---|---|---|---|---|
| | Tribal (%age) | Non-tribal | Tribal (%age) | Non-tribal |
| 1. Cultivators | 54.43 | 41.08 | 58 | 44 |
| 2. Agricultural labourers | 32.67 | 24.94 | 33 | 21 |
| 3. Engaged in cottage industry, manufacturing, processing, servicing and repair and other vocations | 12.90 | 34.38 | 9 | 35 |

## 4. TRIBAL DEPENDENCE ON FOREST ECO-SYSTEMS.

4.1 Like many of the rural poor living in or near forests, tribals depend on forests in a number of ways. The first and foremost is the occupation, legal or illegal, of forest land for agricultural purposes. The Committee on Forests and Tribals in India (Government of India, 1982) reported that nearly 12 per cent of the tribal population of the country is involved in shifting cultivation, 2 per cent reside in forest villages, and 5 per cent is in occupation of forest land through encroachments.

4.2 Non-Timber Forest Produce (NTFP), commonly termed as Minor Forest Produce (MFP), has special importance for tribals. The expression "Minor Forest Produce" is inappropriate as it grossly undervalues the utility of a wide variety of forest material valuable to the lives of a substantial number of Indians. Non-Timber Forest Produce (NTFP) is important to the rural economy to ensure food security by way of staple foods, nutritional supplements and buffers against seasonal and emergency shortages. It is estimated that about 60 per cent of the edible produce is consumed by tribals locally. Traditional medicines use NTFP as essential ingredients, the substitutes for which may either be expensive or simply not available. Ayurveda, the ancient Indian system of medicine, currently being revived, depends a great deal on herbs and plants from natural forests. NTFP is also used as construction material for houses, as implements for domestic as well as economic activities such as agriculture, fishing, hunting or small-scale processing and manufacturing and, finally, as a means of generating income and employment by collection, processing, manufacture and trade of these products.

4.3 In addition to the above benefits accruing to the people, collection of NTFP provides cash earnings to the tribals which is estimated to be between 10 and 40 per cent of the tribal household earnings, depending on the extent of forests in the area. In districts like Bastar, it is estimated to be about 85 per cent of the total earnings of tribal families. A study conducted in Bastar in 1981 revealed that in an average household with 2 adults, at least one child and one old person, about Rs.1,500 out of a total annual income of Rs.1,750 is earned through the sale of NTFP. The collection of tendu leaves through primary cooperatives in Madhya Pradesh has been outstandingly successful and will effectively help to raise the economic level of tribal and other communities in the State above the poverty line. The economic potential of many other NTFPs still remains unexplored. Accelerated erosion of natural forests is resulting increasingly in the rapid decline of income from this source, rendering the existence of tribals in their age-old habitat and life style impossible.

4.4 In India, some of the important NTFPs are tendu leaves, bamboo, sal seeds, sandal wood, catacheu, resins and essential oils. Inadequate appreciation of the value of NTFPs has led to a decline in their trade and there are shortages of many commodities of daily use. For instance, it has become necessary to import catacheu and jigat. The latter is used in "agarbattis" or joss sticks. Further neglect of NTFPs can lead to greater import bills as has been the experience in Thailand where U.S.$ 22 million is spent annually to import NTFPs which was once available from the local forests. However, this may not be an apt comparison, since the availability of NTFP, in commercial use, from both internal and foreign sources, instead of being reversed in the manner recommended in this report, and systematic cultivation of such produce by agriculturists/horticulturists is not undertaken.

4.5 The contribution of NTFP to the total net revenue from the forestry sector in India increased from 30 per cent in the 1960s to over 40 per cent in the 1970s. Tendu leaves alone contributed a revenue of Rs. 480 crores in 1989 and provided indirect employment to 10 people for every one person employed in the collection of Tendu leaves. The contribution of NFTPs to the total revenue has been increasing over the years and is, if especially cultivated on farm lands, likely to increase even further in the near future. However, the revenue which accrued to the forest departments is a small portion of the total (nearly one-third to half of the total) and does not take into account the value of NTFP consumed locally by tribals and forest dwellers, or sold or bartered by them directly.

4.6 It is estimated that sustainable economic value of NTFPs, even in financial terms, may well be greater than destructive alternate forest uses. If the proposals of this committee on ecological restoration are implemented, even without considering the value of the resultant ecological benefits, the value of developing alternative sources of NTFP could be far greater than the revenue earned from the sale of timber.

4.7 Tribals collect a number of items of daily use from the forests. A survey conducted in Bastar District of Madhya Pradesh revealed the following pattern of collection of forest produce.

4.7.1 For Locations Near Dense Forests:

| Category of gatherers | Purpose & percentage of forest produce collection | | | | | | |
|---|---|---|---|---|---|---|---|
| | Food | Construction material | Agricultural & allied activities | for sale | Fuel wood | Socio-religious activity | Total |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. By age group: | | | | | | | |
| (i) Old persons | 31.11 | | 11.11 | 22.22 | 30.23 | 5.33 | 100 |
| (ii) Young persons | 21.01 | 12.61 | 10.08 | 22.69 | 30.25 | 3.36 | 100 |
| 2. By land holdings: | | | | | | | |
| (i) Big farmers | 6.55 | 27.10 | 32.72 | | 29.90 | 3.73 | 100 |
| (ii) Small farmers | 14.68 | 12.08 | 13.83 | 24.18 | 32.82 | 2.41 | 100 |
| (iii) Others | 19.83 | 21.55 | 17.55 | 10.34 | 24.14 | 6.89 | 100 |

4.7.2 For Locations Near Degraded Forests:

| Category of gatherers | Purpose & percentage of forest produce collection | | | | | | |
|---|---|---|---|---|---|---|---|
| | Food | Construction material | Agricultural & allied activities | for sale | Fuel wood | Socio-religious activity | Total |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. By age group: | | | | | | | |
| (i) Old persons | 38.46 | | | | 61.54 | | 100 |
| (ii) Young persons | 22.05 | 15.06 | 13.21 | 5.66 | 39.62 | 3.77 | 100 |
| 2. By land holdings: | | | | | | | |
| (i) Big farmers | 7.69 | 19.23 | 26.93 | | 46.15 | | 100 |
| (ii) Small farmers | 17.77 | 13.34 | 17.77 | 6.77 | 44.45 | | 100 |
| (iii) Others | 10.21 | 20.41 | 24.49 | | 44.89 | | 100 |

4.8 Another survey conducted in the early 1980s in the forest regions of Gujarat, revealed that nearly 22 to 27 per cent of adults and 70 to 72 per cent of children go to the sparse forests of the State to collect of tubers, leafy vegetables, bamboo shoots and a host of other forest products. There is every reason to believe that since then considerable changes in their cicumstances has occurred affecting the living conditions of the tribals.

4.9 A study conducted by the Administrative Staff College of India, Hyderabad (1977-78) indicated that agricultural production from land is inadequate to maintain a tribal household at subsistence level. The income from labour is erratic. Collection of NTFP, which has been important, was conditioned by availability, marketability, access to forest and other constraints. However, in certain cases, a major portion of the collection of NTFP is for self-consumption. During drought and adverse conditions, the households lived mainly on edible products collected from forests. In Andhra Pradesh, Bihar, Madhya Pradesh and Orissa, households owning less than two hectares of land have been mainly dependent on NTFP collection. The average income realised through sale of NTFP is given below:

| State | Income accruing from sale of Non-Timber Forest Produce (% of total income) |
|---|---|
| Andhra Pradesh | 10-55% |
| Orissa | 5.4-13% |
| Bihar | 7.4-4% (sic) |
| Madhya Pradesh | 13.6-38% |

4.10 A recent study conducted by the Tribal Research and Training Institute, Ahmedabad, regarding the impact of NTFP collection on the socio-economic life of tribals, has shown that nearly 35 per cent of the earnings of the tribals in the Panchmahal District in Gujarat was from NTFP.

## 5. FORESTRY OPERATIONS FOR EMPLOYMENT GENERATION.

5.1 Traditional forestry operations such as planting, protection, harvesting, transport, have been important sources of employment for the rural populace and the tribals living in and around forest areas. Such employment is generated during the lean season and supplements employment in agricultural production. Employment potential in traditional forestry has the following special characteristics:

5.1.1 It has provided a livelihood to a comparatively under-privileged section of society in remote and inaccessible areas.

5.1.2 Traditional forestry activities required a very high component of unskilled labour and, therefore, benefitted primarily the unemployed agricultural labour, the weaker sections of society and the landless and marginal farmers.

5.1.3 Traditional forestry employment has been seasonal and complementary to employment in the agricultural sector.

5.1.4 Apart from direct employment, traditional forestry operations created substantial downstream employment for unskilled and semi-skilled labour.

5.2 The National Commission on Agriculture (NCA, 1976) found that in the year 1970, about 2.3 million man-years of employment were generated by the traditional forestry sector. NCA projections for the year 2000 showed 5.5 million man-years of employment could be generated. Since NCA finalised its report, "social" forestry and afforestation are being undertaken on a massive scale. About 2 million hectares of tree planting was undertaken in the year 1988-89. If it is assumed that plantation over one hectare requires one man-year, the employment potential at the current level of plantation activities could be 2 million man-years. This, apparently, is in addition to the NCA estimates shown above.

5.3 According to the Sixth Five-Year Plan document, traditional forestry and logging generated employment of 6.2 million man-years during 1978-79 and it was expected to increase to 7.8 million man-years by 1984-85. In the perspective of that Plan, continued development of the traditional forestry sector on established lines was considered capable of generating employment of 10 million man-years by 1984-85 in the primary sector alone.

5.4 The NCA report had stated that in 1970 the employment potential in harvesting of NTFP was 250 million man-days. By the year 2000, oil production from minor oilseeds of tree and shrub origin was expected to rise by 20 times over the 1970-71 level. There would be a corresponding increase in employment opportunity. Substantial additional employment would be generated in other areas, e.g. oleoresins, gums, tannins, tendu leaves, essential oils, etc. NCA had, therefore, forecast in their 1976 report that if proper investments were made and organisational support given for attaining the potential production of NTFP, the employment on their account can increase easily to 1,000 million man-days by the year 2000.

5.5 Another estimate puts employment in collection of NTFPs at 1.1 million man-years in 1982 and this could be increased to 3.2 million man-years. It is also estimated that for every person directly employed in forestry, four get employed outside from later processing required for such forest produce. In certain products like tendu leaves, employment generation downstream (rolling of "bidis") has been as high as 10 times.

5.6 Forest-based small-scale enterprises (SSEs) have been yet another major source of employment. Precise data for wood-based SSEs is not available. One estimate placed

the number of registered units in 1981 at 50,000 with the presumption that an equal number of units was unregistered. This excluded individual carpenters and artisans. Often forest-based SSEs tended to be in the traditional and informal sectors in terms of employment and value addition. Collection and processing of NTFP has been overwhelmingly an informal, household enterprise, providing livelihood mainly to the disadvantaged socio-economic groups, such as tribals, women and the landless.

5.7 Another form of employment is the collection and trade of headloads of fuelwood. Authentic data about such removal of fuelwood, which is mostly done in a clandestine manner, and its employment potential is not available. However, some information on the grave effects of this form of employment is available from other references. It was estimated that in Madhya Pradesh every year nearly 6 million tonnes of fuelwood were removed from forests (in the form of head loads) for sale in towns and cities. In Rajasthan, it was reported that 4 lakh families were engaged in extraction of fuelwood from forests.

## 6. DEPENDENCE OF NON-TRIBALS ON FORESTS.

6.1 Apart from the tribals, a large number of other rural people have also depended on forests and other Government or community land. The exact population of such people is not known. Professor Madhav Gadgil and others, who were commissioned by the Committee, prepared an in-depth paper in which they concluded that people living below the poverty line in rural areas are dependent on forests and public lands to a great extent. In certain regions of the country, particularly in the Western Ghats, the Himalayas and Western Rajasthan, where forests and degraded lands together account for 75 per cent or more of the total area, the entire population and its livestock have been dependent on these areas in many ways.

6.2 This dependence is said to be negligible in the heart of the Gangetic Plain, where forests and degraded land account for less than 10 per cent of the country's total land mass. People in these areas meet their domestic biomass needs from agricultural and other wastes. They have drawn the inference that dependence of people and their livestock on public lands is the maximum in very arid regions with limited forests and large areas of degraded lands. It is estimated that roughly about 96.5 million people, 36.6 million cattle, 11.1 million buffaloes, 12.3 million sheep and 20.1 million goats are dependent on forests and non-forest public lands. This is roughly one-sixth of the total rural population and about one-fifth of the total livestock population of the country. This obviously includes the tribal population.

6.3 The above establishes the extent of dependence of the true tribals on forest ecosystems. The major and fundamental changes that are taking place in the natural ecosystems of the country brought about by the population explosion and "development" can no longer sustain anywhere near such a level of dependence on forests of these communities. Indeed, the present ecological crisis that the country is reaching, as has been made clear elsewhere in this Report, requires that not only should the existing notified area of forest be protected from further alienation but that the full one-third of the geographical area of the country, and more, must be brought under a full forest rejuvenation regime through natural regeneration. Moreover, the process must be accelerated to achieve ecological climax conditions as soon as possible, though this may sound utopian. The repercussions of this ecological crisis are likely to be visited most upon the majority of the officially recorded tribal communities other than the true "primitive" tribals, who will continue to reside in the forests while their younger generations seek urban locations. It must be the Government's endeavour to mitigate the hardships of the non-primitive tribals by providing the full resources required. Government must accelerate the process of integrating the non-primitive tribals into the mainstream of the country's social and economic structure through providing them increased reservations for available education facilities as well as increased job opportunities. A crucial way of mitigating their problems of relocation is to ensure full enforcement of land tenure legislation. This must now be undertaken in earnest with the primary object of assigning lands to be freed from those whose holdings exceed the land ceilings especially in the plains.

## 7. OCCUPATION OF FOREST LAND.

7.1 Sizeable forest land is under encroachment and continues to be under the occupation of the local people without formal ownership. Repeated attempts have been made in the past by the State Governments to resolve this issue by regularisation of encroachments, but a rational solution remains elusive. The National Forest Policies of 1952 and 1988 make special mention of the settlement of shifting cultivation and view this as a complex socio-economic problem. However, other forms of adverse possessions like encroachments have not been viewed in their totality and appear to be one of the most serious problems facing the ecological role of forests in some areas.

7.2 Often there is a complete dichotomy in perceptions. At one end relocation of human habitations in the interest of "protection", such as relocation of villages for National Parks, is considered legitimate and the only answer. On the other hand, long-established forest settlements are regarded as infringements and their relocation as appropriation of the legitimate rights of

the local people. Such contradictory views, compounded by the lack of decisiveness in the settlement of outstanding land issues, have created conditions which are being exploited by extremist groups and politicians to erode or undermine the authority of the State administration. Some issues which need to be addressed immediately are highlighted below:

7.2.1 Sometimes the process of forest settlement is prolonged and the people continue to live in a state of uncertainty regarding their rights and privileges. There is a possibility that, despite observing all the formalities involved in forest settlement, which often results in delays, the rights of the local people get abrogated owing to their ignorance or negligence and this leads to discontent after the completion of the settlement procedures.

7.2.2 In some cases the position of the forest is ambiguous because of the difficulty in reconciling revenue records with forest records. When such lands are allotted by the Revenue Department to cultivators, the pattas are rightly treated as illegal by the forest officials.

7.2.3 A state of uncertainty continues to exist regarding the proprietary rights on Ek-Sali (one-year) leases, agri-silvi plots, forest villages, Dali-lands etc.

7.2.4 There is a possibility that in certain areas like the ex-Jagirdari forests, the local people had been given certain concessions or privileges without these being formally codified anywhere and therefore stood automatically abolished with the abolition of the Jagirdari system. The present ambiguous state of Warkas land is a fallout of the above.

7.2.5 Shifting cultivation, which is a way of life of some tribal communities, has social and cultural overtones. Whereas the programmes and packages for rehabilitation of tribals engaged in shifting cultivation have been debated at length in the past, the social and cultural aspects continue to be neglected. There is ambiguity about the ownership and legal status of land under shifting cultivation. Such land use occurs in the North-East and also in Orissa, Bihar and Andhra Pradesh.

7.2.6 A number of States regularise past encroachments in forests from time to time. This leads to large-scale encroachments in forests and the problem continues to be open-ended, notwithstanding the provisions of the Forest (Conservation) Act, 1980. The State Governments and the political parties lack either the courage or the will to act legitimately, and a state of uncertainty therefore continues and people are encouraged, often by unscrupulous outsiders, to encroach further. The uneasy

calm prevailing between the forest administration and the local people is exploited by the extremists to spread lawlessness in forest areas. Such instances are common in Naxalite infested areas of Andhra Pradesh, Madhya Pradesh, Maharashtra, Assam and the Jharkhand tract of Bihar.

8. PROVISIONS OF THE NATIONAL FOREST POLICY, 1988.

8.1 The contention that a substantial proportion of the tribal population in India continues to depend on forest produce for their food, shelter and cash income is now debatable. Perhaps this dependence is now limited to primitive groups whose population is around 16 lakhs. However, their livestock do graze in forest areas. The National Forest Policy, 1988, states that "the life of tribals and other poor living within and near forests revolves around forests. The rights and concessions enjoyed by them should be fully protected. Their domestic requirements of fuelwood, fodder, minor forest produce and construction timber should be the first charge on forest produce."

8.2 The Policy further states: To quote "Having regard to the symbiotic relationship between the tribal people and forests, a primary task of all agencies responsible for forest management, including the forest development corporations should be to associate the tribal people closely in the protection, regeneration and development of forests as well as to provide gainful employment to people living in and around the forest. While safeguarding the customary rights and interests of such people, forestry programmes should pay special attention to the following:

8.2.1 "One of the major causes of degradation of forest is illegal cutting and removal of timber by contractors and their labour. In order to put an end to this practice, contractors should be replaced by institutions such as tribal cooperatives, labour cooperatives, Government corporations, etc. as early as possible.

8.2.2 "Protection, regeneration and optimum collection of minor forest produce along with institutional arrangements for marketing such produce.

8.2.3 "Development of forest villages should be on par with that of revenue villages.

8.2.4 "Family-oriented schemes should be formulated for improving the status of the tribal beneficiaries.

8.2.5 "Undertaking integrated area development programmes to meet the needs of the tribal economy in and around the

forest areas, including the provision of alternative sources of domestic energy on a subsidised basis, to reduce the pressure on the existing forest areas." Unquote.

## 9. ISSUES ARISING FROM THE POLICY.

9.1 The policy statements mentioned above need much closer scrutiny and possibly revision, especially with reference to the over-exploitation of the resource base resulting from the rapid escalation of the users' needs. Some of the pertinent issues are mentioned below:

9.1.1 How can tribals and other rural poor living in and around forests continue to enjoy the benefits from forests without destroying the role of forests in sustaining overall ecological security or over-exploiting forest capital? Since the current and growing natural resource use cannot be sustained and should be curtailed or stopped in the interest of the overriding ecological security of the country, what measures should be adopted to prevent users from eroding forest resources and to sustain the ecological role of forests?

9.1.2 What can be done to meet the sustenance needs of the tribals and other local people who are now destroying forests for a living? What should be done to supplement their income and that of others who, at present, are not destroying forests, but will inevitably do so in future in the absence of better alternatives?

9.1.3 How can tribals and other local people be effectively involved in the protection of forests, and what should be done to secure their cooperation?

9.1.4 What measures should be taken to stop the diversion of forest land to other uses and to strengthen the ecological functions of forests, the first beneficiaries of which would be the people living in the vicinity?

9.1.5 How should the present impasse in respect of encroachments, shifting cultivation and other forms of adverse possession and abuse of forest land be overcome, especially to comply with the provisions of the National Forest Policy, 1988, which categorically opposes the regularisation of encroachments on forest lands?

9.1.6 What measures should be taken to ensure the periodic survey and demarcation of forests, expeditious settlement of issues without injustice to individuals, whenever forests, National Parks, and other protected areas are to be notified?

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10.2 A land settlement process should be developed that will ensure that the settlement proceedings are carried out justly and without delay and, equally important, that it is done so in a manner that is equitable and does not allow unjust gains to the more influential sections of the population.

10.3 The process of resettlement of forest villages in particular, and the award of proprietary rights to eligible forest villagers in areas to which they are rehabilitated, will have to be given the first priority and be conducted in a sensitive and understanding manner that secures their cooperation. This work should be conducted by the State Forest Departments in conjunction with Revenue departments of the State Governments. Special budgetary provision would need to be made for this purpose.

10.4 Major development projects should be thoroughly scrutinised before granting clearance under the Forest Conservation Act, 1980, or the Environment Protection Act, 1986, and none that has serious ecological consequences should be approved. This will involve the most careful socio-ecological appraisal before the project can be considered for approval. Whenever any project is deemed essential in a tribal area, adequate measures must be taken to rehabilitate the displaced persons and this should be made a part of the project conditions for approval. Instead of providing for individual rights, concessions and privileges to such persons, provision should be made for community based assets for the sustained enjoyment of privileges, preferably in the form of goods and services rather than in cash.

10.5 Stringent controls of the licensing of new saw mills is, hereafter, essential. In any case, these should not be permitted anywhere near forests. The supply of raw materials to such mills must be carefully regulated and at all times must be kept under strict surveillance.

10.6 Prescriptive/informal rights, concessions and privileges will now need to be entirely revised and preference should be given to translocated communities, until they have been integrated into their new environment in the supply of their essential needs of biomass from alternate domestically raised sources. Village artisans, hitherto dependent on forest produce for their livelihood, should receive preferential supplies of such raw material.

10.7 Public distribution systems for the displaced and relocated communities should be especially responsive to their needs. Such systems should not only ensure timely availability of their requirements of food but their other daily necessities, including their domestic energy needs.

10.8 Special livestock improvement packages, based primarily on stall-fed high-yielding breeds, should be designed for translocated communities. These programmes should take into account the need to supply fodder free of cost initially, and subsequently at heavily subsidised rates. Private farmers should be encouraged by incentives to grow fodder on a commercial basis for Government and should be assured of remunerative prices. Simultaneously, special efforts would need to be made to market dairy and other produce from such communities to supplement their income.

10.9 The degraded areas of hydrogeographic systems, both forest and non-forest, should be rehabilitated through the accelerated regeneration of the natural forests with which they were once clothed. The advantages of this must be carefully and sensitively explained to the communities living in the neighbourhood, both by forest department personnel and by NGOs wherever possible, with the ecological spin-off benefits in terms of goods and services being quantified, so that they are better understood and carry greater conviction.

10.10 To the extent possible, preference in employment in all afforestation programmes, for reforesting the hydrogeographic systems, should be given to relocated and rehabilitated persons. They should also be trained and provided technical support in cultivating NTFP outside the forests and assisted in processing and marketing such produce. The responsibility for providing such assistance should be assigned to the presently named Forest Development Corporations.

10.11 Land development and soil conservation measures on private fields, including tree farming, should be considered eligible for funding under various rural employment programmes.

10.12 Relocated former forest villages should receive priority in the allocation of financial and other resources under all such government schemes as the Jawahar Rozgar Yojana.

10.13 Developmental works which have commenced prior to the enactment of the Forest (Conservation) Act, 1980, without denotifying forest lands, should be reviewed jointly by the Government of India and the State Governments in the light of the need to avoid further ecological degradation and decisions on such cases should be taken expeditiously.

10.14 Collection of soil, boulders, sand, slates, etc. from forest areas should not normally be permitted. Such material should be obtained from designated quarries

located in areas that are neither ecologically fragile nor sensitive. Where the removal of such material from forest lands is unavoidable, reference should be made by the State Governments to the Central Government under the Forest (Conservation) Act, 1980.

10.15 Nomadic/migratory grazing by tribal communities is widely prevalent in Himachal Pradesh, Uttar Pradesh, Haryana, Jammu and Kashmir, Punjab, Rajasthan, Maharashtra and Madhya Pradesh. Such practices invariably lead to degradation of forests and fragile ecosystems besides creating social tensions. Since the problem transcends State boundaries, no single State is in a position to tackle it effectively. It is recommended that an Inter-State Advisory Committee should be constituted to suggest ways and means of resolving the problem of migratory/nomadic grazing in a manner that avoids ecological damage and on the contrary leads progressively to ecological security. Policies and programmes for this purpose should be implemented under an integrated project involving rehabilitation of nomadic tribal graziers, livestock improvement programmes, marketing of dairy products, development of pastures and cultivation of fodder; the primary thrust being to establish stall feeding through the cultivation of fodder crops on a commercial basis and supplied as a commodity free or at a subsidized price through the government purchase and distribution system.

## CHAPTER IV : ECOLOGICAL SECURITY AND FOREST PROTECTION

### 1. BASIC PERCEPTS FOR ECOLOGICAL SECURITY.

1.1 The Sixth Five-Year Plan (1980-85) framework document aptly expressed grave concern for the ecological degradation that was occuring in the country. Calamitously, this is true in a far greater measure today. It is imperative that the renewable resources of the country, namely, soil, water, plant and animal life are carefully husbanded to sustain economic development through securing the country's ecological foundations. The increasing over-exploitation of the natural resources is now dramatically reflected in the serious and widespread soil erosion, siltation, drought and floods and the rapid destruction of forests and biotic resources, which are irreversible and are leading the country rapidly towards an ecological crisis.

1.2 In the quest for economic growth, all development agencies are concerned only with growth and favourable cost/benefit ratios in utter disregard of the environmental degradation and the consequential phenomenal costs it imposes on society. The development projects are conceived and appraised keeping in view only the immediate needs and gains, with efforts at conservation of environment being either inadequate or disregarded. "Environmental costs" are generally ignored altogether at the policy planning level.

1.3 The natural assets of a country contribute to the long-term economic productivity and should be treated as inviolable capital assets. It should be recognised that their worth lies not in their investment cost but in their potential to generate income now and in future, if conserved. However, natural resources like natural forests are regarded as gifts of nature instead of being considered the country's most valuable capital assets. The intrinsic value of forests and the income they generate is neither accounted for nor are such assets depreciated in the National Budget as these are increasingly exploited and eroded with no provision for replenishment.

1.4 The precipitate slide into an ecological crisis can be contained only if the hard options, which alone remain now open to the country, are adopted without hesitation no matter what the cost. Such options should inevitably reflect the following concerns:

1.4.1 The collective welfare of the country's people as a whole must be Government's overriding concern. In this national interests must take precedence over sectoral or group interests, which in turn must override individual interests.

1.4.2 Whenever individual or group interests must be bypassed in favour of the larger national interest, the affected individual or groups should be compensated to the extent that equity and social justice demand.

1.4.3 Protection of land, water, air and genetic resources followed by the production of natural and cultivated biomass to meet collective community needs, must rank well above the needs of any individual interests. Once this is accepted as the justification for the protection of areas of forest, other objective functions can be pursued but only to the extent that these are ecologically compatible.

1.4.4 It would be ecologically disastrous for an ever-increasing human and livestock population to continue to be supported by liquidating forests. The country's environmental carrying capacity has already been exceeded. The sustenance of human and livestock population can only be safeguarded to the limited extent now available through the spin-off benefits of the existing forest capital and the extent to which this can be progressively increased.

1.4.5 It has become imperative now for the nation to base its value systems and life styles on simple necessities of everyday life. Ecological restoration through natural regeneration, rather than the development based upon contemporary principles of economic growth, is the only certain way of achieving equity and distributive justice for the poorest sections of society. In India, and for that matter all Third World countries, and this would apply as much to the so-called developed world when it is eventually forced, as it inevitably will in this finite world to adopt value systems and life styles based upon simple necessities of every day life, ecological restoration through supporting and strengthening natural regenerating processes will ensure far greater equality and distributive justice for human beings, and for that matter all forms of life on earth, than development based upon contemporary principles and modes of economic development, including the application of virtually all known modern scientific and technological knowledge and skills.

1.4.6 The present levels of use of natural capital assets to meet immediate consumption needs as well as for the creation of social and industrial capital assets leads to major erosion of the resource base. This can no longer be permitted since gains in current income are illusory, or at best temporary, whereas the loss of the vital capital assets, beyond a certain level, is irretrievable.

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harvest. A number of prescriptive rights are, at present, guaranteed to the local people for removal of forest produce for their domestic consumption. Alternate arrangements must be provided for meeting these bona fide needs of the rights and concession holders. The domestic energy needs of the local people must be met by stepping up production of fuelwood in non-forest revenue areas and degraded agricultural lands on the plains and by concerted propagation of the use of alternative sources of energy, both conventional and non-conventional. Unless this is done, local communities will continue to exert irresistible pressure on forests and the vegetative cover of the hydrogeographic systems to meet their essential daily needs. Besides, they will also continue to be forced to burn organic matter which could otherwise be used as manure.

2.1.5 Presently the outlay for the forestry sector is barely one per cent of the total Plan outlay. In future, the outlay must be enhanced for the better protection and restoration of forests. Additional provision must be made to enable the appropriate agencies to develop and distribute alternative sources of domestic energy, like LPG, biogas, solar and wind energy. Substantial investment will be needed to strengthen the public distribution systems so that the equivalent of hitherto essential forest produce, produced from alternative domestic sources, can be made available at points where it is most needed. At least to commence with, the various forms of domestic energy will need either to be provided free or at highly subsidised costs.

2.1.6 Natural regeneration of forest areas is drastically reduced by the present system of unregulated and excessive grazing in forest areas. The Forest Survey of India, Dehra Dun, has estimated that regeneration is either absent or inadequate in about 53 per cent of the forest area. Thus, grazing of cattle and other livestock in forests must be eliminated. Prescriptive grazing rights in the forest areas under closure, affecting about 90 million cattle, must be abolished. Private land holders must be encouraged to grow fodder crops for which an assured market must be provided through government purchase and distribution. Simultaneously, with increased pressure on livestock owners to curtail their herds, fodder will initially need to be supplied free of charge and subsequently a system equivalent to that operated by the Food Corporation of India for food grains will need to be introduced.

2.1.7 Livestock improvement programmes will be essential in order to reduce the cattle population through every possible means, including the elimination of scrub cattle. There is a need to improve the resource base by improved productivity of private fodder farms and by the creation of fodder banks, especially to meet exigencies arising from natural cause such as droughts, which hereafter will be a regular phenomena. To bring about

## 2. POLICIES AND PROGRAMMES FOR ECOLOGICAL RESTORATION

2.1 Socio-economic compulsions and paucity of resources make it abundantly clear that only a well-conceived multi-pronged approach can arrest ecological degradation in the country. For this, the following factors must be taken into consideration:

2.1.1 Of overriding importance is the need to protect the remaining natural forests of the country. A firm and uncompromising decision must be taken to phase out extraction of timber from all forests, which occur in the fragile ecosystems of the country and in the areas of rich bio-diversity. About 37.84 million hectares of forest area, representing about 11.5 per cent of the total geographical area of the country, is reported to be under good forest cover with a canopy cover of 40 per cent or above. This is barely one-third of the minimum required under the National Forest Policies of 1952 and 1988. To preserve a significant proportion of the country's present bio-diversity, the Wildlife Institute of India has proposed that the minimum protected area network for National Parks and Sanctuaries should be 15 million hectares. However, this does not include a number of existing areas of rich bio-diversity which have not yet been officially identified and brought under protective legislation, the loss of which the country cannot afford. The existing network of National Parks and Sanctuaries comprise an area of 12.5 million hectares.

2.1.2 If, as is necessary and agreed at the Central Board of Forestry in December, 1987, all extraction from the existing forests is banned, alternative provision will have to be made for the supply of about 27.58 million cu.m. of construction and utility timber and 235 million cu.m. of fuelwood. This must be given the highest priority and the means for doing so have been referred to in Chapter II. Similarly, as explained later in the report, systems must be devised for distribution of household utility timber and fuel for domestic energy requirements at an affordable cost and in many cases initially free.

2.1.3 It is necessary to provide employment to tribals and rural people through massive land development programmes on the plains, mining, processing of agricultural produce and other rural based economic activities. This will limit their otherwise inevitable encroachment on protected forest areas, their dependence on animal husbandry, illicit felling and other activity that contributes to such serious biotic pressure on forests.

2.1.4 All forms of informal or illicit removal of forest produce from forest areas must be stopped. It is well known that in case of fuelwood alone, the informal and unauthorised extraction is far in excess of the recorded

harvest. A number of prescriptive rights are, at present, guaranteed to the local people for removal of forest produce for their domestic consumption. Alternate arrangements must be provided for meeting these bona fide needs of the rights and concession holders. The domestic energy needs of the local people must be met by stepping up production of fuelwood in non-forest revenue areas and degraded agricultural lands on the plains and by concerted propagation of the use of alternative sources of energy, both conventional and non-conventional. Unless this is done, local communities will continue to exert irresistible pressure on forests and the vegetative cover of the hydrogeographic systems to meet their essential daily needs. Besides, they will also continue to be forced to burn organic matter which could otherwise be used as manure.

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the necessary change in traditional animal husbandry practices, intensive publicity and extension efforts will be necessary.

2.1.8 Ecosystems which have been affected due to bio-degradation but which are still retrievable need to be identified. Such areas exist in the mountainous areas in the Himalayas, Western and Eastern Ghats and also the arid and semi-arid lands of Rajasthan, Gujarat, Haryana and the tablelands of the Deccan Plateau. Protection of such ecologically fragile systems to allow for forest regeneration would also necessitate settlement of shifting cultivators, involving about 6.42 lakh families and approximately 4.35 million hectares. This will call for suitable changes in land tenure systems, especially in the tribal areas.

2.1.9 Under the so-called Social Forestry programmes, the traditional production functions of forests will now need to be established on non-forest plains areas of revenue lands, community lands and private agricultural holdings. It is estimated that, of about 143 million hectares of land currently under agriculture, nearly 59 million hectares is marginally productive. Such agricultural land is in varying stages of degradation and is, therefore, largely unsuitable for intensive cropping. From the viewpoint of ecological security, much of such area, which largely exists in hills and plateaus, should be brought under permanent forest cover. Within the shortest time possible, an area of at least 10 to 15 million hectares of degraded agricultural land on the plains must be brought under tree farming and silvi-pasture systems through the initiative of private land holders with a view to meeting a substantial portion of the demand for fuelwood for domestic energy, timber for commercial and industrial sectors, and fodder for livestock. Special incentives, including long-term institutional financing and an assured market, will need to be provided to such land holders.

## 3. THE EXTENT OF FOREST COVER.

3.1 Scientific enquiry which might, at the most, gives cogent explanations for certain natural processes under controlled conditions, is unlikely to indicate the threshold limits of forest cover. The framers of the National Forest Policy, 1952, who for the first time stipulated that one-third of the total geographical area of the country should be under forests, appear to have drawn their inspiration from Europe. The scientific justification for this is uncertain. However, given the physical conditions, demographic pressures and social structure of the Indian society, with rural poor and tribals consisting of so substantial a proportion of the total population, equity and distributive justice demand the optimum functioning of its natural ecosystems, which alone can lead to optimum natural biomass productivity

and equitable distribution. This can be ensured only by maintaining substantial areas of the country under the most favourable ecological conditions by rapidly restoring, through ecologically compatible scientific processes, the optimum density of climax vegetation endemic to each area.

3.2 While low population density and consequent limited pressures on available land and the comparatively well-regulated land use may justify multiple use of forests in the West without seriously undermining the ecological functions of temperate forests, this cannot be the case in high density population countries in the tropics. The functional division of land areas based on their ecological function and ecological capabilities is essential if a tropical country like India is to gain from the enormous advantages to be derived from nature's own beneficience, a factor that modern applied science and technology have largely ignored.

3.3 Although Europe, with its temperate climate, even distribution of rainfall, and its industrial bias, provides a valuable guide, India needs a higher proportion of forests. India has to reckon with an oppressive tropical sun, dessicating hot winds, seasonal monsoons, steep mountain slopes, a lower exploitable forest productivity and a predominantly agricultural population, all of which justifies a proportion of forests higher than that of Europe. The close parallel between a high proportion of forest area and the general prosperity of a region further strengthens the contention that a country like India must have at least one-third of its area under forests.

3.4 At the micro-level, the extent and density of forest cover will depend primarily on site specific characteristics. Location-specific factors, like topographic conditions, quality of soils, frequency and extent of rainfall, temperature zones, subsistence requirements of the dependent communities, and biotic pressures are essential parameters to be considered while deciding the optimum level of forest cover at the micro-level. Aggregated, and on the basis of an ecological overview, there is empirical justification for assuming that, for the country as a whole, a minimum of one-third of the geographical area should be under acceptable forest cover to provide ecological security.

3.5 The over-riding and immediate national concern must be to restore the ecological balance of the country. The country's hydrogeographic systems include mountains, hills and major plateaus. The figures for the land mass of India, divided on the basis of major altitude zones is given below:

| | | |
|---|---|---|
| Plains | below 300 metres above sea level | 1,435,576 sq.km. |
| Plateaus | 300 - 1,000 m.s.l. | 1,092,893 sq.km. |

| | | | |
|---|---|---|---|
| Hills | 300 - 2,000 | m.s.l. | 486,349 sq.km. |
| Mountains | 2,000 - 6,000 | m.s.l. | 272,959 sq.km. |
| Total | | | 3,287,782 sq.km. |

Plateaus, hills and mountains combined comprise of 1,852,206 sq.km. or 56 per cent of the total land area. Two-thirds of this total area, that is, 1,234,804 sq.km., or 37.55 per cent of the total geographical area, should optimally be brought as rapidly as possible under forest cover. This would ensure conformity and more with a major requirement of the forest policies of 1952 and 1988. By adding areas of rich bio-diversity in the plains, there should be a larger target of forest cover for the country. Ideally, approximately 45 per cent of total geographical area of the country should be under forests in order to achieve an ecologically secure foundation in view of the following factors:

3.5.1 There is now growing evidence of the increasing loss of soil fertility. Unless this trend is reversed through ecological restoration, there may be compelling pressures to extend the area under agriculture to compensate for the declining land fertility if the present self sufficiency in food grain production is to be maintained. To some extent this could be achieved by establishing tree and fodder plantations on marginal agricultural lands on the plains to reduce the biotic pressure on forest areas, especially those in the hydrogeographic systems of the country.

3.5.2 Since forests secure soil-moisture conservation so efficiently, maintenance of hydrological systems under forests is more crucial now than ever before in view of the need to protect the soils in productive agricultural tracts, to regulate water flows in the streams and rivers, and to maintain optimum surface moisture, sub-soil water levels and aquifers.

3.5.3 The disparity in demand and supply of fuelwood, fodder and timber has increased due to stagnant production and the growing population.

3.5.4 Over the years there has been progressively accelerating environmental degradation. The regularity and growing severity of droughts and floods is plaguing many parts of the country. The ecological role of forests, constituting as it does so crucial a factor in environmental security and stability has, therefore, assumed the gravest significance.

## 4. MONITORING THE STATE OF VEGETATION COVER.

4.1 To maintain adequate forest cover over the country, it is essential that the state of the vegetation cover is monitored regularly using modern technology. Satellite remote sensing can be a valuable tool to map and monitor the forest cover of large areas, doing so in a relatively shorter span of time as compared to conventional surveys, and providing consistency in the data base. The data obtained through satellite imagery reveals that the actual forest area in India is significantly lower than the land area notified as forests.

4.2 In recent years, satellite data has frequently been used to monitor the forest cover of the entire country. In India, the vegetal cover is being monitored through satellite imagery every two years by the Forest Survey of India (FSI), Dehradun. However, neither is the accuracy of the results known, nor are any attempts being made to test the data to statistically quantify accuracy. Moreover, satellite imagery is hampered by its limited resolution and needs to be supplemented with detailed information.

4.3 The National Remote Sensing Agency made the first attempt to assess the changes in the forest cover of the country at roughly seven-year interval through interpretation of Landsat imagery which is summarised below:

| | 1972-75 | 1980-82 | Change |
|---|---|---|---|
| Total area under forest cover (% of total geographical area) | 16.89% | 14.10% | (-) 2.79% reduction |
| Categories | | | |
| Closed forest | 14.12% | 10.96% | (-) 3.12% reduction |
| Open/degraded forest | 2.67% | 3.06% | (+) 0.39% increased degradation |
| Mangrove forest | 0.099% | 0.081% | (-). 0.018% reduction |

4.4 The Forest Survey of India made a second assessment of the actual forest cover in the country by visual interpretation of Landsat imagery pertaining to the period 1985-87. This has been termed as the 1989 assessment. The result is as follows:

| Category | Area in sq.km. (1981-83 imagery) | Area in sq.km. (1985-87 imagery) |
|---|---|---|
| 1. Dense Forests (crown density 40% and over) | 3,61,412 | 3,78,470 |

| | | |
|---|---|---|
| 2. Open Forests (crown density 10% to less than 40%) | 2,76,583 | 2,57,409 |
| 3. Mangrove Forests | 4,046 | 4,255 |
| Total | 6,42,041 | 6,40,134 |

4.5 The new assessment gives the figure of actual forest cover at 64.01 million hectares against the previous assessment of 64.20 million hectares. Thus on the basis of gross figures, there has been a reduction of 0.19 million hectares of forest cover during the last four years. The annual rate of loss of forest cover is, therefore, 47,500 hectares.

4.6 To allow such massive deforestation to take place is to invite ecological disaster. The dynamics of change in forest cover is such that it warrants a Nationwide Forest Monitoring System using the latest available technology.

4.7 The National Forest Data Management Centre (NFDMC), set up at the Forest Survey of India (FSI), Dehra Dun, is equipped with a digital image processing system configured around a Vax 11/780 host computer. In future, a digital cartography system is proposed to be set up at FSI, Dehra Dun, to digitize and plot maps. The process of commissioning of NFDMC and the digital image processing system has, hitherto, not been satisfactory. Immediate efforts are needed to make these operational.

4.8 Forest mapping and monitoring through satellite remote sensing has the following advantages:

4.8.1 Fast synoptic coverage of large areas, for instance, the entire Indian sub-continent.

4.8.2 Capability of repetitive coverage in a relatively short time.

4.8.3 Reasonably high accuracy because of relatively low planimetric and image distortions amenable to correction procedures.

4.8.4 Relatively fast and economical for gross estimates compared to any other method.

4.9 However, changes have to be incorporated in the methodology and the techniques to monitor the forest cover. A multi-stage sampling approach should be adopted for a more accurate and reliable estimate. Landsat TM or IRS LISS II should be the prime source of data for a nation-wide programme of forest cover mapping on 1:250,000 scale. In the areas where rapid changes are

taking place, SPOT geocoded subscenes could be used for more detailed analysis on a 1:50,000 or an even larger scale. A network of sample points should be distributed throughout the country using an appropriate stratified sampling design. The sampling strategy should ensure that the cluster of sample points is more dense in regions of rapid "changes". Ground data on relevant parameters should be collected periodically to create a permanent data base. These points should be marked on the remote sensing imagery and used in subsequent monitoring programmes of samplings. Wherever necessary, these samples should be replaced to eliminate bias. This methodology will provide a cost-effective and reliable approach to an ongoing national forest cover monitoring system.

4.10 The hydrogeographic systems (mountainous regions) of the country are crucial to the hydrological cycle which is governed by complex physical and biological processes. Unfortunately, so far no organisation has been set up to study and monitor the changes taking place in the hydrogeographic systems. This should be remedied immediately by setting up a National Centre to Monitor Hydrogeographic Systems. The Centre should evolve suitable methodology to measure periodic changes in the important parameters of the hydrogeographic systems. The data base to be created for this purpose should assess the changes in the three key hydrologically active components, namely, the soil, climate and vegetation. A number of important variables for routine monitoring can be sensed by satellite. The most hydrologically important surface variables measurable by satellite are topography, vegetation cover, snow cover and surface water. Satellite and ground based information in multiple layers can be manipulated through Geographic Information System (GIS) technology for modelling purposes.

4.11 A first step towards the establishment of a National Forest Monitoring System could be regular forest cover mapping consecutively for three years on a 1:1 million scale. This must be confirmed through a repeated study to stratify the entire country into four areas, namely, minimum change areas, afforested areas, deforested areas and areas undergoing degradation. The first two types of areas may be termed as relatively stable zones and monitoring of these areas could be done every three years on a 1:1 million scale. The areas undergoing deforestation and degradation should be subjected to intensive ground study to evaluate the causes and evolve remedial measures.

4.12 The areas being subjected to encroachment, unauthorised or legalised clearing and cutting, submergence through hydroelectric dams and other projects and shifting cultivation, tend to be unstable and therefore annual mapping on a 1:500,000 scale is warranted. For the areas undergoing degradation due to climatic factors, unauthorised felling of trees, over-exploitation by

forest departments, erosion, shifting cultivation, forest fires and/or forest diseases, annual monitoring on a 1:250,000 scale is suggested. A forest division or district could be selected as the minimum unit which may be subjected to annual monitoring in the unstable zones.

4.13 Two specific long-term studies which need to be pursued additionally are:

(a) Recession of glaciers;

(b) Monitoring of acid rain and atmospheric pollution and their impact on forests, particularly coniferous forests.

## 5. STRATEGY FOR ECOLOGICAL RESTORATION.

A long-term strategy to ensure forest protection and conservation will require the formulation of a comprehensive land-use strategy, which should include, in particular, forest areas, other public lands and marginally productive agricultural land holdings. In addition, an integrated policy for grazing and improvement of livestock will be necessary to minimise, and ultimately eliminating, biotic interference from grazing in forest areas. The forests will need to be classified according to various functional categories and the specific objectives of management will need to be defined for each category. Simultaneously, supportive measures will be required to minimise other adverse impacts to hasten vegetative recovery of the degraded areas.

### 5.1 LAND-USE PATTERN.

5.1.1 A broad land-use pattern, primarily for forest areas which will be entirely set aside for ecological security, other public lands and marginally productive agricultural land holdings, to meet the twin objectives of environmental protection and domestic biomass production needs to be evolved. Area statistics are not available for different geomorphological configurations and land ownership thereof. Nevertheless, it is essential that the land areas to be brought under complete protection, where forests should be regenerated, are clearly identified. Similarly the minimum area required for the production of fuel, fodder and timber for the bonafide domestic needs of the local people and production of wood for trade and commerce must also be determined.

5.1.2 The protection of hydrogeographic systems to restore hydrological regimes and preserve bio-diversity to ensure long-term ecological security will constitute the highest category of land-use. Such areas will comprise mainly natural forests. The total land area of the Himalayas, the Western Ghats and the Eastern Ghats is 88 million hectares of which only 30 million hectares are under forests, whereas the afforested area of these regions should be 59 million hectares to bring two-thirds of the land mass under forest cover as enunciated in the

National Forest Policy, 1988. In order to support the all-important hydrological systems, these forests must be completely safeguarded, entailing the phasing out of all extraction of timber and other economic uses. Simultaneously, in addition, the areas identified by the Wildlife Institute of India (WII) totalling 15 million hectares will need to be protected to preserve an important proportion of the country's remaining bio-diversity. Some of the forest areas in the hill and mountainous regions and parts of the protected area network identified by WII are common. Taking into account the common areas, the two types of areas together cover around 37 million hectares. It is, therefore, suggested that about 35 to 40 million hectares, mainly forest areas, should be brought or maintained under protective forest cover immediately as a first major step towards the long-term protection of hydrological systems and the preservation of bio-diversity. This must be followed rapidly by a programme that aims at ensuring revegetaion of the entire 37.55 per cent of the total geographic area of the country, which represents roughly two-thirds of the area of important hydrogeographic systems of the country by afforestation, ecologically compatible agricultural techniques and animal husbandry practices.

5.1.3 Sizeable areas of public and private lands, mainly in the plains, will have to be brought under fuelwood, fodder and timber production. Although the extent of degraded lands in the country is said to be approximately 175 million hectares, the report of the Advisory Board on Energy (1985) has estimated that only 63 million hectares would be suitable for tree planting. Since a substantial portion of the degraded areas comprises important sections of the hydrogeographic systems, these must be brought under vegetative cover as a part of the programme to ensure the country's long-term ecological security. The remainder would need to be put under fuelwood, fodder and timber. As most of the public lands are being used for various purposes, primarily grazing and collection of fuelwood, it may be difficult to free them for plantations. However, concerted efforts to do so must be made.

5.1.4 If the present estimates of future demand for fuelwood and fodder are accepted, about 35 to 40 million hectares of public and private land will need to be brought under intensive production of these commodities. However, as stated elsewhere, given the present extent of degraded lands and the fact that the carrying capacity of the country as a whole can neither support its present and growing livestock population, nor meet the growing demand of domestic fuelwood, basic changes in policy with regard to the allocation of alternative fuels, particularly natural gas, will have to be made. These alternative sources will, of necessity, have to be diverted substantially from industry to domestic consumption and the enormous wastage of natural gas now taking place, through flaring 10.55 million cu.m. per day, must be

stopped forthwith and converted for domestic consumption. Areas that will need to be brought under fuelwood, fodder and timber will be primarily government, public and private lands situated outside the hydrogeographic systems. Wherever public lands are not available, marginally productive agricultural lands should be brought under tree farming by motivating private land owners through appropriate incentives.

5.1.5 The National Forest Policy, 1988, emphasises that forest-based industries should secure their requirements of raw materials from private farmers. The total requirement of raw material for trade, commerce and industry has been discussed in detail in Chapter II. An area of about 10 to 15 million hectares is considered adequate to meet the requirement of this sector. Such areas should come from the private land holdings through suitable measures to bring about changes in the crop-use patterns.

5.1.6 A certain amount of land is required to meet the survival needs of the local communities who have hitherto overwhelmingly depended on them. The Government should identify such communities, predominantly tribals, who depend for more than 50 per cent of their sustenance on forests and public lands. The nature of their sustenance needs will need to be clearly identified and means found to supply these in full from alternate non-forest sources free of cost to commence with, and later at highly subsidized prices so as to avoid sacrificing the ecological security of the area. These communities will include nomadic tribes and other tribal communities who are yet to adopt settled agricultural practices. In the case of the latter, agricultural land will need to be provided to them in the plains by rigorous enforcement of the existing land ceiling legislation, and where necessary, lowering the present land ceiling to accomodate them, however drastic such measures appear to be.

5.1.7 About 4.5 million hectares of land is reported to be under shifting cultivation. In addition, one million hectare of land is estimated to be under encroachments and other forms of adverse possession, making a total of 5.5 million hectares.

5.1.8 According to one estimate about 25 million tribals were estimated to be living in and around forests. The Scheduled Castes and Scheduled Tribes Commission has estimated that "primitive tribal groups" comprise a total population of only 1.6 million. However, the extent of their total dependence on forests is not known and there is every reason to believe that this number is rapidly diminishing. Assuming a family comprises 5 members, where at least one member of each of the families of the 1.6 million has to be provided employment throughout the year to ensure its livelihood, based on past practices, forestry activities would have needed to generate 300,000

man-years of employment for the identified communities. However, the change in the role of forests introduced in the National Forest Policy, 1988, in which the ecological role of forests is a primary national concern, forests will very soon cease to offer the substantial employment opportunities they once did for tribal communities. In any case the rapid reduction in the area under forests has already forced a major portion of the traditional tribal communities away from their dependence on forests and has led them increasingly to seek a livelihood from labour intensive activities, primarily agricultural and major developmental and industrial employment involving substantial manual labour. This trend will accelerate in the foreseeable future and is likely to provide the only employment opportunities open to those members of the tribal communities who remain capable of only manual labour. However, whatever employment opportunities are open under the new role of forests, such as responsibility for guarding the forests and minor water and soil conservation works that may be necessary, should be made available, as far as possible, to tribal communities, particularly primitive tribal groups.

5.1.9 The more intensive management of agricultural lands to achieve higher levels of production, will generate substantial employment opportunities, both seasonal and permanent, for a sizeable proportion of the tribal families, except the diminishing communities of those who now live in a primordial state. Special measures would be required to meet their sustenance needs without disturbing the pristine condition of the forests that comprise their habitat. It should not be the intention to specifically set aside land from forest areas to meet the sustenance needs of these tribals since they could be expected to derive such personal needs from climax forests in which they reside. As increasing number of these tribes are drawn into the mainstream of national development, they would become alienated from their original habitats and lifestyles and will increasingly choose to settle in semi-urban and urban areas where their rising aspirations and consumption needs could be met with greater facility.

5.1.10 The overall land use pattern is indicated below:

| Objective | Types of Land | Range of Area (m.ha.) |
|---|---|---|
| 1. Protection of hydro-geographic systems and preservation of bio-diversity | Phase I - Mainly Forests. | 35 - 40 |
| | Phase II - Ecologically critical and sensitive areas within the hydro-geographic systems. | 35 - 40 |
| | Phase III - Predetermined proportion of the hydrogeo-graphic systems supportive | 40 - 45 |

| | | | |
|---|---|---|---|
| | | of the areas under Phase I and II. For example, the upper reaches of the catchment areas, including the major portion of headlands, plateaus and table lands of the catchment areas. | |
| | | Subtotal | 110 - 125 |
| 2. | Production of fuelwood, fodder and household utility timber. | Private agricultural holdings, non-forest public lands including government lands, community lands, road and railway line verges and canal embankments. | 35 - 40 |
| 3. | Wood production for trade and commerce. | Private land. | 10 - 15 |
| 4. | Sustenance needs of primitive groups and those engaged in shifting cultivation. | Predominantly forest areas, excluding conservation areas. | 5 - 6 * |

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* This area comprises the present estimated area under shifting cultivation, which would need to be progressively contained and stabilised by natural regeneration leading to ecological succession.

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NOTE: 1. Degraded forest lands have been excluded, as it would be the intention to exchange such of these areas that are located outside the hydrogeographic systems and outside the areas of rich bio-diversity with areas within these owned either by private land owners or the Government, as a step towards consolidating the hydrogeographic systems.

2. The 1.6 million "primitive" tribals would have free range use of the forest areas which they inhabit, for their sustenance needs but only for such time as they continue to live in a so-called "primitive state".

## 5.2 LIVESTOCK AND GRAZING POLICIES.

5.2.1 Incalculable damage has been caused to fragile ecosystems, especially the forests, by unrestricted grazing. The vicious cycle of unregulated grazing and proliferation of scrub cattle must be stopped forthwith. This problem must be solved by culling, despite its social repercussions, as failure to do so will accelerate damage to the area under forests, and inevitably precipitate a major ecological crisis with all its socio-economic implications. Concerted measures are required to systematically develop the cultivation of fodder crops and make this available to livestock owners through a well-organised distribution system under government aegis. Organisations such as the National Dairy

Development Board should be encouraged to intensify their national programmes for the introduction of high-yielding cross bred cattle. A policy decision must be taken and enforced within a reasonable period, say five years, to ensure that the cattle are stall fed. A penalty should be imposed on free range grazing scrub cattle. Government should provide incentives to encourage the sale of all such animals to States that can make use of them.

5.2.2 According to experts, the cattle population in the country can be reduced to 50 to 100 million for draft and milk purposes. Animal Husbandry programmes should aim at reducing the livestock population to a level sustainable by fodder grown by agriculturists.

5.2.3 Concerted efforts aimed at the reduction of the livestock population, coupled with a change in its feeding habits, could eliminate unrestricted grazing and eventually establish stall-feeding. In view of the long-term gains, animal husbandry should be considered eligible for Government support. Assistance should be provided in the form of marketing of milk and other dairy products and export of livestock.

5.2.4 At no stage in the development of livestock farming in the country has the need for a national grazing policy been seriously addressed. This can no longer be delayed and must aim at bringing about a progressively rapid increase in commercial fodder production, and marketing and distribution of such fodder, with the built-in proviso that in the initial phases of its introduction, the policy will provide for free supply of fodder to the deprived sections of population to be followed by diminishing subsidy for this produce.

## 6. OBJECTIVES OF FOREST MANAGEMENT.

6.1 Forests should be classified into the following broad functional categories:

6.1.1 Protective Natural Forest for the Hydrogeographic Systems of the Country: The hydrogeographic systems, will among others, include the Himalayan mountains and their off-shoots, the Aravalli Range, the Vindhya and Satpura Range with their offshoots in Madhya Pradesh, the Chhota Nagpur and Ranchi Plateaus hills, the Garhyal Hills of Orissa, the hill ranges of the North East States, the Western Ghats, the Eastern Ghats, and the hills of the Deccan Plateau. The objectives of management in these areas should be to establish ecological climax forests to mitigate the impact of floods, droughts and soil erosion, to strengthen the hydrological systems of the country and thereby the quality, duration of flow and the natural beneficent capabilities of the perennial and seasonal rivers of the country; and to restore hill springs. This

would benefit agricultural productivity and contribute greatly to the overall food security of the country.

6.1.2 Forests for Restoration of Degraded Ecosystems: These will include arid and semi-arid areas and degraded forests in other agro-climatic regions of the country. The main objective should be to prevent further degradation of such areas and to initiate the process of ecological restoration. A major benefit will be greatly improved productivity of agricultural lands in and adjoining such areas.

6.1.3 Forests for protection of coastal strips: Where favourable conditions prevail, mangroves should be restored. These represent a complex ecosystem and contribute substantially to marine ecosystem productivity, emphasising the need for complete protection. Other vegetation suited to coastal ecotones such as casuarina (Casuarina equisettifolia), cashew (Anacardium occidentale), Acacia planiforns, Acacia ferruginea, Pongamia pinnata and Palmyrah (Borassus spp) should be established to prevent formation of shifting dunes along the coasts.

6.1.4 Forests of rich Bio-diversity: These would comprise forest eco-systems with rich bio-diversity, including areas of bio-diversity identified by the Wildlife Institute of India, which include all existing National Parks and Sanctuaries as well as other remaining areas yet to be identified. These will act as gene-pools and bench-marks of ecological succession in the representative areas as well as contribute marginally to ecological stability outside their boundaries.

6.1.5 Community Woodlots: These will be plantation crops or naturally regenerated degraded revenue and community lands on the plains, strip-plantations along roads, railway lines, canals, etc. The main purpose of these will be the production of fuel and household utility timber for domestic use of the local people.

6.1.6 Agro-Silviculture Plantations: These will consist of tree plantation crops or tree groves to be raised by farmers on marginal private holdings, primarily for commercial and industrial use. These could also meet an important portion of the domestic timber, fuelwood and fodder requirements of the people.

6.1.7 Silvi-Pastures: These will be established on marginal agricultural lands, privately held agricultural holdings, community lands and non-government forest lands all located on the plains. The cultivation of fodder would be encouraged as a commercially viable commodity through assuring, particularly to private farmers a remunerative return. Government should ensure institutional finance

is made available and purchase fodder for supply through a specially formed distribution system, at rates which livestock owners can afford. On public lands, only harvesting and bailing of fodder crops should be permitted, and not grazing by cattle. On all such lands, the emphasis would be on maximising fodder production.

6.2 Benchmark Area Ecosystems - Identification and Preservation: The topographic and climatic heterogeneity of the country, its vastness in extent, its location at the junction of different biographic realms, its geological evolutionary history, its complex long history of human habitation and inflow of races and cultures modifying and introducing vegetation etc. has resulted in a remarkably unique array of ecosystems in the hills, in the plains and along the coast. This spectrum of natural and cultural landscapes forms by far the richest expression of our living heritage.

6.2.1 Partly documented, even less studied or catalogued and much less protected, they are, with extreme rapidity, being diluted in complexity of composition, and being disrupted, modified, replaced and converted in toto into disintegrating "wastelands" and deserts.

6.2.2 At this critical juncture in the country's ecological history when the options are about to close, the first priority must be to identify and protect at least a representative minimum samples of varied ecosystems that India still possesses. This is necessary as an attempt to retain samples of the natural heritage of the country and is an overriding moral responsibility.

6.2.3 At the scientific level these benchmark areas are necessary as reference points to study how the biosphere functions. The organic productive processes in nature, so much more efficient than what science can contrive, needs to be monitored, understood and modelled to the maximum extent possible. Most of the surface of this planet has been interfered with and modified. So little remains natural that these must be totally protected as yardsticks or benchmark areas representing standing indicators of the original blueprint of the planet's biosphere.

6.2.4 The natural ecosystems can exist anywhere, but in India the most valuable ones and the relatively intact ones are the forest ecosystems. Each climax forest type is a unique entity reflecting a unique set of edaphic (physical environmental) and biotic components. Since forest degradation is accelerating, the last of these benchmark areas of forests are also being rapidly and irreparably damaged or lost. These must be identified and protected intact before it is too late. The identified areas must be natural unit ecosystems which are in themselves viable entities and not artificial units for

administrative or economic convenience.

6.2.5 The protection of benchmark areas is not merely delineating or circumscribing an area with indicators of governmental ownership and instituting machinery to prevent trespass. Degradation of intact ecosystems is through a whole array of direct and indirect, immediate and distant (in space and in time) interferences some of which are directly and tangibly perceivable, while others are insidiously long acting. It is not possible to be sure of how and why and where these die. All that can be attempted to protect them is to create around each core intact area, a series of concentric zones to act as a gradient of insulating buffer areas capable of absorbing anthropogenic interferences, of sufficient depth and functional capability for attempts to be made to incorporate as many just and essential human needs and social functions as can be ecologically harmonious as possible.

6.2.6 In India, at least, it is still possible to exercise the social, economic and cultural options to protect the most valuable ecosystems of the country by catering to the survival needs of the rural people from less intact inadequately protected areas around the former because the natural potential productivity of the country is still so remarkably high. If only ecological perceptions, indeed compulsions are accepted into resource planning and the rapacious greed of industrial urbanity contained, it will still be possible to rejuvenate the land. This very concept of guaranteeing protection to benchmark areas through sustainable eco-development of protection zones (restoration and exploitative management areas), identified according to natural, functional and spatial units of the biosphere, that is, watersheds, is the focal imperative of Biosphere Reserves protection. Although initiated in the early 1980's and officially inaugurated at the end of 1986, the Biosphere concept has, while remaining essentially understood, been stalled.

## 7. RECOMMENDATIONS.

7.1 Direct management action alone cannot ensure forest protection and stipulated usages because there are overwhelming external pressures constantly working against it. Therefore, simultaneously, appropriate supportive restoration measures must be undertaken in each functional class of forests.

7.2 In the protective natural forests of the hydrogeographic systems and the areas of rich bio-diversity, Government programmes and policies should focus on progressive reduction of human population, habitation and other human activities to take the pressure off these forests. Except under extraordinary circumstances, the diversion of forest lands for other uses must not be permitted.

7.3 As a matter of policy, the Government should progressively purchase private holdings in ecologically sensitive areas to enlarge and consolidate the area under forest cover. An important provision of Government policy should be to exchange land on a quid pro quo basis to promote ecologically compatible land-use planning and practice.

7.4 In order to progressively strengthen the ecological forces of these areas and achieve a state of ecological stability within them as soon as possible, "development" activities within such areas must be avoided. However, those who are displaced from these areas should be provided employment in labour intensive activities with emphasis upon the optimal development of available artisans skills. In the main, however, these would be cooperative cottage industries, handicrafts, aquaculture of various descriptions, apiculture and other similar activities. Where opportunities for employment in large-scale commercial activities are available in the areas to which they are translocated, in which their natural talents can be employed, and this would include animal husbandry, agriculture, plantations, horticulture and the like, this should be encouraged. However, it is important that they should be protected from exploitation.

7.5 Marketing support for various products manufactured by artisans and craftsmen and for non-forest produce should be provided by the respective State or Union Territory Governments through such established organisations as the currently named Forest Development Corporations, which would need to be reorganised for the purpose. Artisans and craftsmen should be motivated through the provision of technical guidance and financing of the requisite inputs.

7.6 Areas of rich bio-diversity should be protected through much stricter enforcement of existing administrative and legal provisions than is the case today, in order to free them from biotic pressure caused by humans. The law enforcement mechanism must be made much more efficient by training and the provision of modern surveillance equipment, including communication, transportation and electronic machinery and devices. There should be statutory requirements to create buffer zones around protected areas. Relocation and resettlement of human habitats away from National Parks, and similar areas of rich bio-diversity that are brought under strict protection should be undertaken on a priority basis. Economic rehabilitation of affected people including provision of housing and employment opportunities on preferential terms must be ensured. Infrastructure and community assets should be created for displaced communities. The affected families should be granted usufruct of common lands adjoining the area in which they

are resettled. Agricultural land should be allotted to displaced persons in command areas of irrigation projects on a preferential basis.

7.7 Mining must be prohibited within the ecologically sensitive areas in the hydrogeographic systems other than for minerals of very exceptional national importance and value. Where such mining is unavoidable, transportation of ore should be by such means as overhead rope-ways. All beneficiation and other operations should be carried out well away from the forest areas. Effluent discharge into streams, rivers and estuaries must be totally prohibited.

7.8 Tourism in all such areas should be strictly confined to pre-determined zones, and in such areas too it must be restricted to prescribed levels which on no account must be exceeded.

7.9 An intensive national awareness programme must be launched to create widespread concern, indeed alarm and outrage, at the rapidly developing ecological crises and the causes thereof, so as to motivate all sections of society to participate voluntarily in environment amelioration programmes and regard it as a matter of urgent civic responsibility to do so. Government through the Ministry of Environment and Forests, must demonstrably welcome and encourage through all possible means the participation of voluntary groups and individuals. There should be mechanisms through which such awareness-raising programmes and participation are closely monitored by the Central and the State Governments, with the active support of the non-governmental organisations. The monitoring systems and controls employed must not be too circumscribed by bureaucratic procedures, and allowances - financial and otherwise - must be made for the initial learning process, and perhaps lack of professional skills involved. Integrity of purpose and commitment must be the major criteria to determine the selection and involvement of voluntary organisations.

7.10 In particular, formal and informal local community organisations should be promoted and their support solicited to strengthen the processes of ecological restoration of public lands to optimize spin-off benefits, and thereby create greater understanding of such values.

7.11 Intensive tree farming and agro-silvipasture to maximise production of private holdings should be encouraged through adequate incentives from Government, including financing and marketing support for the sale of the produce. Seed orchards, seed banks, nurseries including ones of clonal and tissue culture material from improved and selected elite trees, legumes and grasses should be

set up and farmers should be provided with tissue culture and clonal propagated plantlets. Awareness, extension and dissemination of technical know-how will also be necessary. Those with marginally productive lands should be provided with financial incentives to encourage them to devote these areas to tree and fodder farming. On the evidence of their past activities, licences for the establishment and location of forest-based industries, or saw mills, should be issued with great care and be based strictly on the availability of raw material from non-forest areas.

7.12 People, not only those living in and around forests, but all others who have hitherto been dependent on forests to meet their domestic fuelwood requirements, must now be provided with substitute sources of fuel like natural gas as well as the equipment to use it, kerosene, briquetted agricultural wastes, lignite and non-conventional energy equipment. This should initially be supplied thus free of cost in the hope of weaning them from the use of firewood, as well as making them more demanding on the public supply system. Subsequently such fuel should be supplied at diminishing rates of subsidy as supplies from agricultural land become available. It must be noted here that the Union Minister of State for Petroleum and Natural Gas stated in Parliament on July 24, 1989, that 10.55 million cu.m. of gas was being flared every day, equivalent to 49,000 tonnes of fuelwood, sufficient to meet the annual requirements of 25,000 families. This figure must have increased considerably as further sources of natural gas have since been discovered. That the government has tolerated this flagrant waste of potential fuel, when there is such a serious dearth of domestic fuel for the poorer sections of society, is astonishing. This must be stopped forthwith.

7.13 As an immediate start, urban and semi-urban areas connected by road and rail must hereafter be supplied with the above-mentioned alternative forms of fuel and their dependence on fuelwood from forests ended forthwith. The development and use of non-conventional sources of energy should be promoted far more vigorously, as should the use of fuel-efficient stoves and other energy consuming devices. Wherever feasible, non-conventional energy should be provided from other hitherto unexplored sources of energy such as wind mills or sea-tides. Such sources should also provide energy for rural, more remote, coastal areas to the maximum extent feasible.

7.14 Soil and moisture conservation measures, such as small check dams, gully plugging, etc. should be undertaken wherever feasible, and endemic vegetation should be used to stabilize such structures. Shelter belts and other vegetative wind breaks should be established to protect agricultural fields from desiccation and wind and water erosion. Full protection should be provided to the existing coastal forests, particularly mangroves.

Coastal shelter belts should, in particular, be created to minimise damage by salt-laden winds, and the growth of natural coastal biomass should be established. Ecological restoration through revegetation of areas vulnerable to erosion, including the banks and verges of canals of major and medium irrigation projects, and above the high tide levels of the coastal and other water bodies should be undertaken to prevent water and land erosion. Problematic degraded areas like salt flats and areas affected by alkalinity such as those occuring in Punjab, Haryana, the Usar lands of Uttar Pradesh should be treated to improve their productivity through afforestation and, where possible, mechanical fracturing of pan-formations.

# CHAPTER V : THE FOREST (CONSERVATION) ACT, 1980, AND ITS IMPLEMENTATION.

## 1. BACKGROUND.

1.1 A major area of national concern has been the indiscriminate and massive diversion, after Independence, of forest land for non-forestry purposes by the respective State Governments. Calamitously, as much as 4.328 million hectares of forest land was diverted for non-forestry purposes during the period from 1950 to 1980, the bulk of which was for agriculture. The environmental or ecological repercussions were never considered important while permitting such diversions. Finally, the implications of the loss of forest cover and its likely effects on the ecology and environment drew the attention of the Central Government in the 1970s, when measures were initiated to stem this trend. Until 1977, forestry was a State Subject under the Constitution. An amendment was made in the Constitution in 1977 to place forestry on the Concurrent List. Guidelines were issued by the Central Government in 1978 laying down that all proposals involving the diversion of forest land of and above 10 hectares must be reported to the Central Government. The State Governments, however, ignored these instructions and continued to divert forest lands at the slightest pretext.

1.2 The Central Government then issued the Forest (Conservation) Ordinance in 1980, which stipulated that every case involving dereservation of Reserved Forests or the diversion of forest lands to non-forestry use would require prior approval of the Government of India. Later, this ordinance was converted by the Parliament into the Forest (Conservation) Act, 1980. Clearance of the Central Government to every proposal of dereservation of reserved forests, or to every proposal of transferring forest lands to non-forestry use, is now necessary under this Act. Thus, in effect, the powers of the State Governments to dereserve forests and put any forest land to non-forestry use were withdrawn by this Act. As a result, the rate of diversion of forest lands was drastically reduced. About 16,000 hectares of forest lands was diverted per annum since the enactment of the Act against a staggering 1,50,000 hectares per annum during the preceeding 30 years. The Act was amended by Parliament in December, 1988, to make it more stringent and effective. Leasing of forest land, clearance of natural forests for reafforestation, or raising of non forestry crops like tea, coffee, rubber, spices or medicinal plants now requires the explicit approval of the Central Government.

## 2. PURPORT OF THE FOREST (CONSERVATION) ACT, 1980.

2.1 As stated above, the Act restricts the powers of the State administration and State authorities in respect of the following:

2.1.1 when a reserved forest is to be dereserved;

2.1.2 when forest land is to be diverted for non-forestry purposes as defined in the Act;

2.1.3 when forest land is to be leased or assigned to private individuals or non-government organisations;

2.1.4 when forest land is to be cleared of naturally growing trees for "reforestation";

2.1.5 when forest land is to be used for certain land use practices involving cultivation of commercial crops.

2.2 The Act also has a penal provision under the Amendment made in December, 1988. Guidelines have been framed under the Act, as well as in the Amendment Act, stipulating the procedure to be adopted for the submission of cases by the State Governments to the Central Government and processing of cases referred to the Government of India under the provisions of the Act.

2.3 Section 3 of the Forest (Conservation) Act, 1980, stipulates that the Central Government may constitute a committee consisting of such number of persons as it may deem fit to advise the Government with regard to (i) the grant of approval under Section 2 of the Act, which relates to restriction on the dereservation of forests or use of forest land for non-forest purpose; and (ii) any other matter connected with the conservation of forests which may be referred to it by the Central Government.

2.3.1 Accordingly, an Advisory Committee comprising three ex-officio and three non-official members has been set up by the Government of India. This Committee is headed by the Inspector General of Forests. Other official members of the Committee are the Deputy Inspector General (Forests), who is also the Member Secretary, and the Joint Commissioner (Soil Conservation), Ministry of Agriculture. The three non-official members are nominated by the Ministry of Environment and Forests for an indefinite time period. The Committee can be reconstituted any time by the Ministry. At present these three members are Dr. T.M. Verghese, Professor of Zoology at the Hissar Agriculture University, Dr. S.M. Mohnot, Professor of Botany at Jodhpur University, and Shri Chandi Prasad Bhatt, a well-known environmentalist. The Advisory Committee meets once every month to make recommendations on the cases that are placed before it.

2.3.2 The State Governments send their proposals to the Secretary, Ministry of Environment and Forests for the diversion of more than ten hectares of forest land for non-forest purposes, who refers the case to the Advisory Committee. After this Committee has made its recommendations, the proposals are routed through the various rungs of the bureaucratic ladder. The proposal ultimately reaches the Minister, through the IGF, who takes the final decision.

2.3.3 The Ministry of Environment and Forest has also internally evolved certain broad policies to decide cases of a particular nature like transmission lines, mines, irrigation, hydro-electric projects etc. under the Act. Decisions are also governed by other considerations also, for instance, to discourage the use of forest land for resettlement of displaced people in forest areas, construction of buildings, etc. Government does not allow the use of forest lands for resettlement. An exception is, however, made for resettlement of persons proposed to be shifted out of the National Parks and Sanctuaries so that safeguarding these protected areas from human exploitation can be more effective.

2.3.4 Under the mistaken notion that "compensatory afforestation" is possible for areas of natural forests that have been deforested, the Central Government insists on this at the time of clearing proposals, knowing full well that the so-called "compensatory afforestation" will in most cases be merely tree plantations until natural regeneration, if safeguarded, restores some vestige of natural forests. Such "compensatory afforestation" has to be accompanied by full protection of the area to ensure maximum inter-row natural regeneration.

2.3.5 The Central Government has set up six regional offices for overseeing and monitoring the implementation of the Act, particularly in respect of matters like compensatory afforestation, adequate provisions for the ecological enrichment of the catchment areas, rehabilitation of oustees, reclamation plans for mines and checking violation of the provisions of the Act. These regional offices are located in Bhopal, Bhubaneswar, Shillong, Lucknow, Bangalore and Chandigarh and work under the charge of the Regional Chief Conservator of Forests. The Chandigarh office, however, is headed by an officer of the level of Conservator of Forests. These regional offices are also expected to assist the officials of the State Governments in formulating their proposals.

3. STREAMLINING PROCEDURES.

3.1 There has been, and still is, a feeling in certain quarters that the Act delays developmental projects. In view of such criticism and for other considerations, the Ministry of Agriculture constituted a Working Group in 1983 to make an in-depth study of the procedures followed under the Act and to suggest ways and means of facilitating clearance. This Working Group observed that the procedures laid down by the Central Government are neither difficult nor time-consuming. On the contrary, the Group concluded that the discipline which the Act has introduced is not to the liking of some of the project proponent agencies. In many cases, the diversion of forest land was taken for granted by the project authorities. The State Forest Departments were not consulted during the formulation of project proposals, or even in the implementation of projects on forest lands. The Working Group further observed that the delay in submission or disposal of some cases was due to inaction and/or indifference on the part of the project proponent agencies.

3.2 An analysis of the proposals received by the Government of India from the States and Union Territories under the Forest (Conservation) Act, 1980, as on September 30, 1989, is given below:

| States/U.T.s | Total received | Total approved | Total rejected | Total rejected for want of adequate information | In process | Withdrawn |
|---|---|---|---|---|---|---|
| Andhra Pradesh | 134 | 66 | 24 | 33 | 3 | 8 |
| Arunachal Pradesh | 58 | 25 | 10 | 22 | 1 | - |
| Assam | 60 | 44 | 7 | 5 | 3 | 1 |
| Bihar | 81 | 32 | 6 | 39 | 3 | 1 |
| Goa | 14 | 4 | 5 | 4 | 1 | - |
| Gujarat | 309 | 80 | 61 | 143 | 8 | 17 |
| Haryana | 28 | 15 | 3 | 8 | 2 | - |
| Himachal Pradesh | 169 | 78 | 26 | 48 | 15 | 2 |
| Jammu & Kashmir | 6 | 3 | - | 3 | - | - |
| Karnataka | 250 | 94 | 61 | 86 | 2 | 7 |
| Kerala | 96 | 50 | 22 | 20 | - | 4 |
| Madhya Pradesh | 514 | 153 | 108 | 198 | 32 | 23 |
| Maharashtra | 546 | 267 | 36 | 198 | 35 | 10 |
| Manipur | 7 | 4 | - | 2 | 1 | - |
| Meghalaya | 16 | 12 | - | 4 | - | - |
| Mizoram | 5 | - | - | 5 | - | - |
| Nagaland | 2 | - | - | 2 | - | - |
| Orissa | 112 | 60 | 14 | 23 | 11 | 4 |
| Punjab | 30 | 10 | 5 | 5 | 5 | 5 |
| Rajasthan | 109 | 56 | 14 | 37 | - | 2 |
| Sikkim | 54 | 33 | 6 | 11 | 4 | - |
| Tamil Nadu | 173 | 105 | 28 | 31 | 4 | - |
| Uttar Pradesh | 869 | 596 | 62 | 137 | 63 | 11 |
| Tripura | 41 | 15 | 2 | 22 | - | 2 |
| West Bengal | 47 | 22 | 7 | 14 | 3 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Andaman & Nicobar | 39 | 20 | 10 | 7 | 2 | - |
| Dadra & Nagar Haveli | 6 | 2 | - | 4 | - | - |
| Delhi | - | - | - | - | - | - |
| Daman & Diu | - | - | - | - | - | - |
| Pondicherry | - | - | - | - | - | - |
| Lakshadweep | - | - | - | - | - | - |
| Chandigarh | 1 | - | 1 | - | - | - |
| TOTAL | 3,776 | 1,846 | 518 | 1,111 | 198 | 103 |

3.3 The above table reveals that a large number of cases are delayed because information required is not furnished by the State Governments. Certain essential information is prescribed to allow proper scrutiny and assessment of the environmental and ecological implications of such projects. The Ministry of Environment and Forests has made efforts to streamline procedures from time to time and to eliminate delays in clearance. A decision has been taken that when complete information is provided, the cases must be decided within six weeks of their receipt in the Ministry. The Government of India has also advised the State Governments to appoint nodal officers to coordinate with the proponent agencies and the Government of India to ensure submission of full particulars and timely scrutiny of proposals.

## 4. REVISED GUIDELINES ISSUED BY THE GOVERNMENT OF INDIA.

4.1 The Government of India was persuaded that some of the conditions earlier imposed for the release of forest land for non-forest purposes under the Forest (Conservation) Act, 1980, should be reviewed so as to expedite clearance of cases concerning developmental works to benefit the tribal and other local people, especially in hilly and forested districts. This issue was discussed at considerable length in the Forest Ministers' Conference held in May, 1989. The representatives of the State Governments then wanted limited decentralisation to expedite clearance of cases under the Forest (Conservation) Act, 1980, particularly in the tribal and hilly forest areas. The concern then of the Central Government was to ensure acquisition of equivalent non-forest land in place of the forest land proposed to be put to non-forestry use so that the area under forests in the country is maintained. However, proponent departments often state now that non-forest land for compensatory afforestation is not available with the Government. Most regrettably, the Central Government has now liberalised its stand and has agreed to the following:

4.1.1 In the hill districts as well as in districts with 50 per cent or more land area under forests, "compensatory afforestation" (?!) would be "allowed" on the degraded forest lands in twice the forest area to be put to non-

forest use. This is stipulated when the land is limited to 5 hectares, and where it is required for purposes of construction of link roads, small water works, minor irrigation works, school buildings, dispensary, hospitals, tiny rural industrial sheds or any other similar works which directly benefit the local people of the area. By succumbing to this demand, Government has failed to realise that this will soon lead to the rapid fragmentation and attrition of the limited consolidated blocks of forests that still remain intact, particularly in the hydrogeographical areas, resulting in the progressive erosion of their ecological value. Also that this will make it increasingly difficult to bring one-third the geographical area of the country under forest cover, which is the very minimum necessary to provide a secure foundation on which the country's ecological balance can rest.

4.1.2 Further permission would be granted for diversion of forest land for the rehabilitation of people, as a special case, if required for rehabilitation of Scheduled Castes and Scheduled Tribes and other people who may have to be shifted from the core zone of National Parks and Sanctuaries.

4.1.3 The Government of India had initially decided, and wisely, not to divert forest land for the construction of buildings. Unaware, or in desregard of the larger vital national need and interests, and yielding to populistic demand for short-term political advantage, in the revised guidelines, Government has decided that such diversion may be allowed for construction of buildings for schools, hospitals and dispensaries, community halls, cooperatives, panchayats, tiny rural industrial sheds of the Government etc. which are required for the benefit of the people of that area. However, such diversion is to be limited to the actually needed area and is not to exceed one hectare in each case. Without a doubt, this will rapidly lead to the development of full-fledged settlements and progressive growth of infrastructure with all its concomitant dangers to the surrounding forest areas and its ability to contribute to ecological security.

4.2 These revised but shortsighted guidelines will gain Government at Central and State level some short-term peace and political advantage, especially State Governments which wish to execute small-scale development works in tribal and inaccessible areas, but will cause irreparable longer-term environmental and ecological damage to the country.

4.3 With a view to decentralizing powers to expedite clearance of cases, the Government of India in June, 1989, amended the rules framed under Section 4 of the Forest (Conservation) Act, 1980. The new amendment provides that any proposal involving forest land of less

than one hectare should be submitted by the State Government to the Regional Chief Conservators of Forest of the Ministry of Environment and Forests. It is estimated that many simple but important cases involving a small requirement of land for purposes such as drinking water supply, link road, small buildings and sheds etc. belong to this category. The State Governments may find it easier to refer such cases to the concerned Regional Chief Conservator of Forests and obtain quick clearance. Unless however the Regional Chief Conservators of Forests have strict instructions to exercise extreme caution in granting sanction, they are likely, in most cases, to yield to local political and social pressures, and take the line of least resistance by agreeing.

4.4 Similarly, the rules have also been modified to the effect that only those cases which involve more than ten hectares of forest land are now referred to the Advisory Committee. Cases involving land less than 10 hectares are handled by the Ministry directly on the advice of the Inspector General of Forests (IGF). This procedure may expedite the clearance of many of the medium type of cases to avoid keeping them in abeyance pending the next sitting of the Advisory Committee which takes place once in a month in accordance with the accepted procedures. However, here again, unless the IGF can act in the certain knowledge that in principle Government is opposed to alienating forest areas and is determined to ensure that one-third the geographical area of the country is brought under forest cover, he is unlikely to be able to resist pressures from other official and political quarters to yield in most cases.

## 5. ISSUES RAISED BY VARIOUS AGENCIES AGAINST THE ACT.

Various State Governments, organisations and individuals have posed certain problems with reference to the Forest (Conservation) Act, 1980. The more important ones are described below:

5.1 Regularising old encroachments.

5.1.1 Some States had decided on regularisation of encroachments prior to 1980, but this could not be done because the Forest (Conservation) Act, 1980, came into force before the concerned forest lands could be denotified. The States involved are Madhya Pradesh, Maharashtra and Kerala.

5.1.2 The States of Madhya Pradesh, Maharashtra, and Kerala are confronted with the problem of settlement of past encraochments on forest lands. The Government of Madhya Pradesh had granted five-year leases to the people for the lands upon which they have encroached. In 1977, the Government of Madhya Pradesh took a decision to regularise encroachments, subject to certain conditions.

Accordingly, about 93,000 persons are said to be eligible for regularisation of encroachment on about 1.11 lakh hectares of forest land. In addition, there are substantial encroachments, on record, of ineligible persons or of encroachments that occurred after the cut-off date set by the State Governments. In Madhya Pradesh alone, 91,000 persons belong to this category, and the area involved is of the order of 1.28 lakh hectares. There appear to be many unrecorded encroachments also. A similar situation exists in Maharashtra and Kerala. The Government of Madhya Pradesh has pointed out that because of the provision of the Forest (Conservation) Act, 1980, it cannot renew pattas to individuals. It has proposed denotification of forest areas, which inevitably would attract the Forest (Conservation) Act, 1980, and encourage further wholesale encroachments.

5.1.3 The State Governments have further requested that the condition of compensatory plantations should not be insisted upon as they have neither the non-forest land nor financial resources for such plantations. This issue was discussed at a meeting of the Forest and Tribal Secretaries and the Principal Chief Conservators of Forests from the States of Bihar, Orissa and Madhya Pradesh in the Ministry of Environment and Forests on March 2, 1989. Regrettably, the Government of India yielded.

5.2 "Settlement" of early forest villages and agri-silvicultural plots.

5.2.1 Old settlements in the midst of forests, known as forest villages, continue informally. The settlers have not been given titles to the land they occupy. States are requesting that they should be permitted to grant titles to villagers. In particular, this has been posed to the Central Government by Orissa.

5.2.2 In States like Maharashtra, certain old cases of annual agri-silvi leases commonly called Ek Sali plots (one year leases) exist. It has been asked that such forest lands should be denotified and transferred to the Revenue Department for award of ownership rights to the concerned persons. Shoshit Jan Andolan, Bombay, has taken up this issue with the State Government.

5.3 Resettlement of Jhumias.

5.3.1 There are certain schemes for rehabilitation of shifting cultivators (Jhumias). According to the provisions of the Forest (Conservation) Act, 1980, forest land cannot be assigned to any private individual without prior permission from the Government of India. Any scheme which aims at resettling them by guaranteeing usufructory right to the plantations on forest land, would require clearance from the Central Government. This prevents settling them. It has been proposed that the

beneficiaries are allowed the usufruct from plantations raised in Jhum land - which often happens to be forest land. For this purpose exemption has been sought under Section 2(a) (iii) of the Forest (Conservation) Act, 1980. This issue has been raised by Orissa. If accepted, this approach would be applicable to Andhra Pradesh, parts of Madhya Pradesh besides the North East where jhum cultivation is practised on forest lands. If adopted, such schemes, which are almost entirely on hill areas, would prevent once and for all the jhummed areas from being brought under natural forests, since usufructory rights will hereafter make rapidly growing demands on the forests and soon lead to their irreversible degradation. The former Chief Minister of Mizoram asserted in meetings with the Vice Chairman of the National Wastelands Develpment Board that he could persuade many of the Jhumias of that State to accept a settled existence if they were rehabilitated in roadside locations and helped in taking up alternate vocations, particularly shopkeeping and other such commercial activities. The same may well be the case with those practicing shifting cultivation in other States, if alternative vocations could be offered to them. Unfortunately, as far as is known, no concerted effort has been made to pursue this suggestion and also to see whether a similar approach cannot be taken with other jhumias especially those who are now increasingly involved in the country's cash economy and would therefore more easily relinquish their age-old agricultural practices.

5.3.2 Some States have proposed schemes for plantation of perenniel crops like rubber, coffee, tea and horticultural species to resettle shifting cultivators. If such crops are developed as small private holdings, they may not be economically viable as has proven to be the case elsewhere in the country, unless developed on a cooperative basis. If this should happen, it would lead to the diversion of such lands for cultivation of annual crops and subsequently cause serious ecological fragility and erosion of the areas. However, any such proposal for cultivation of cash crops on forest land now requires prior clearance from the Central Government since it would attract the provisions of the Forest (Conservation) Act, 1980 (Explanation (a) of Section 2 of the amended Act). Orissa has proposed blanket exemption for such land-use practices. Since, as stated earlier, most jhumming is carried out on hill tracts and mostly on what have now become ecologically fragile areas, acceptance of such a proposal will inevitably result in undermining the long-term ecological security of important hydrogeographic systems that such areas represent.

5.3.3 The practice of jhumming may once have been justified when vast tracts of virgin forests existed. The present ecological circumstances can neither sustain nor generally justify the continuance of this form of agriculture so destructive of vegetative cover and responsible for such serious erosion, either on grounds

of sustaining the ecological balance or for cost-effectiveness. In the course of time, continuance will spread rancour and misery amongst the inhabitants of the tracts where jhumming is practised and lead to large-scale migration to the plains as is already happening in the North-East, and to semi-urban and urban areas with all the further social upheavals this will create.

5.4 Restrictions on land-use practices and grant of tree pattas.

5.4.1 Besides the Rural Development Department in the Government of India, the Governments of Orissa, Kerala and Madhya Pradesh have proposed cultivation of spices, oil-palm, sericulture, tassar and the like. It is argued that these would be potentially useful for tribal development. However, such land-use practices require prior clearance of the Central Government under the Forest (Conservation) Act, 1980 (Explanation (a) of Section 2 of the amended Act). These State Governments have proposed that cultivation of such crops on forest land should be exempted from the purview of the Forest (Conservation) Act, 1980. Apart from permission to bring these lands under such use, some of the States want the beneficiaries to be given usufructory rights under tree pattas or any other suitable arrangement. Usufructory rights and tree pattas inevitably lead to long-term control of the land on which such rights are exercised and limit the change of land use for other purposes, especially ecological restoration. While this may do little harm in the plains, it would well have serious repercussions in the hill regions.

5.5 Leasing of forest lands.

5.5.1 The Act requires that every proposal which gives forest lands on lease to individuals or cooperatives, or to any non-government organisation (NGO), for afforestation or any other purpose must be submitted to the Central Government for prior approval. Some NGOs, and Government agencies like the Ministry of Welfare and the Department of Rural Development, are of the view that a more effective approach to revegetate forest areas could be to involve individuals/cooperatives/NGOs by issuing land pattas to them. They feel that the Government of India may unjustifiably delay sanction of such proposals.

5.5.2 It has been said that the Act does not allow the State Governments to assign forest land for certain uses to non-government agencies, which have to obtain approval from the Central Government and in the process the potential role of non-governmental organisations in afforestation activities is ignored.

5.5.3 A sense of disappointment also prevails in the industrial sector. Some forest-based industries hope to raise captive plantations on forest land to meet their raw

material requirements. Under the Act, such ventures are no longer possible without obtaining clearance of the Central Government. As a matter of principle, industries must motivate private farmers to grow their requirements of raw material as has been done so successfully in the case of some items of daily necessity.

5.6 Restriction on development activities.

5.6.1 Many State Governments have suggested that they should be authorised to divert forest land for non-forestry developmental needs, for example, construction of hospitals, minor and medium irrigation schemes, rural electrification, construction of schools, and the like. The Government of Orissa has suggested that the State Governments may be delegated powers to divert forest land upto 5 hectares in each case for development of infrastructure in the tribal area when the benefits are to accrue primarily to tribals. This issue of delegation of powers to States has been debated in various fora including the Parliament, and the Government of India has maintained that neither delegation nor exemption under the Forest (Conservation) Act, 1980, would be desirable. The experience of the pre-1980 years leads one to believe that any delegation of such authority will lead to large-scale diversion of forest lands to non-forestry purposes.

5.6.2 Developmental activity in the Hill districts of Uttar Pradesh is claimed to have been adversely affected by the Forest (Conservation) Act, 1980. This includes such work as housing programmes, construction of roads, drinking water schemes, quarrying, electric and communication lines etc. Such a situation has arisen mainly because of the fact that the State Government does not offer non-forest lands in exchange of lands proposed to be diverted. Certain representatives from the Uttar Pradesh hills have sought the simplification of the Act to overcome these difficulties.

5.6.3 The provisions of the Act are claimed to be detrimental to various developmental activities especially in tribal areas. In particular, it is said to be an obstacle in the way of hydro-electric projects in the hills. This is certainly not true. Many hydro-electric schemes, for which complete information was provided by the State Governments, have been cleared by the Central Government. The Government of India is required to ensure that the project is in no way detrimental to the ecology or the environment of the area as well as to ensure the resettlement of the affected people and protection of the catchment areas. However, Government should now exercise greater caution in approving of such schemes and in principle favour mini schemes to mega ones, since there is no dout that the former cause far less environmental damage.

5.7 Obligatory procedures.

5.7.1 Some argue that the entire process of obtaining clearance of the Central Government for use of forest land involves procedural delays which cause serious time and cost over-runs in the execution of the projects. They seldom consider the environmental problems that a lack of forethought and hasty decisions can cause.

5.8 Obligatory "compensatory afforestation".

5.8.1 The guidelines issued under the Act stipulate that whenever forest land is diverted to other use, an equivalent non-forest area should be afforested. Whenever such diversion takes place in a well forested district the project authorities find it difficult to make available non-forest area to raise compensatory plantations. This is said to result in delays, and consequent escalation of the cost of projects.

5.8.2 Some States have suggested that a certificate from the Collector of the concerned district, to the effect that non-forest land is not available, should suffice to permit "compensatory afforestation" on degraded forest land. According to the guidelines of the Government of India, compensatory afforestation on the degraded forest land is to be twice as much in areas as the diverted forest land. This can be considered only if the Chief Secretary of the concerned State certifies that no non-forest land is available in the State. It is not realised that so-called "compensatory afforestation" is not afforestation but tree planting and will be "compensatory" to a limited extent only after a reasonable degree of natural revegetation has taken place between the rows of trees through the area being totally protected and excluded from any human manipulation.

5.9 Administrative and legal aspects.

5.9.1 It is realised that the Act will create friction between various departments of the Government, especially between the Forest Department and others. This is inevitable, and indeed rightly so, since the forest departments are the custodian of the forests and have been charged with the responsibility of protecting them. This custodianship must on no account be undermined. On the contrary, it must be greatly strengthened by reviving full Government support.

5.9.2 The Indian Forest Act, 1927, under Section 28, provides that certain forest lands can be assigned to the local communities for management by constituting them into "village forests". This has been done in States like Uttar Pradesh, where there are comprehensive regulations for management of Panchayat forests. It is said that as the provisions of the Forest (Conservation) Act, 1980, are contradictory to the provisions of the Indian Forest

Act, 1927, the institution of village or Panchayat forests would be adversely affected. The problem can be overcome if so-called village or panchayat forests, where the villages and these "forests" are not located in the proposed "National Forests", are developed specifically through the most intensive and modern silvicultural and silvipastural techniques to rapidly reach maximum levels of productivity, but with no false pretensions to forestry - a term increasingly and now gravely misused to describe what can more rightly be termed as agricultural activities.

5.9.3 States like Madhya Pradesh and Maharashtra have pointed out that certain lands, outside legally constituted Reserved Forests, Protected Forests and Unclassed Forests, have been classified as forests in the revenue records of the State administration under different names. In Maharashtra, these are called Zudpi jungle, while in Madhya Pradesh they are called chhote jhar ka jungle, bade jhar ka jungle, Nishtari jungle, etc. The States contend that such land areas should not attract the provisions of the Forest (Conservation) Act, 1980. The Government of India has rightly maintained that any land, which has been recorded as "forests" in the Government records must attract the provisions of the Forest (Conservation) Act, 1980.

5.10 Area specific problems.

5.10.1 It is argued that the Act should not be applied uniformly in all the States and Union Territories. In regions like the Andaman and Nicobar Islands, where about 80 per cent of the land is under forest cover, the strict enforcement of the Act is pointed out to be causing an adverse impact on developmental activities. And one should add justifiably so.

5.10.2 It is also contended that the decision making process is too highly centralised. The Advisory Committee works at the national level and is expected to pass judgement on the socio-economic and environmental implications of all projects in the entire country. In this process, the specific issues of different regions are ignored. It has, therefore, been suggested that the decision making process should be decentralised. Another view is that district level Committees representing various concerned organisations should be constituted and these should have the authority to decide such questions which relate to smaller projects. To accept such a view would be tantamount to the Central Government renaging on its environmental, and more specifically its overall ecological security responsibility for the whole country. In this, the nation-wide acceptance of crucial and basic forest norms will play a critical role.

5.11 Restriction on traditional forestry practices.

5.11.1 By restricting felling of naturally grown trees, the Act rightly introduces a vital ecological constraint to orthodox and now outmoded forestry operations. Certain forestry species as teak, pines and bamboos are strong light demanders and do not tolerate shade, when quick and good growth is required. Raising plantations of such species even in degraded forest lands normally involves clearing of all other miscellaneous species. Under orthodox silvicultural practices, trees are felled to "remove congestion" during tending and thinning operations! Since many foresters, particularly the more senior, are deeply conditioned by the orthodox silvicultural approach to forestry, they find it difficult to accept the need to revise such practices and adopt approaches that lead quickly to strengthening the ecological instead of the silvicultural concerns to forest management. Crash courses for all forest officers on an ecology and ecosystem based approach to forest management is thus essential and this can best be conducted at the Indian Institute of Forest Management as soon as it is staffed adequately to do so. Clearly such courses must be designed to give effect to the 1988 National Forest Policy, hopefully amended, as proposed in this Report, to remove certain serious contradictions.

5.11.2 States like Karnataka, West Bengal and Kerala are of the view that the provisions of the Forest (Conservation) Amendment Act, 1988, affect certain types of forestry practices, like under planting of minor forest products, medicinal plants, spices etc. though no tree felling may be involved. They have unjustifiably opined that such activities should be exempted from the purview of the Forest (Conservation) Act, 1980. To do so would undermine the primary objective of the National Forest Policy, 1988. Under no circumstances should this be permitted.

5.12 Other considerations.

5.12.1 The view prevails in some quarters that the Act dilutes the rights, concessions and privileges of the local communities in respect of tree felling for meeting the bona fide Nishtar removal. While this is so and is unavoidable, it is essential that all steps must be taken to meet the sustenance needs of local communities from alternate sources as explained elsewhere in the report, particularly of fuel, fodder and household timber. This would not apply, of course, to "primitive" tribes as long as they continue to live in symbiotic relationships with their environment and are not drawn into the country's over-exploitative market and cash economy.

5.12.2 Many environmentalists and conservation activists justifiably claim that the Act has not proved effective in restraining the execution of mega-projects. They also

hold the view that "compensatory afforestation", which is undertaken to compensate for forest areas lost through inundation or destruction, are incapable of compensating for the loss of valuable natural forests. Some environmental groups have filed public interest writ petitions to restrain States from interfering with their forests. Such actions rightly arouse public indignation and delay diversion of the forest areas through the Forest (Conservation) Act, 1980, even though they may interfere in the finalisation of cases. The voices of these groups must not be muted or discouraged by an attitude of cavalier disregard from Government concerned more with supporting established interests that are determined to pursue traditional concepts and modes of "development" and their own objectives. Unfettered by outmoded orthodox thinking, these groups have important messages to convey and must be given an unbiased hearing and their opinions considered with respect.

## 6. RECOMMENDATIONS.

6.1 Whatever the criticism against the Forest (Conservation) Act, 1980, and the Amendments made to it in 1988, on the grounds that it carries the same imprest of arbitrariness as the Indian Forest Act, 1927, there has in recent decades emerged environmental justification for such provisions in the overall national interest that are so impelling as to be irrefutable. Indeed, if anything, these would justify even more stringent provisions directed not against tribals and the rural poor, but against the large scale users of all manner of forest produce, particularly Government, Industry and Commerce, and not the least the political system, all of which have contributed so greatly to the deforestation in the country.

6.2 The Forest (Conservation) Act, 1980, has to a large extent proved to be an effective legal instrument in preventing the indiscriminate and wholesale diversion of forest land for non-forestry purposes. Prior to the enactment of the Act, the State Governments, who were in the final analysis the custodians of the country's forests, released their forest lands liberally for a variety of other purposes, irrespective of the environmental and ecological consequences. This contributed greatly to the annual rate of forest loss, rising to 1.5 lakh hectare prior to 1980. It is claimed that this has now been reduced to about 16,000 hectares because of the stringent regulations imposed under the Act. The Act has also been instrumental in preventing the States from indiscriminate regularisation of forest land that has been encroached upon. The experience in the past was that at every election, the State Governments, distributed forest lands or regularised encroachments, as a largesse, making a mockery of forest protection. This not only encouraged further encroachments but was also responsible for demoralising forest staff and encouraged some of them to collude with encroachers when they

realised that their attempts to prevent encroachments would ultimately be to no avail and would ultimately visit upon them the odium of their superiors and the political bosses. This situation not only led to further loss of forests but contributed substantially to corruption among the staff, politicians and society as a whole. It is well-known that many a prominent politician succeeded in advancing his political career through funds generated through illegal forestry operations conducted by forest contractors.

6.3 There are certain anomalies in the composition and functioning of the Advisory Committee which must be seriously considered and removed. The Inspector General of Forests is placed in an insiduous position. By virtue of being the Chairman of the Advisory Committee which makes recommendations, he is both the advisor and the formulator of the Committee's final recommendations. He is also the key official who tenders formal advice when the cases are being considered and decided by the Ministry of Environment and Forests. Further, Government is not obliged to accept the recommedations of the Advisory Committee. Questions of such importance as those that come before this Committee must be decided neither by political nor bureaucratic considerations but only by those of national ecological security. The answer lies in deciding whether the Committee as currently constituted and empowered is in a position to meet this concern.

6.3.1 The present arrangement for the scrutiny of the proposals must be rectified to make it broad-based and effective. The Committee should be reconstituted by including more non-official members and possibly by keeping out the official members. The role of those officials, who in any case are going to examine the proposals in the files of the Ministry of Environment and Forests, needs to be minimised in the Committee.

6.3.2 The proposals are routinely forwarded to the Central Government by the State Governments, who have hitherto failed to analyse the environmental or ecological consequences of the diversion of forest land for non-forestry use. It is only at the insistence of the Government of India that the States make the effort to look into this aspect. To remove such apathy and indifference on the part of the State Governments, the Act must provide for a similar Advisory Committee at the State level to thoroughly scrutize and approve the proposals before these are forwarded to the Government of India for final consideration.

6.3.3 Presently, the State Forest Departments and the Ministry of Environment and Forests of the Government of India are the two main Government organisations entrusted with the responsibility of enforcing the provisions of the Act. Often other Departments and District level officials

perceive these provisions of the Act as unnecessary fetters to the discharge of their duties and adopt a hostile attitude. In order to remove this antipathy and apathy, other Government Departments should be actively involved in the implementation of the provisions of the Act. The District Collector should be given an active responsibility to enforce the Act and he should ensure that no financial provision is made in the District Plans for any project involving the diversion of forest land unless the project has been approved by the Government of India after it decides to concede this loss, if in fact it does.

6.3.4 Mega-projects have been responsible for the diversion of extensive forest lands for non-forestry uses. The Narmada Sagar and Sardar Sarovar projects account for about one-third of the total forest area of the country diverted between 1980 and 1987. Often such projects are finalised in advance of any reference to the Government of India. In some cases the external financial assistance required is sought even before approval under the Forest (Conservation) Act, 1980, is obtained. This exerts extreme and unjustified moral pressure and obligation on those who are responsible for according approval to the projects under the Act. Besides, such projects involve large-scale displacement of human habitations. This leads to the alienation of additional pressure on forest lands when the displaced persons have to be relocated. In view of the socio-economic and the environmental implications of such projects, a mechanism must be evolved to make a quick feasibility appraisal before such projects are finally formulated and details worked out. The Administrative Ministries, the Ministry of Finance and the Planning Commission must ensure that administrative and financial sanction is not accorded to such projects unless these are approved by the Ministry of Environment and Forests, Government of India, in accordance with the provisions of the Forest (Conservation) Act, 1980.

6.3.5 The Government of India has a skeleton staff to monitor the implementation of the Forest (Conservation) Act, 1980. The six Regional Offices set up by the Ministry of Environment and Forests for this purpose are widely dispersed and each office is expected to look after cases in five or six States. To ensure effective vigilance in the enforcement of the Act, the Ministry of Environment and Forests, Government of India, must strengthen its existing Regional Offices. If necessary, new offices should be established in a way that none of these should be responsible for looking after more than two major States.

6.4 Many individuals, organisations and government agencies have expressed opinions about the Act. Views on the subject have been made public through published documents, including the proceedings of debates in the Lok Sabha. The Government of India is fully aware of the

concern expressed by various functionaries, particularly with respect to the clearance of developmental projects under the Act. Succumbing to the pressure of certain lobbies, the Government of India has over time adopted increasingly liberal procedures for clearance of cases, and has amended guidelines, relaxed rules, and relegated its responsibilities by the delegation of powers to its Regional Chief Conservators of Forest so that so-called "developmental" activities could proceed, often without regard to their environmental consequences. Taking account of the actual reasons that have led to delays in the clearance of cases, the following measures are suggested to meet the objectives of the Act:

6.4.1 Achieving forest coverage of one-third the geographic area of the country: Above all other considerations, Government in the Ministry of Environment and Forests must, even at this late juncture, regard it as its primary responsibility to strive with greater determination to gain control, through purchase or acquisition, sufficient land in the hydrogeographic systems of the country, and put these under programmes of natural revegetation, to achieve the minimum forest coverage of one-third of the geographic area. To this end, the Ministry should, in principle, consider conceding notified areas of forest, whether vegetated or barren, for whatever purpose, only when alternative areas within the hydrogeographic zones, or of valuable bio-diversity are offered in lieu. The purpose is to progressively consolidate the hydrogeographic systems and bring and maintain these under optimum forest cover. This objective of the Government of India must be conveyed immediately in unequivocal but evocative terms to State Governments to convince them of the importance to the country as a whole of achieving this overriding national objective.

6.4.2 Furnishing of adequate information: It is noticed that the State Governments do not submit complete information in the prescribed form to the Government of India to enable proper scrutiny of their proposals. This necessitates seeking further information from the State Governments. If the officials of the proponent departments and the State pay proper attention to the formulation of proposals and submit all required details, anticipating the queries that may arise, such correspondence could be avoided. In case of mega-projects involving loss of large tracts of forest lands, an assessment of the environmental and socio-economic impact is also required to be undertaken by the State Governments. The impact assessment analysis requires to be examined occasionally by experts commissioned by the State Governments at the behest of the Government of India, to assess the merits of a project on technical grounds or on socio-economic and environmental considerations. If State Governments take such precautions, it will be possible to avoid loss of time and money in preparation of environmentally acceptable proposals.

6.4.3 Post clearance monitoring: Proper monitoring of the implementation of various conditions and safeguards, often stipulated by the Government of India while according approval to proposals, should be carried out on an on-going basis. Wherever possible the State Governments should entrust this work, especially for afforestation, to reputed and competent NGOs in addition to Forest Departments and Forest Corporations. Finances required for this purpose should be made available by the concerned project authorities to ensure effective implementation of the conditions stipulated by the Government of India while according clearance.

6.4.4 Maintenance of records: Government must ensure that forest land is properly demarcated and records are maintained. In many cases it is not clear whether a piece of land is a forest land and, if so, what are its boundaries; nor are maps of such lands maintained. The difficulties are far more pronounced in areas which are unsurveyed, as is often the case in the North-Eastern States.

6.4.5 Mechanism for appraisal of projects: In consultation with their environment departments, the State Governments should evolve a methodology for this purpose particularly taking into account the environmental and socio-economic aspects of development projects, and lay down appropriate criteria for the acceptance or rejection of proposals.

6.4.6 Adequate provision of alternative land for agriculture, fuel and fodder to meet the basic needs of displaced people: Government is compelled to reject any proposal which does not provide for these basic needs. If affected people are not adequately looked after in this respect, they will inevitably damage the adjoining forests and the ecology of the area by encroachments and misappropriation of the natural produce that exists. All irrigation projects in particular should provide in both their catchment and command areas land in each equal to the submerged forest land for afforestation as well as water and funds to produce downstream the displaced persons' basic needs like fuelwood and fodder. Wherever alternate Government lands are not available for this purpose, the project authorities should acquire private land for afforestation and development for these purposes.

6.4.7 Proper dissemination of information: Many misconceptions about the provisions of the Act prevail in Government and NGO quarters. Project proponents have hitherto seldom given the necessary importance to environmental considerations in the formulation of their projects. This has caused, and will now increasingly cause, opposition and conflict. Hereafter, the Government must insist that all projects that clearly have serious

environmental implications are made public, not only through tabling these in advance in Parliament and State Legislatures, but also by disseminating through the Government of India, Ministry of Environment and Forests, and the State Departments of Environment to the NGO network and the public, particularly in the States directly concerned. This should be regarded as an edict under the "Right to Information". Reasonable time should be given for consideration of these projects by such agencies, particularly NGOs and interested members of the public, whose views should be sought and given cognisance by making suitable modifications to the projects. Such right to information should, in fact, become a right under the Constitution through appropriate amendment.

6.4.8 Regularisation of past encroachments: Encroachments have taken place largely in Madhya Pradesh, Kerala and Maharashtra. This has occurred mainly within the hydrogeographic systems and in many cases in ecologically sensitive areas. Regularisation of such encroachments in the past has inevitably encouraged further encroachments in the vicinity of the earlier ones. Rather than compound the original error committed by the State Governments in not evicting encroachers, it is essential that all those occupying ecologically fragile and sensitive areas should be translocated to areas that are less prone to ecological damage that will inevitably occur through agricultural operations by such persons in the areas they have originally encroached upon. Relocation should, if necessary, be undertaken by the State Government purchasing alternative agricultural lands and allotting this to the affected persons. Central assistance for this purpose will probably be necessary and should be forthcoming without hesitation. In particular, priority should be given to such persons in the allocation of land coming within the lower command areas of hydro-electric projects.

6.4.9 Settlement of more recent encroachments: The States would be required to evict or relocate and rehabilitate those families who have encroached upon forest land after 1980, or persons who were not eligible according to the criteria evolved by the State Governments in case of old encroachments. While it is recognised that eviction of such persons would create a problem in view of the prevailing political and socio-economic environment, the growing ecological crisis facing the country calls for a responsible attitude on the part of the Central and State Governments to face this problem squarely, and undo the damage done by proceeding according to the law. The existing state of uncertainty in such cases should be resolved quickly by providing alternate means of livelihood to the affected persons in the new areas in which they are relocated. Since virtually all the persons concerned are agriculturists, agro-based vocations should be developed for them which are ecologically compatible. Where the relocated sites allow for this, such persons, if suitable, could be engaged in

the protection of forests. The people concerned could also be encouraged to form tree and grass cooperatives and their produce marketed through the reformed Forest Development Corporations. Forest restoration and related work could be entrusted to such cooperatives on payment of wages under the directions of the Forest Departments. In the interest of ecological security, apart from other considerations, firm measures are essential to prevent further encroachment on forest lands.

6.4.10 Settlement of all old issues regarding agri-silvi plots and Ek Sali plots: This should be resolved in the same manner as has been suggested for encroachments prior to 1980.

6.4.11 Rehabilitation of shifting cultivation: This should be given special consideration and it should be ensured that those directly affected are drawn rapidly into the mainstream of socio-economic development to enable them to enjoy the material advantages that accrue from it. To begin with, this would be both agricultural activity and marketing of their produce. In all cases the endeavour would be to establish them in locations away from the ecologically sensitive jhum lands that they formerly cultivated to make it possible for these areas to regain their natural vegetative cover and restore ecological succession, strengthened by minimal soil and moisture conservation works that may be necessary.

6.4.12 Cultivation of non-timber forest produce (NTFP), oil bearing plants, and horticultural species in the hydrogeographic area: It is reprehensible that sanctions have been accorded by the Ministry of Environment and Forests for the cultivation of such crops, since it will inevitably lead to rapid growth of areas under such produce as commercial demand for this increases. Consequently, the pressure to bring additional area under cultivation for similar purposes will increase and will be acceded to because of the precedent already set. Where such produce is raised in the plains, outside the designated areas of rich bio-diversity, this should be encouraged. However, the hydrogeographic systems, which would include virtually all jhum lands, must progressively be fully protected.

## CHAPTER VI : THE NATIONAL FOREST POLICY, 1988, AND ITS IMPLEMENTATION.

### 1. HISTORICAL PERSPECTIVE.

1.1 The Indian Forest Act VII of 1865 is regarded as the first well-conceived attempt at forest legislation in India. It provided the notification to bring land under trees, brushwood or jungle within the ambit of the Act, which however "shall not abridge or affect any existing rights of individuals or communities." The first concern of the Government of the day was to maintain peace, law and order, and the forests with whatever these stood for had to be managed without leading to conflict with people. There was considerable objection to even such measures, the most vocal criticism coming from the Board of Revenue, Madras Presidency in April, 1868.

1.2 Between 1869 and 1878, when forest laws for different provinces were being drafted, the question of the extent to which the long-standing rights of people should be regarded as constituting prescriptive rights, came up for serious discussion. These rights included free collection of forest produce such as fuelwood, grass, bamboos, and practices like grazing and shifting cultivation on forest lands. It was decided that the customary rights of the users of forests must be held to constitute prescriptive rights.

1.3 The Forest Policy of 1894 subordinated forest conservation to the promotion of agricultural interests. A Dr. J. A. Voelcker was appointed to study the situation of agriculture in India and submitted a comprehensive report. This report gave overriding importance to the expansion of agriculture in the country. The Forest Policy of 1894, which was prepared under the shadow of this report, ensured that agricultural interests did not in any way suffer on account of forest conservation. The 1894 policy clearly stated that whenever forest land was required for agriculture, it should be excised without hesitation. Forests were, thus, to be managed in the interests of and for the enhancement of agriculture. Forest ecology and conservation were in those days obviously considered inconsequential. It is of particular interest to note that the policy further stated that consideration of forest income should be subordinated to the satisfaction of the needs of the local people. These considerations continued to govern Indian Forestry till Independence. In fact, the accelerating growth of population, the droughts and famines and finally the food scarcity faced by the country during the Second World War resulted in large scale deforestation.

1.4 Following Independence, the popular Government enacted the National Forest Policy, 1952. At that time, this

policy was hailed as one of the most scientific policy documents to be ever encoded anywhere in the world. It displaced the prevalent belief that forestry had no intrinsic right over land and that it should be permitted on sufferance on residual lands not required for other purposes. This policy proposed that 60 per cent of the land in the hills and 20 per cent in the plains and one-third of the total geographical area of the country should on the average be under forest/tree cover. The National Forest Policy of 1952 was formulated on the basis of the following six paramount needs of the country:

1.4.1 the need for evolving a system of balanced and complimentary land-use, under which each type of land would be alloted to that form of use under which it would produce the most and deteriorate the least;

1.4.2 the need for checking -

(a) the denudation in mountainous regions, on which depends the perennial water supply of river systems whose basins constitute the fertile core of the country;

(b) the erosion progressing apace along the treeless banks of the great rivers, which lead to ravine formation and on vast stretches of undulating degraded lands which deprived the adjoining fields of their fertility;

(c) the invasion of sea-sands on coastal tracts, and the shifting sand-dunes, more particularly in the Rajputana desert;

1.4.3 the need to establish treelands, wherever possible, for the amelioration of physical and climatic conditions to promote the general well-being of the people;

1.4.4 the need to ensure progressively increasing supplies of fodder, small wood for agricultural implements, and particularly firewood to release cattle dung for manure to increase food production;

1.4.5 the need for sustained supply of timber and other forest produce required for defence, communications and industry;

1.4.6 the need to realise the maximum annual revenue in perpetuity consistent with the fulfilment of the needs enumerated above.

1.5 Having regard to the foregoing functions, the country's forests were classified into various categories, namely, Protection Forests, National Forests, Village Forests and Tree lands. The functional classification, though suggested as an illustration, was considered essential to focus attention on the objective of management necessary in each case.

1.6 In spite of the excellent prescriptions enshrined in the National Forest Policy, 1952, the policy was not implemented. The problems of increasing human and livestock population on the one hand, and chronic food shortages necessitating imports on the other, seemed to have compelled the diversion of forest land for the expansion of agriculture. This led to many excellent forests being diverted for human settlements and others being submerged under dams. Forests, at that time, being a State subject under the Constitution, the Government of India could play no active role in respect of conservation of forests. Forests continued to receive low priority in the States in the matter of "development". The National Commission on Agriculture (NCA), in its report published in 1976, critically reviewed the National Forest Policy, 1952, and observed that important developments had taken place in economic, social and political fields since the enunciation of this policy. The increase in demand for different kinds of forest produce it was claimed was due to the increase in population. Consequently, this caused heavy pressure on land resulting in substantial loss of forests. The NCA, therefore, recommended that the National Forest Policy, 1952, should be revised in view of the changed circumstances. It was suggested that the National Forest Policy should rest on two key considerations, namely, (i) to meet the requirement of wood for different purposes, that is, industrial wood for the forest-based industries, defence, communications and other public purposes, besides meeting the needs of the rural community for small timber, firewood and fodder; and (ii) to satisfy the present and future demand for protective and recreative functions of forests. In order to achieve these objectives, there should be dynamic production oriented efforts in forest areas as also social forestry programmes in non-forest lands.

1.7 The NCA also stated that the National Forest Policy should clearly indicate the inter-relationship of forest economy with rural and tribal economy, taking into account factors like employment, rights of the users and involvement of the local people. It suggested that, on the whole, the revised National Forest Policy of India should be based on the following primary needs of the country:

1.7.1 Managing the forest resources of the country so as to provide maximum goods and services for the well-being of the people and economic progress of the country.

1.7.2 Checking denudation and erosion in mountainous regions and catchments of rivers on which depends the perennial stream flows, fertility of the land in the catchments and the useful life of dams and reservoirs.

1.7.3 Preventing erosion along treeless banks of rivers, and on the vast stretches of degraded lands, and arresting the spread of sea sand on coastal tracts and of shifting sand dunes in the western desert.

1.7.4 Maximising forest productivity with a view to meeting the growing demand for industrial raw materials, timber and other forest produce for defence, communications and domestic needs, and to augment employment potential, with the ultimate aim of national prosperity.

1.7.5 Providing for small timber and fuelwood requirements of the rural population.

1.7.6 Providing grass and grazing for livestock in forest areas, while ensuring that it is not harmful to forests.

1.7.7 Providing recreational and tourist opportunities in forests without impairment of forest resources including wildlife and the preservation of environmental balance.

1.7.8 Creating blocks of forests interspersed with cultivation or by introducing trees in larger numbers in the ecosystem after careful selection for maintaining a healthy relationship between soil, vegetation and animal life and establishing diverse biotic complexes for minimising chances of elimination of natural enemies of insects and other pests which damage crop monocultures.

1.8 The NCA also recommended that forest land should be classified functionally into Protection Forests, Production Forests and Social Forests.

1.8.1 The first category of forests should be managed primarily for the protection of hill slopes, river watersheds, river banks, sea shores and other ecologically fragile areas. Though NCA made a functional classification of forests, it gave protection forests the primacy of place and spelt out where such forests should be established.

1.8.2 Production forests should be managed essentially for commercial purposes and these should comprise valuable or potentially valuable timber bearing stands occuring in favourable regions which are indispensible for the development of the country and for meeting diverse requirements of the national economy.

1.8.3 The Social Forests should cover degraded lands, panchayat lands, village commons and lands on sides of roads, canal banks and railway lines. Social Forestry should also include shelterbelts, silvi-pastures, fuelwood plantations, "minor forests" and the forests to be used for recreation purposes. The main function of such forests should be to meet the demands of the communities for agricultural timber, firewood, grazing and grass and recreation.

1.9 The Estimates Committee (1968-69) of the Fourth Lok Sabha, in its 76th Report, expressed the view that the National Forest Policy, 1952, should be reviewed on the basis of the experience gained during the years of the

development plans and the research and technological advancements made in the field of forestry. The Forest Policy of 1952 should be modified to become a "more purposeful, realistic and effective apparatus" for the development of forests and forestry in the country. The Committee, inter alia, suggested that the Central Board of Forestry (CBF) should take effective steps to increase the forest area in the country. It proposed that the proportion of areas for each State/Union Territory that ought to be under forests should be clearly indicated and the Central Government should give priority to the detailed survey of all lands to evolve a system of balanced and complementary land use. The Committee also made certain other suggestions including the demarcation of forests on a functional basis; compensation for the loss of forests due to the implementation of development projects by afforesting equivalent areas; a sound grazing policy; rehabilitation of people practising shifting cultivation through agri-silvicultural practices and the provision of alternative means of livelihood. It also suggested that the CBF should explore the possibility of regulating or restricting the rights of the local inhabitants under customary laws by providing suitable assistance to the affected persons and adequate funds on a continuous basis for the development of forests.

1.10 In 1974, the CBF appointed a Committee with the then Forest Minister, Maharashtra, as the Chairman to prepare a draft of the revised National Forest Policy. The draft was considered by the CBF in 1976, 1978, 1980 and finally in 1982, when it was approved at a special meeting. Subsequently, the draft Forest Policy was deliberated upon in various official fora. It was considered by the Consultative Committee of Parliament, attached to the then Ministry of Agriculture in 1982 and by Members of Parliament representing tribal areas in 1983. The Policy document was also considered at various levels in the Government of India before being officially pronounced in December, 1988 - a sad commentary on the dilatory way in which such an important subject has been handled by Government.

1.11 The first general legislation which related to forests was the Indian Forest Act, 1878. This Act was replaced by the Indian Forest Act, 1927, which was amended in the years 1930, 1933 and 1948. A number of States enacted parallel Acts under different names. In the States where the Indian Forest Act, 1927, was adopted, the State Governments made a number of amendments to the principal Act.

1.12 The Report of the Committee for Recommending Measures and Administrative Machinery for Ensuring Environmental Protection, 1980, headed by Shri N.D. Tiwari, observed that despite these amendments, the forest legislation was inadequate as it failed to save forests from degradation. "Encroachments on forest lands account for a sizeable degradation of forest area. The present procedure of

evicting encroachers is so lengthy that once a forest area is encroached upon, it becomes treeless before the encroachment is removed..." Punishment for various forest offences are clearly inadequate in view of the increased value of timber and other forest produce.

1.13 An amendment to the Indian Forest Act, 1927, or the enactment of comprehensive legislation of forests has been under the consideration of the Government of India for almost one and a half decades. This issue was also considered by the CBF which appointed a Sub-Committee to prepare a draft amendment of the Act. The draft legislation framed by the Sub-Committee was circulated to the various States and Union Territories to solicit their views. Subsequently, it was amended taking into account the comments and observations of the States and Union Territories. The amended draft legislation was discussed at a meeting of the CBF in 1982. After the approval of the CBF, it was considered by the Central Government at various levels. It is understood that the Government deferred the enactment of the proposed legislation till the revision of the National Forest Policy. Since the revised National Forest Policy was announced in December, 1988, the Government of India has set up a drafting committee to propose changes in the Indian Forest Act, 1927, to comply with the new policy.

## 2. KEY REQUIREMENTS OF THE NATIONAL FOREST POLICY, 1988.

2.1 The National Forest Policy, 1988, was evolved after considerable debate within the governmental structure. The public, however, was not taken into confidence in the final formulation that was tabled in Parliament on December 7, 1988. The primary objective of the policy was to ensure environmental stability and maintainence of the ecological balance, including atmospheric equilibrium. In the policy, derivation of direct economic benefits is to be subordinated to this principal aim. The following are the basic objectives, listed in order of priority, of the National Forest Policy:

- "Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.

- "Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.

- "Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

- "Checking the extension of sand-dunes in the desert

areas of Rajasthan and along the coastal tracts.

- "Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.

- "Meeting the requirements of fuelwood, fodder, minor forest produce and small timber of the rural and tribal populations.

- "Increasing the productivity of forests to meet essential national needs.

- "Encouraging efficient utilisation of forest produce and maximising substitution of wood.

- "Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimise pressure on existing forests".

"THE PRINCIPAL AIM OF FOREST POLICY MUST BE TO ENSURE ECOLOGICAL STABILITY AND MAINTENANCE OF ECOLOGICAL BALANCE INCLUDING ATMOSPHERIC EQUILIBRIUM WHICH ARE VITAL FOR SUSTENANCE OF ALL LIFE-FORMS, HUMAN, ANIMAL AND PLANT. THE DERIVATION OF DIRECT ECONOMIC BENEFIT MUST BE SUBORDINATED TO THIS PRINCIPAL AIM."

2.2 The National Forest Policy, 1988, places overriding importance on the following conservation measures:

2.2.1 Ecological protection and conservation of natural heritage, especially bio-diversity, should be treated as an all important function of forests.

2.2.2 The network of National Parks, Sanctuaries and Biosphere Reserves should be strengthened and extended.

2.2.3 Tropical rain and moist forests, particularly in Kerala, Arunachal Pradesh and the Andaman and Nicobar Islands should be totally safeguarded.

2.2.4 Any proposal for the diversion of Forest land for non-forestry purposes is to be subjected to detailed ecological scrutiny.

2.2.5 Encroachments in forests should not to be regularised.

2.2.6 Modern fire-fighting techniques should be introduced to prevent forest fires to facilitate the natural restoration process.

2.2.7 Exotic species should only be introduced with extreme caution and only after long-term comprehensive scientific trials.

2.3 A minimum of one-third of the total land area of the country under forest or tree-cover has been set as the

national goal. In the hills and in mountainous regions, such cover is to be two-third of the area to prevent erosion, land-degradation and to ensure stability of the fragile eco-systems.

2.4 The new policy also emphasises the need to meet the domestic demands of the tribal and rural people for forest produce. It is increasingly believed that the conservation objectives can better be achieved if the bonafide requirements of the local people are satisfied. The following are some socio-economic concerns highlighted in the National Forest Policy, 1988:

2.4.1 Meeting the needs of the local people has been defined as an important objective.

2.4.2 The customary rights of local communities including tribals, to meet their bonafide domestic needs, are to be safeguarded.

2.4.3 The first charge on forest produce would be the domestic requirements of tribals and other poor people living in and around forests.

2.5 A major departure in the revised Forest Policy is with regard to meeting the demand for industrial material. Realising the fact that uncontrolled expansion of forest-based industries would adversely affect the conservation objective, the revised policy makes the following stipulations:

2.5.1 No forest-based industry, except in the small-scale and cottage sector, would be permitted unless sustained availability of raw material is ensured.

2.5.2 Forest-based industries should have a tie-up with the farmers to fulfill their raw material needs.

2.5.3 Natural forests will not be made available to industries for undertaking plantations and other activities.

2.5.4 Forest produce will not be supplied to industries at concessional rates.

2.6 The Policy envisages a need-based and time-bound afforestation programme with the active involvement of people. Degraded lands are to be used for increasing production of fuelwood and fodder for which greater emphasis is laid on Social Forestry and Farm Forestry. Ownership rights over trees are to be conferred on the people, particularly the small and marginal farmers and the landless to involve them to take up tree planting on degraded lands.

2.7 The need for enhancing the level of scientific input into forestry has been realised. Emphasis has been laid on forestry research and its potential to augment productivity. The revised Forest Policy indicates the priority areas for research.

## 3. PROBLEMATIC ISSUES THAT NEED TO BE RESOLVED BEFORE THE POLICY CAN BE IMPLEMENTED.

3.1 The following are certain important objectives/programmes highlighted in the National Forest Policy, 1988, which need closer scrutiny to evolve an appropriate strategy to ensure effective implementation.

3.2 The policy lays down that one-third of the country's total geographical area should be under forests or tree cover. This is ambiguous as explained earlier in the report. Ecological security requires not merely tree cover, but to establish stable natural forests, to cover the major hydrogeographic systems of the country. The National Forest Policy will require revision in this respect. It has been proposed in the current Report that such forests should be constituted as NATIONAL FORESTS, which must be the responsibility of the Central Government supported by the State Governments. These forests should be treated as sacrosanct and not subjected to any of the orthodox forestry operations. They must be protected from all human-caused biotic pressures so as to form as quickly as possible, the bulwark of the country's ecological security. In fact, may not be enough that only two-thirds of the hills and mountainous regions of the country should carry forests. A higher proportion may well be considered. While the 1952 Forest Policy laid down objectives similar to the 1988 policy, these objectives were not fulfilled as those concerned were unable to resist the major exploitative pressures on land in general, and forest land in particular. This has been explained earlier in Chapter II. Since 1952, with greatly increased and growing human and cattle population the pressure on land has since intensified greatly. The time has now come for the Government to take far clearer ecological stock of the country; to recognise that ecological security is the only sound foundation for sustainable and viable economic development; and to take the increasingly hard decisions and adopt the means to implement them on land use that are now unavoidable if the future of the country is not to be irretrievably imperiled. These must aim primarily at establishing forests on the hydrogeographic systems with a simultaneous rigorous effort to progressively minimising and finally eliminating, as early as possible, human caused biological pressures on these areas. There is today no midway course that government can risk adopting given the rapid ecological degradation taking place in

the country and the very serious almost irretrievable economic and social consequences to which this is leading. In doing this, Government must recognise that it must, of sheer compulsion, look beyond the human dimensions of its limited traditional concerns and endeavour to comprehend the ecological foundations on which these rest.

3.3 Both the 1952 and the 1988 National Forest Policies suggest that grazing in forest areas must be regulated. However, due to rapidly increasing livestock population and non-availability of alternate grazing land, forests continue to deteriorate under severe grazing pressure. Increasing cattle population and reduced fodder resources have resulted in a vicious circle of poor quality livestock and poorer yields. Proportionately, for the cattle population in India, the yield of milk, wool and meat is pathetic compared to other countries of the world. This has made animal husbandry, that is, dairying, sheep rearing, and the like excessively wasteful in the use of the country's natural and domestic phytomass potential and has led to severe degradation of its land resources. Over-grazing is a complex socio-economic problem which cannot be viewed merely as an issue related to the forestry sector. Here again if the country is to avoid the dire ecological consequences that degradation of land through over-grazing is leading, a clear cut livestock policy, based on the limited phytomass productivity of the marginal agricultural lands of the plains, must be laid down. This policy must also state unequivocally that without loss of time free-range grazing in forests must be eliminated and all scrub cattle replaced with a far smaller number of high yielding varieties maintained under stall fed conditions. The removal and disposal of unproductive animals should be made the responsibility of Commissioners of animal husbandry and such organisations as the National Dairy Development Board. Any less stringent measures will merely lead to continuing and increased land degradation, the ultimate consequence of which would be ecological collapse, disintegration of agriculture and social and economic dislocation and upheaval. It will also clearly be necessary to change the socio-economic life of nomadic and migratory graziers and establish them as settled dairy farmers in the very near future. The process by which this can be accomplished must be planned immediately.

3.4 The National Forest Policy, 1988, states that the domestic requirements of fuel, fodder and timber for the local people should be considered to be the first charge on forest produce; but these requirements are to be limited to the carrying capacity of the forests. Supply of these items and their alternatives through retail depots has been suggested. Ecological imperatives and current economic needs must for some time to come be treated as mutually exclusive in the context of the generally extremely degraded and the very limited extent of current forests. The principal aim of forests as

stated so unambiguously in the National Forest Policy, 1988, must in fact become the overriding, indeed the exclusive focus of concern, with manipulated agro-economic systems by whatever name delinked from protective ecological systems with economic requirements of forest produce being met through the economic market systems. In other words, the government agricultural policy must now include the motivation of farmers to grow such produce with Government assuming responsibility for providing the necessary incentives through finance, know-how, fertilisers and other inputs, and most importantly by assuring farmers of a market for this produce. Marketing would be facilitated by Government itself or a Government-appointed agency initially purchasing such produce and establishing a distribution network that caters especially to the needs of the deprived sections of the population, to begin with through free supply from depots located at a convenient distance from their places of domicile.

3.5 The uncompensated curtailment of concessions/privileges on forest produce will inevitably foment social and economic tensions. The already excessive and growing pressures that these concessions/privileges already exert must now be diverted by using marginal agricultural land under private ownership to develop sources of supply of traditional forest produce, particularly fuelwood and fodder. At the same time, alternative sources of fuel like natural gas and LPG, biogas and all available forms of non-conventional energy as well as energy saving devices must be supplied, initially free, and later at highly subsidised prices to bring about a rapid acceptance and use of these alternatives. As stated earlier, this will require a network of distribution systems capable of delivering these requirements and stimulating acceptance. Government will need to provide substantial financial resources to meet the cost of the initial free supply and subsequent subsidy. Forest managers should obviously not be involved hereafter in the public distribution of what was formerly forest produce or their substitutes, since their responsibilities must be directed to ensuring the ecological security provided by forest cover and restoring and enriching such cover where this is essential.

3.6 The National Forest Policy, 1988, states categorically that encroachments on forest land should not be regularised. The experience is that regularisation of encroachments is generally used as leverage by politicians, though it does not contribute to the long-term well-being of the people or generally to the condition of the land encroached upon. It usually sets off a vicious cycle of poverty and land degradation. Since this problem has vast and volatile ecological, social, economic and political dimension, a solution will remain ever-elusive without a clear cut, committed, ecologically-based policy. It is a priority problem in many areas of the country. In the context of the

country's ecological security, the solution lies in not merely the removal of such encroachments but in the total ecological rehabilitation of the much larger areas comprising the hydrogeographic systems of the country through the establishment of fully protected National Forests. The manner in which this should be done is explained elsewhere in the report. This must be supplemented by demonstrated political concern for ecological restoration and adequate financial and administrative support for it must be forthcoming. It must be further strengthened by concerted measures to involve local communities who must be shown and convinced that in ecological restoration lies the most important means of sustaining themselves in the long run.

3.7 It has in other fora recently been proposed that tribal and labour cooperatives be assigned greater participation in forestry operations. Here again such operations in the context of ecological security would be of an entirely different nature, and within the hydrogeographic systems and other protected areas would be without any commercial concern. In this context, cooperative structures would be inappropriate, but tribals should have first call on the employment opportunities arising in the context of new ecological concerns.

3.8 The National Forest Policy, 1988, discourages the continuance of shifting cultivation. It requires that suitable alternatives should be provided to those engaged in this practice, since shifting culivation is almost without exception practiced in the most sensitive areas of the hydrogeographic systems of the country. It has today therefore serious ecological repercussions. All efforts must be made to discontinue this practice as soon as possible within a predetermined time frame and the affected areas quickly afforested. Alternative modes of employment for affected people should be devised in keeping with their ethnic and cultural ethos. Though a special centrally sponsored scheme for this purpose is under implementation through various States and Union Territories, with the Ministry of Agriculture, Government of India, as the nodal agency, this should be reviewed in the light of this Committee's recommendations. Under the existing scheme, it is hoped that within five years (from 1987 to 1992), about 25,000 families would be rehabilitated. However, there are about 622,000 families practising shifting cultivation. Hence, the rate of resettlement must be increased substantially if this practice is to be eliminated.

3.9 There are about 5,000 forest villages in the country. The National Forest Policy, 1988, advocates that the forest villages should be developed on par with revenue villages. This is hardly likely to benefit them as Revenue Villages in tribal areas are no better off than Forest Villages. Special measures are essential for the satisfactory translocation of forest villages and for the advancement of the affected villagers. Since the Forest

Department has always had greater interaction with these people, it should work in close concert with the revenue and other authorities concerned. Special allocation of plains land and funding, should be provided for the rehabilitation of these people. To carry out such an important programme successfully will call for considerable ingenuity and imagination on the part of the State Governments.

## 4. RECOMMENDATIONS.

4.1 The requirements of ecological security will not be met by implementing the requirements of the National Forest Policy, 1988, under which one-third of the geographical area of the country should be under forest, or tree cover, for the improvement of agriculture, soil conservation, for meeting the demand of the people, and for the conservation of ecology and environment. From the point of view of ecological security, the afforestation of the hydrogeographic systems of the country is the most important. These cover more than one-third of the land area and it is imperative that such areas must be afforested to the maximum extent possible to contribute to the productivity of the plains area of the country which must increase sufficiently to sustain the country's growing population. The reforested hydrogeographic systems must be fully protected and when reforested must not be exploited to meet the fuel, fodder and timber requirements of the people. Any policy that permits this will inevitably lead to over-exploitation of these areas causing grave deprivation to the people of the surrounding areas and severe adverse repercussions to the country's ecosystems. To compensate for the removal from active exploitation of the forests of the hydrogeograhic systems, all plains areas comprising revenue "wastelands", community lands and other non-forest lands owned by Government and public institutions, such as strips along railway lines, canals, and roads, should be entrusted to the respective State or Union Territory Agricultural Departments for management for the production of fuel, fodder and timber requirements. All encroachments on such areas must be vacated. Similarly, steps should be taken to encourage agri-silvi and silvi-pastural practices, tree farming, etc. on privately-owned marginally productive agricultural lands. About 30 million hectares of marginally productive agricultural land, it is estimated, could be diverted to such land uses without any significant impact on agricultural production. It may in fact contribute to its enhancement.

4.2 The forest areas in ecologically sensitive or fragile zones, generally covering the hydrogeographic systems of the country as well as areas of rich bio-diversity, it is recommended most strongly should be designated as "National Forests." Eventually, such forests should cover a minimum of at least 110 million hectares, that is, 33.3 per cent of the geographical area of the country

stipulated under the 1988 National Forest Policy. These would comprise about 16.7 million hectares, or 37 per cent of the geographical areas of the Himalayas, 5.3 million hectares or 38.5 per cent of the geographical area in the Western Ghats, and 8.1 million hectares or 34.1 per cent of the geographical area in the Eastern Ghats - a total of 30.1 million hectares. To this would be added the important hydrogeographic systems of Ganga and Brahmaputra drainage, the North-Eastern highlands and important areas of the Central Indian and Deccan plateaus. The areas of rich bio-diversity would include in the "National Forests", currently estimated to be about 15 million hectares as identified by the Wildlife Institute of India, including the existing network of National Parks and Wildlife Sanctuaries and additional areas of rich bio-diversity which exist but have not so far been officially identified. Taking all these areas together, about 35 to 40 million hectares of forests would need to be designated immediately as "National Forests."

4.3 The protection and management of the "National Forests" which would form the major bulwark in securing the ecological stability of the country, and by its very nature is essential to the internal security of the country, should come under the close supervision and control of the Government of India. All developmental activities, in and around these areas, should be conceived on a long-term perspective land-use plan basis. Restoring the optimal ecological functioning of such forests, through the protection of the hydrogeographic systems and the maintenance of bio-diversity, should be the fundamental criteria for planning the development and management of such forests. All policies and programmes for these areas should be brought under a single umbrella of control. A sectoral or micro-plan approach for the "development" of these areas should follow from a holistic overview approach aimed primarily at restoring, sustainably, the beneficient processes of nature.

4.4 In proposing in the Report the establishment of National Forests, it would be the intention to relinquish in the States much of the unproductive forest areas outside the hydrogeographic systems, on a quid pro quo basis for the management by States, primarily for human habitation and, where not required for this purpose, for domestic biomass production needs.

4.5 The State and Union Territory Governments should take immediate steps to assess the domestic requirements of the local people of fodder, fuel (not necessarily fuelwood) and household utility timber on a village by village basis. Simultaneously, an assessment must be made of the available plains land, consisting of degraded forest, revenue and other suitable lands on which to establish people displaced from the hydrogeographic systems to facilitate a major revegetation programme of these systems. At the same time, marginal agricultural

lands in the plains suitable for the production of domestic requirements of fodder, fuelwood and small timber as well as industrial timber should be identified. Efforts should be made to ensure that, as far as possible, every village on the plains becomes self-sufficient in its basic necessities of fuelwood, fodder and small timber. Note should be taken of the existing skewed distribution of public land which will act as a serious constraint in making each village self-sufficient. In order to overcome such constraints, agri-silvi, silvi-pasture and tree farming on marginally productive private land holdings should be very actively promoted. Government should evolve a marketing system with the farmers under which it would purchase all such produce and assume responsibility for distribution in deficit areas at prices within the purchasing power of the common man. Free distribution initially to the poorest sections of rural society and to tribals of such fodder, fuelwood and small timber may be necessary and such a step should be accepted without hesitation. In fodder deficient areas, modification of existing animal husbandry practices, drastic reduction in "cattle" population and livestock improvement programmes must be undertaken, taking into account, in particular, the availability of feed.

4.6 The existing agencies that could be made responsible for generating and marketing fuel, fodder and timber from the areas mentioned could be the existing Forest Development Corporations by reorganising them for this purpose. In this regard there is justification now to reconsider the need to continue the Forest Development Corporations in in their present form in the light of the National Forest Policy, 1988, and its major ecological concerns. If these corporations are to continue, both their nomenclature and charter must be more specifically laid down. The nature of their earlier activities brought them the dubious distinction of being referred to by the late Smt. Indira Gandhi, as the "Forest Destruction Corporations". The Corporations could either become extension agencies to encourage and provide technical assistance to private farmers to grow fuelwood, fodder and timber and become the marketing agencies for these commodities. In any case, there must be no ambivalence in their responsibilities and functions as is currently the case. If the corporations are to assume the responsibility for fuelwood, fodder and timber production and marketing which would seem appropriate, then the nomenclature used to describe them should be changed to be descriptive of their new role. For the purpose, these could be named the Government Agro-Silvicultural Corporations or the like. The officers serving these corporations should thereafter not be inter-transferable with those in the Indian Forest Service cadre, whom, it is recommended, should be entrusted hereafter with responsibility for only managing "National Forests" and other protected areas to fulfil the ecological role of these areas and to maintain bio-diversity.

4.7 It is of exceptional importance that special measures should be taken to solve the problem of fuelwood and fodder scarcity. Government should aim at bringing the major proportion of the marginal agricultural and other areas in the plains comprising of degraded forests, revenue lands, community lands and the larger units of private fallows/marginally productive land holdings, under fuelwood, fodder and timber plantations. This will call for an enormous effort and a massive financial outlay, roughly estimated to be of the order of Rs.30,000 to 40,000 crores at current prices. Left to the Government alone, this would take 25 to 30 years, far too long to ease the existing and growing pressures on the forest cover that must be established very quickly over the hydrogeographic systems of the country to overcome the growing ecological crisis. It is recommended, therefore, that the programme to achieve fuelwood, fodder and timber self-sufficiency should involve all Government and private sector agencies as well as NGOs and the general public, but under the overall control, direction and responsibility, not of the Ministry of Environment and Forests but of the Ministry of Agriculture and State Agriculture Departments. This should not in any case be made the responsibility of the Forest Departments if these are to fulfil their proposed new responsibilities, and particularly not that of the Ministry of Environment and Forests which as stated elsewhere was not set up to be an "Economic" ministry but a scientific one. It bears repeated emphasis to state in the strongest possible terms that this Ministry's involvement in any form of economic activity would seriously impair, indeed entirely undermine its watchdog, conscience keeping and custodianship role for the protection of the country's environment. All vacant public lands in the plains should be entrusted to State level Agricultural Services for development and proper management. These organisations must involve local communities and NGOs in the development and management of fuelwood, fodder and small timber plantations, as well as of pastures on such lands.

4.8 After guidelines, based upon a country-wide over-view of ecological imperatives critical to the country as a whole, have been laid down by the Government of India, Ministry of Environment and Forests, management plans for afforestation of the hydrogeographic systems should be prepared at district level by multidisciplinary teams led by the District Forest Officers. Such teams must include, among others, soil conservation and minor irrigation experts. In the execution of all such programmes, the State Forest Departments must take the leadership role. Local communities should be associated with both the formulation and later the implementation of such composite ecological security plans. Village communities must be involved from the start and encouraged to assume a major responsibility for the protection of the areas to be afforested, from all forms of human-caused biotic pressures, particularly cattle trespass, fires and vandalism, by educating them to appreciate the enormous spin-off benefits to be derived

from these crucial ecological assets once they have developed to their full ecological potential. During the time this potential is developing, people from the surrounding areas will be denied the usufructory use of such areas. They should, therefore, be supplied their requirements from outside sources free or at a nominal price. This will apply particularly to fuel and fodder.

4.9 If the recommendation that the State/Union Territory Forest Corporations be given the overall responsibility for the production of fodder, fuel and timber needs under the State Departments of Agriculture is accepted, they should concentrate on reviving the productivity of existing degraded forest and other available lands in the plains, especially those near human habitations for the use of the local inhabitants. Such areas while ceasing to be classified as Forests will be brought under intense silvicultural and silvipastural management leading to increased production of fuelwood and fodder, improved soils and moisture conservation and greatly improved agriculture made possible by employing much more intensive agricultural systems. In turn this will generate substantial labour intensive, land dependent employment. The Agricultural Services of the States would concentrate on developing other public lands on the plains for similar reasons. Under the direction of the Forest Departments and with support from NGOs, cooperatives of tribals and labourers should be formed under the patronage of the Gram Panchayats, to promote the restoration of the vegetative cover of the "National Forests", which it is proposed should hereafter cover the hydrological systems. However, with the proposed reorganisation of the Forest Development Corporations and their equivalents, these should act as catalysts in stimulating the rapid growth of tree farming and agro-silviculture/silvipasture on private land holdings by getting forest-based industries to offer attractive financial incentives to private individuals and farmers for propagating agri-silvi/silvi-pasture/tree farming, since the produce to be obtained could provide the raw material required by these industries. Financial institutions and NABARD should also provide attractive incentives and packages for fuel, fodder and timber production employing the subsidies from the Rs.12,000 crores per annum (1986-87), that has been made available for agricultural production. Apart from providing financial and technical incentives at the stage of planting, steps should be taken to ensure that the farmers are provided adequate marketing support and an attractive price for their produce. The proposed "Government Agro-Silvicultural Corporations" should be employed after being reorganised to undertake the responsibility for providing technical services and marketing of this erstwhile forest produce.

4.10 Existing land laws relating to the felling and trade in trees should be suitably reviewed so that these do not act as an impediment to agro-silvicultural programmes. The laws pertaining to inheritance of land should also be

suitably modified to prevent uneconomic fragmentation of land holdings following the sub-division of land in each successive generation.

4.11 Existing tree plantation work, as distinct from afforestation programmes, has in many cases been successful, technically, but is devoid of people's participation. In future, tree plantation plans and programmes should be formulated after careful consultation with local people and should be ecologically-oriented taking into consideration locally prevalent situations. Micro-level planning in the plains, within the context of a macro-national ecological restoration plan, should be carried and this should include determining the domestic biomass needs of communities living in these tracts. The availability of public and private lands there and people's socio-economic circumstances should be important determinant factors. These plans will be developed with the intention of progressively reducing the exploitation of the forest cover of the hydrogeographic systems which must be made progressively sacrosanct from all forms of exploitation so that they provide the all important ecological security required to sustain communities living in the down reach areas, particularly the plains. Traditional forest working plans will have no place hereafter. These will be replaced by plans for ecosystem restoration and preservation which have the hydrogeographic areas as the spatial units for management and aim at stabilising the local hydrological systems and contributing to optimising the regional hydrological regimes. The State and district administration should ensure availability of the resources required, especially the finance and technical know-how for such hydrologically-based ecologically-oriented conservation action plans. These should be formulated in consultation with the local people and aim at ecologically sound land-use practices. They will form the basis for the development of integrated socio-economic plans which should incorporate the sharing of domestic usufructs with the local people and the marketing of surplus, if any. Manpower requirements and social outlays for forest restoration and forest protection will require to be substantially increased. At least five per cent of the total plan outlay should be earmarked immediately for this purpose.

4.12 Those tribal communities, who are genuinely dependent for their basic survival needs on the goods and services provided by forests, should be identified afresh. Since the vast majority of those formerly claiming to be so dependent have now been drawn into the cash economy and the mainstream culture of the country they cannot continue with any justification to claim the rights to exploit forests at will. By doing so, they will undoubtedly accelerate the rate of forest degradation which the country can no longer risk. Only those areas where truly forest dependent tribals, that is, "primitive" tribes have always lived, should be

demarcated for sustained use by them. In accordance with the National Forest Policy, 1988, however, the areas in need of complete protection for conservation of the hydrological/hydrogeographic systems and the areas of rich biodiversity should hereafter be managed strictly for these purposes. In such areas, ecological and environmental protection should be the aim of management and these cannot therefore be considered to be available for short term economic use. Hereafter, forest management systems should be based on practices aimed at restoring the natural vegetative cover to strengthen the ecological functions of such areas and maximize the ecological spin-off benefits that would accrue to the surrounding and further removed areas. The primary edict of the National Forest Policy, 1988, justifies discontinuation of the traditional harvesting of forest produce for trade and commerce. In fact all exploitation of forests except what is required to meet the bare necessities of life of the genuine tribals must be quickly phased out.

4.13 Given the impending ecological crisis, it is no longer possible to permit all traditional rights, concessions and priveleges in respect of forest produce to continue as hitherto. If these and the additional biotic pressures now operating continue, forests will be subjected to accelerated degradation to the serious detriment of the country as a whole. The only sustained yield use, that can for the present continue, is to allow the remnant hunter-gatherer tribals communities still living in symbiotic relationship with their forest environment and have little or no contact with the outside world to continue to draw their basic necessities of life from their immediate surroundings. It will however be necessary to maintain a close surveillance on the activities of external commercial and industrial agencies, as well as political vested interests, to prevent them from using these tribal communities as a means of exploiting, and thereby degrading the forests on which they depend. Socio-economic monitoring of these communities on an ongoing long-term basis will also be needed as their younger generations are drawn increasingly into the mainstream cash economy of the country and develop lifestyles and patterns of consumption that can be sustained only through commercial exploitation of the forest resources to which their communities have access.

4.14 Effective measures must be evolved to curb encroachments on forest/public lands. Regularisation of encroachments on degraded marginal lands only accentuates poverty and gives rise to further land encroachment and consequently further degradation of land. It is essential that the forest laws should provide for the eviction of encroachments and the award of exemplary punishment as a deterrent. Forest officials, at all levels, must be made personally responsible to detect and check encroachment into the forest area under their jurisdiction. Suitable legal measures should be evolved to restrain State and

Union Territory administrations from cheap or populist measures like regularisation of encroachments on public lands. Instead, to resolve the impasse of poverty and land degradation which is continuously increasing, Government should develop a rehabilitation programme for under-privileged and poor persons surviving on marginal lands. Existing encroached lands and other degraded areas in the plains should be developed and restored by suitable land use practices like agri-silvicultural/silvi-pasture, whereas in the hill areas, activities to preserve and enrich the natural forest cover only should be permitted. This should be accomplished by both natural regeneration and other ecologically compatible means of vegetative restoration that science and technology can devise. Government should progressively assume custodianship of the major proportion of the hydrogeographic systems of the country so as to restore their forest cover as rapidly as possible to enable the ecological benefits of this to be made available to the whole country. Since it would be necessary to sytematically relocate substantial numbers of people from the hills to the plains this process must start with the more affluent sections of residents whose presence in the hill areas are one of the causes of opening up these areas for human habitation leading to increasing degradation. Rigorous enforcement of land tenure on the plains will make it possible to provide land for a substantial number of those translocated from the hills. Those who cannot be provided with land should be persuaded to take up non-agricultural vocations or employment in industries as their means of livelihood.

4.15 A national land use survey must be undertaken on a war-footing utilising the capability of all agencies equipped to contribute to quick completion of this all important and urgent task. The survey should first cover the hydrogeographic systems, followed quickly by a survey of the plains areas, the purpose of the latter being to determine what land can be made available to those relocated from the hills and upper plateaus. Such responsibility should be the first of the tasks undertaken by a high powered National Land Use Board located in and serviced by the Ministry of Environment and Forests. Within two years of commencing the survey, sufficient data should be generated to provide the basis for planning the major translocation of human populations from the hydrogeographic systems that will be necessary. The actual translocation operation should be well advanced by the end of the 8th Five Year Plan (1995). The National Land Use Board must ensure that all land records are accurate and reconciled by 1992 and all violations of the land use ceiling accurately determined so that land available to accomodate displaced persons is demarcated and translocation can start immediately thereafter.

4.16 Relocation and rehabilitation of Jhumias should receive the highest priority. The annual targets for their resettlement to permanent cultivation plots should be

increased and the programme of rehabilitation should be completed within five years. Simultaneously, in surplus Jhumland (which is released after implementation of such programmes) efforts should be made to restore natural vegetative cover, which will contribute greatly to enhancing the productivity of the lowland areas.

4.17 The present multiplicity of agencies and programmes for rehabilitation of Jhumias should be eliminated. A nodal agency, preferably one like the Tripura resettlement corporation should be formed, guided by the State Agricultural Departments, with support from the Ministry of Agriculture at the Centre. Forest Departments under the patronage of which the Tripura Corporation is functioning should be relieved of this responsibility and entrusted instead with the ecological restoration of the degraded jhum lands and ensure that these are brought rapidly to ecological climax conditions. The State Forest Corporations and tribal cooperatives should be involved in the implementation of resettlement programmes and enabled to do so by the availability of institutional finance. The use of the latest developments in agricultural sciences such as high yielding varieties of grains, fruits and tuber crops together with the use of clonal and tissue culture plant material should make it possible to increase agricultural yields on the plains and lower hill slopes considerably to make the local communities self-sufficient in their essential material needs. Since the ecological restoration of the hydrological systems is of such prime national concern, the highest priority must be given to the provision of funds, not merely for the rehabilitation of displaced people but equally importantly to the restoration of the natural vegetative cover of newly jhummed areas.

4.18 To preserve the extraordinary natural wealth of the country, represented by the unsurpassed richness of the bio-diversity contained in its National Parks, Wildlife Sanctuaries, biosphere reserves and other protected natural areas, these areas should be freed from biotic pressures caused by human presence. Given the prevailing weakness of India's administrative system and the exploitation of human communities by commercial and industrial vested interests, the country is left with no option but to translocate human communities living in these areas to other ecologically less vulnerable environments, which offer greater opportunities for employment and social advancement within the larger ambit of human society. The whole spectrum of rich bio-diversity can survive and flourish only if it is allowed to evolve in natural evolutionary systems. This implies that the necessary spatial dimensions for this process must be made available and external adverse pressures are contained within acceptable limits. The use to which the areas surrounding these protected core areas are put, must be limited to those that are ecologically compatible with the protection and evolutionary processes of the ecosystems that are sought to be perpetuated. People who are displaced should be culturally and socio-economically

rehabilated in a manner that not merely fully compensates them but provides added richness and fulness to their existence both materially and emotionally. The manner in which this is sought to be accompanied must be based upon the ethnic and cultural aspects and dimensions of their present existence as well as the social advancement to which they aspire. This must also determine the choice of the environment to which they are translocated and the manner in which the land they are to occupy should be "developed" and the infrastructure to be built up to sustain such development. All this will demand considerable Government resources. Government should assign resources from those sectors of the economy that exploit natural resources and profit from it, while depleting the environment rather than enriching it by levying an "ecological restoration cess" on most of the commercial and industrial sectors concerned in the country.

4.19 Policies and decisions to ban the extraction of timber and other forest produce from natural forests should be implemented as early as possible in a strict phased, time-bound manner. Simultaneously, an all-out programme should be launched on a war footing to encourage owners of marginal agricultural lands on the plains to produce fuelwood, fodder and timber as well as Non Timber Forest Produce (so-called Minor Forest Produce) that is in commercial demand. Marketing and distribution systems under government aegis must also be planned and put into operation as the products of this programme become available, so as to fulfil the objective of the programme, which is primarily to satisfy the essential needs of tribals and the rural poor. Only through these means and an imaginative interpretation and presentation of the benefits that would accrue from ecological restoration, can the support and cooperation be secured of people living in and around natural forests and within the hydrogeographic systems of the country where the forests are being restored.

4.20 Few today appreciate that nothing leads to greater employment opportunities than successful ecological restoration. This applies particularly to tribals and the rural poor, provided that the enforcement of Government land tenure and land ceiling laws achieve the objective of ensuring that fertile agricultural land on the plains becomes available to them. But often what happens is that the existing land holders continue transgression of the land tenancy laws through the subtle means of benami transfers and absentee landlordism so widely practiced throughout the country, and keep the best arable land from the reach of the tiller. Tribals and rural poor should have first priority on the lands freed by the determined and honest enforcement of such laws. The considerable increase in employment opportunities from ecological restoration of land, with additional possibilities evolving from the vastly improved levels of productivity of the cultivated lowlands of the country, if some degree of ecological

balance can be reached, will be the first step towards sustainable development of the country. In addition there are enormous other advantages, particularly through the availability of greatly increased potable water supplies to the populations living in areas remote from the urban centres - the tribals and the rural poor in particular. There is no other feasible, cost-effective technological means that is suitable for India today of providing pure water to the major sections of the population who are being increasingly deprived of it at present. The advantages of ecological restoration must be communicated evocatively to those immediately affected by ecological degradation, those to be translocated, and others directly affected. Modern communication techniques under imaginative direction can make this possible. These social groups can be dissuaded through these means from damaging their own interests through injudicious practices like encroachment, felling of trees, maintaining excessive number of scrub cattle which adversely affect the environment. This could also lead to securing their cooperation for fire protection, soil and moisture conservation and such other ecological restoration work necessary to bring about rapid regeneration of degraded forest areas. Simultaneously, farmers on the marginal lands in the lowlands could be assisted through technological know-how and funding to raise and market high yielding nutritious fodder for the more productive breeds of cattle that should be made available to them. It would also be necessary to develop the infrastructure required for the more intensive agricultural management systems that are introduced on the lowland agricultural tracts to make these more productive.

4.21 New licences either for expansion or establishment of forest resource-based industries should not be issued for the time being. Only when adequate raw material is available from non-forest sources and a certificate to this effect can be given by the Ministry of Environment and Forests, should licenses be given. By public notification, the Government of India should announce this decision as well as inform the existing forest based industries that the existing leases will be terminated forthwith and due compensation paid, except in the case of those industries that are in a position to secure their raw material requirements immediately from agro-based sources. Those paper mills that presently draw the bulk of their requirements from forest areas in the form of bamboo and wood, but which can convert very quickly to agro-based raw material are such exceptions. This would encourage holders of marginal agricultural land to grow tree plantations and other crops suitable as raw material for these industries. Government incentives to such farmers would accelerate their efforts to grow such material and such assistance should be readily forthcoming.

4.22 The Government Agro-Silvicultural Corporations, presently known as the Forest Development Corporations, as well as

the National Dairy Development Board type Tree Growers Cooperatives, should formulate and implement schemes and projects for tree farming and the growing of cellulose raw material on marginal agricultural land for trade and commerce. Jhum areas being located almost exclusively within the hydrogeographic systems must be sytematically restored to natural vegetative cover to strengthen the ecological security of the regions in which they are located. If the recommendation made elsewhere in this report that the "Government Agro-Silvicultural Corporations" should assume the responsibility of providing technical advice and undertaking the marketing of fuel, fodder, timber and non timber forest produce raised on marginal agricultural land, then it would be their responsibility also to determine the correct product mix for the farmers of such lands that will enable farmers to determine more correctly the types of such crop that they should raise. For this purpose, wherever possible, joint sector companies should be set up consisting of the "Government Agro-Silvicultural Corporations" on the one hand and Industries, Cooperatives of tree farmers and professionals on the other. The marginal farmers involved should be actively associated with all management decisions of these companies. The active involvement of the Corporations with representatives of Tree Growers Cooperatives would give a fillip to fuelwood, fodder and timber production on private lands by creating an atmosphere of mutual trust and confidence between the industries and the marginal farmers involved as well as the financial institutions willing to make their resources available on the other.

4.23 The existing concessions on import of wood and wood-based raw material cannot be expected to continue for an extended period as world-wide concern at the growing deforestation and the restrictions on forest felling that this has already begun to provoke, will result increasingly in a shortage and probably early cessation of supplies from these sources. This apart the extent and potential of land available for growing such crops in the country would appear to suggest that long-term imports are unnecessary since such lands could be put to use for the purpose proposed with more concerted efforts. Additionally, as costs of imports increase, as it will undoubtedly, a progressively adverse effect on the trade balance of the country will be felt and would require corrections through import substitution. A time-bound programme to meet wood and cellulose based raw material must be adopted which encourages stepped-up production by marginal farmers should lead to early cessation of imports.

4.24 Until adequate supplies become available from marginal lands, efforts should be made to economise and replace use of wood in urban as well as rural areas. Wastage of timber in rural housing, fencing of homesteads, fencing of agricultural fields, especially in and around forests, should be curtailed by popularising alternate materials.

4.25 According to the statement made by the former Minister of Petroleum, Shri Brahm Dutt, in Parliament on July 24, 1989, 10.55 million cubic metres per day of natural gas was flared during 1988-89. It is estimated that if this loss were to be eliminated by liquifying this natural gas for domestic consumption, fuelwood to the extent of some 24 million cubic metres could be saved every year - the annual requirements of 25,000 families, assuming a family unit of five. In this regard, the overriding need for ecological security would justify reconsideration of the priority given by government today to industry in the use of available natural gas. A major reallocation of this natural resource for domestic use to lighten the pressure on forests and substantially reduce the extraction of fuelwood from natural forests is clearly justified. This would apply particularly to the fertiliser industry which is given an undue share of available natural gas.

4.26 There is growing evidence of the potential of natural farming to save energy inputs and boost unit area production. The excessive use of fertilisers, pesticide, herbicide and irrigation, the basis for the so-called Green Revolution, it is now becoming known, leads to the levelling off of yields and in time there is a fall in productivity as soils gets depleted of nutrients. On the other hand, the "organic" or "natural farming" systems hold out the promise of reducing requirements of land and inputs required to generate food for the country, even releasing land to be put under forest cover. Mr. Fukuoka of Japan, who received the Magsaysay award in 1988, achieved much higher yields through "natural farming", that is, without the use of chemical, water and energy subsidies than is possible even with so-called scientific farming. In the West, the premier scientific institution of the United States, the National Academy of Sciences, has also now appealed to the US Government to encourage more productive, environmentally benign farming practices, that is, natural farming. There is, therefore, the real possibility now that more food can be grown from less land, that too without extra monetory investment.

4.27 This must be supplemented by the provision of alternate sources of fuel and a major means of doing so is to provide natural gas to those cottage and village-based industries that today use agro-waste such as bagasse as fuel, so that agro-wastes become available to industries that today depend on forest based produce for their raw material.

4.28 The continued use of fuelwood by defence and paramilitary establishments and other services within the organised sector is wholly unjustified, considering the cost it inflicts on the ecological balance and this must be stopped forthwith except under very exceptional circumstances and replaced by fossil fuels, primarily LPG, kerosene and coal. Equally the felling of trees in

the hills to provide timber at concessional or subsidised rates, particularly for the manufacture of packing cases should also be stopped forthwith and re-usable containers should be introduced. Agro-waste or synthetic packing material, which have been proposed for so long should be utilised for this purpose.

4.29 State Forest Corporations and related organisations should set up extension and education services to promote agro-silviculture and agro-silvipasture on private lands similar to the activities of the existing Krishi Vigyan Kendras of the agricultural universities. These should also provide training in silvicultural activities for the field staff to supplement the field experience provided in courses run by agricultural universities. In effect, this would largely result in the redundancy of the faculty of forestry in State universities unless the course content of such courses is substantially recast to conform to what is now advocated as the primary thrust of the National Forest Policy, 1988.

4.30 The Government of India should strengthen data base on forestry with a view to monitoring the overall ecological health and the state of the forest cover in the country. The State and Union Territory Governments should also strengthen their forestry data base which should be linked up with the Government of India's data base in the Forest Survey of India and the so-called "Wastelands Development" Organisations.

4.31 The Indian Forest Service has suffered in the comparatively recent past, from the selection of personnel who have by temperament and inclination not always been best suited for the kind of working environment and responsibilities they are required to assume. This apart, there is a growing tendency on the part of existing members of the service to avoid the far greater physical stress that outdoor life and fieldwork, which are an essential part of their official duties, involves more so than is the case with most other Central services. The Service is becoming increasingly desk and jeep bound and their diminishing involvement in direct field observation and surveillance is adversely affecting forest conservation. This further strengthens the contention that selection on the basis of temperament, inclination and interest must take precedence over academic qualification, though there is clearly need for a minimum academic competence including the ability for analysis and expression, both orally and in writing. If the selection is made of persons of the right personal characteristics, the demand now made so frequently for appropriate financial incentives and rewards for living in stressful circumstances away from the comparatively sedantary existence of urban life would not be so marked. All this apart, infrastructure for the protection of forests must be improved by providing modern means of communication. The Forest Service and organisations should also be restructured as has been proposed at some

length elsewhere in the Report.

4.32 The existing administrative systems and the strength of forest personnel as well as their deployment is nowhere near adequate to provide the protection necessary for the existing forest areas, let alone the much larger areas now proposed to be brought under forest cover. As of January, 1990, the total strength of the Indian Forest Service is of the order of 2,368. Equipped as the Forest Service now is, it is abundantly clear that the service cannot possibly conduct their custodian role to fulfil the responsibilities of it.

4.33 The Government of India should set up a special Cell, to be headed by a senior official, to monitor the implication of National Forest Policy, 1988. The Government of India should take upon itself the responsibility to see that firm action is taken to restore the ecological balance and protect the environment, especially because of non-implementation of the objectives of the National Forest Policy by the State Governments. Management/Working Plans should be prepared in consultation with the Government of India, taking into account the overriding ecological concerns and safeguards which have been provided under the Forest (Conservation) Amendment Act, 1988.

# CHAPTER VII : IMPLEMENTATION STRATEGIES AND SUPPORTING INSTITUTIONAL STRUCTURES.

## 1. BACKGROUND.

1.1 The preceding chapters have highlighted the alarming state of the country's environment, especially the process of bio-degradation and the loss of forest cover that has taken place, especially in recent years, and is now accelerating despite all assertions to the contrary. Certain recommendations, listed below, have been made with a view to prevent further deterioration in this respect:

1.1.1 Specific recommendations to implement the Forest (Conservation) Act, 1980, more effectively.

1.1.2 Specific recommendations to implement the National Forest Policy, 1988, after it has been amended to make it unambiguously focused as suggested elsewhere in the Report.

1.1.3 Analysis of important issues, especially maintenance of the life support systems - the water regime and soil stability and productivity, on which the ecological security of the country depends and are today under the gravest threat. A broad framework of future policies and programmes has been suggested to mitigate these serious threats.

1.2 Throughout its deliberations the Committee has been guided by the following concerns:

1.2.1 Protection of important hydrogeographic/hydrological systems is of paramount importance to ensure the country food and economic security, particularly the livelihood of the poorest sections of the population - the tribals and rural poor. The Committee has broadly identified such areas, where immediate and concerted action is essential, to restore the protective natural vegetative cover through providing conditions for natural regeneration and ecological succession. This must be complemented through enrichment by ecologically compatible afforestation techniques.

1.2.2 Progressive translocation of the human population in the areas that contribute primarily to ecological security through encouraging emigration through incentives; and particularly the provision of land in the plains and lower slopes combined with much more rigorous promotion of birth control. This is essential if the accelerating degradation of these areas, leading inevitably to forced migration to the plains and urban areas and consequently great human distress, is to be forestalled.

1.2.3 In fragile ecosystems, the delicate water balance must be monitored and remedial action through reafforestation must be taken lest irretrievable damage is caused to the ecosystem. If population pressure and economic activities are not quickly and progressively reduced to insignificant proportions, to stabilise precipitation and optimise the hydrology of these areas, periodic variations in rainfall will result in severe drought and flood conditions and cause increasing havoc. Achieving and maintaining the optimum hydrological regime through the establishment of natural vegetative cover should, therefore, be the foundation of all developmental policies at the National, State and District level. This itself will lead to a stable hydrological regime at regional, block and village levels, particularly in the plains, where it will count the most. In the process, it will provide the basis on which the maximum domestic biomass productivity, particularly agricultural - the most important factor in a rural based economy, can be ensured.

1.2.4 Maintenance of biological diversity is vital to the sustenance and improvement of the productivity of the agricultural systems and is also an insurance against possible natural calamities caused by the erosion of the genetic base of agriculture. Protection of the country's genepool for future scientific investigation is, therefore, vital. However, setting aside a mere five per cent of the geographical area of the country for this purpose, surrounded as it will, unless deliberately prevented, be by intense human and human caused biotic pressures, will not sustain its existing genetic resources unless it is greatly strengthened by the substantial and well-protected natural forest and reafforested areas proposed for the country's hydrogeographic systems. These latter areas, therefore, will form a multifaceted ecological role and will become the great storehouses of the country's genetic wealth, the primary beneficiaries of which will be the tribals and rural poor.

1.2.5 Hitherto, the ever-widening gap between the demand and the production of biomass for domestic consumption has been one of the major causes of deforestation. Unless the bare necessities of life are fully met, regulatory measures imposed by the State will prove totally ineffective against continued bio-degradation. Of the various domestic biomass needs, fuelwood, fodder and small timber required by a large segment of the poorer rural populace and tribals, are the most important. To avoid undermining the ecological security provided by forest cover proposed for the upper reaches of the elevated areas of the country - the hydrogeographic systems, these domestic biomass needs, namely, fuel, fodder and small timber, should to a substantial degree be met by farmers of marginal agricultural lands to whom incentives and facilities for marketing should be provided. However, this will still prove inadequate and will need to be supplemented by non-conventional energy

sources, but more importantly by diverting for domestic use existing energy sources from industry as well as fossil fuels now going to waste, namely, flared natural gas. In no circumstances can industrial growth take precedence over ecological security, which is now endangered by existing and growing domestic demands. Such demands must hereafter have first call on all available fuel resources, in preference to industry.

1.2.6 Regulation of land use of the country must no longer be postponed. Functional classification of public lands, which would entail identification of primary objectives for each functional category, is essential for purposeful land management. Secondary objectives, wherever considered essential, must be limited to the extent these are compatible with the primary objectives of ecological security. Careful land use planning must be undertaken to ensure that incompatible uses are not accepted in the areas bordering those designated for ecological security and preservation of bio-diversity.

1.2.7 A concerted and determined effort to bring about changes in land-use practices, especially on marginally productive agricultural lands, is essential. The possibility of enacting suitable legislative measures along with various policy options, both economic and fiscal, have been explored. At least 30 million hectares of marginally productive agricultural land could be released for the production of fuelwood and fodder, by bringing about suitable changes in the current land-use practices. Experts corroborate that such changes would not jeopardise agricultural production and food security.

1.2.8 There is urgent need to identify those communities, predominantly "primitive" tribals, whose lives are still truly symbiotic with the forests and other public lands on which they live. It is imperative that only such communities are allowed unrestricted use of the forests and other lands for their survival and management interventions should not come in the way of their doing so for the time-being. As the younger generations of such tribals, with the encouragement Government is already extending to them, are entering the mainstream of the country's socio-economic development, the restrictions applicable to the various other sections of the general populace in gaining access to, and the use of the forests of the country, must apply to them also.

1.2.9 The multiplicity of agencies and organisations, presently responsible for the management and maintenance of public lands, has prevented the adoption of clear cut policies and programmes for the development of common property resources. The option for entrusting all public lands to a single agency for its protection and proper management has been examined and suitable recommendations have been made.

1.2.10 The prevalent practice of regulating the use of public lands without the active involvement of local people and informal user groups has proved ineffective in preventing the degradation of such lands. The Committee has examined the possibility of enlisting people's participation in the management and development of common property lands, especially to increase the production of domestic biomass for local consumption and distribution.

## 2. HISTORICAL BACKGROUND OF ENVIRONMENTAL PLANNING AND IMPLEMENTATION IN INDIA.

2.1 Till 1980, the National Committee on Environmental Planning and Coordination (NCEPC) was responsible for environmental planning in India. The NCEPC had taken over from the earlier Committee on Human Environment (COHE) in 1973, constituted by Smt. Indira Gandhi on her return from the UN Conference on Human Environment in Stockholm in 1972. These Committees were assisted by a cell within the Department of Science and Technology, Government of India, consisting of a few professionals from various disciplines.

2.2 During the Janata Government's term of office from March, 1977, to December, 1979, an "Informal Group" was set up by the then Finance Minister, Shri H.M. Patel, to examine the overall problem of Nature Conservation and Environmental Protection in all its major aspects and recommend how these should be mitigated through measures incorporated in the mainstream of Government policies and programmes. Apart from Shri Patel, the committee comprised of Prof. M.G.K. Menon, Dr. Raja Ramanna, Dr. M.S. Swaminathan, Dr. Satish Dhawan, Shri G.V.K. Rao, Dr. B.P. Pal, Shri B.G. Verghese, Shri Vasant Rajadhyaksha, Dr. H.N.Sethna and Shri Duleep Matthai among others with Shri N.D. Jayal as Member Secretary. Over a period of 14 months, the Committee deliberated and formulated, for the first time in the country's planning history, a chapter on Nature Conservation and Environmental Protection was incorporated in the draft Sixth Five-Year Plan published by the Janata Government. This draft was, however, reframed after the Janata Party lost at the general elections in January, 1980. A revised version was, however, incorporated in the Sixth Five Year Plan that was subsequently formulated and adopted by the Congress (I) Government.

2.3 In keeping with her election promises and the growing evidence that a far more comprehensive planning and coordinating structure was required to do justice to the large and growing agenda of work in the field of environmental protection and management, Smt. Gandhi on her re-election in January, 1980, set up a "Committee for

Recommending Legislative Measures and Administrative Machinery for Ensuring Environmental Protection", headed by Shri N.D. Tiwari. It submitted its report in September, 1980. The central recommendation of this Committee was to establish a Department of Environment at the Centre, which was to provide "explicit recognition to the pivotal role that environmental conservation must play for sustainable national development". The Tiwari Committee also made a series of other recommendations to give effect to the concerted and coordinated actions that were required to be taken by official agencies at the Central and State levels, by NGOs, educational and research institutions, community organisations, besides individual citizens. The Tiwari Committee envisaged that the Department of Environment would play a "watchdog" role to study and bring to the attention of the Government and Parliament instances, causes and consequences of environment degradation in all sectors.

2.4 For a country of the size and diversity of India, with its federal political structure, it would hardly be possible for any one Department at New Delhi to be responsible for the environmental management of the entire country. The Tiwari Committee, therefore, made two categories of recommendations, though not formally listed in separate categories. The first set was on the structure and functions of the proposed Department of Environment. The second related to some of the other measures to be taken to ensure that environmental management became a mandatory part of the concern and responsibility of virtually all official and non-official bodies at the Central and State levels. The Department of Environment was, therefore, essentially intended as the central nodal agency in the structure of Government to plan and monitor programmes on environmental management. These included environmental protection which was to be implemented on a decentralised basis. A limited amount of direct administrative responsibility for environmental managaement in certain sectors such as pollution control was envisaged for the Department.

2.5 It was clearly recognised that the Department, unlike other economic Ministries, which had extensive responsibility for the direct implementation of programmes, would primarily be a planning, monitoring and coordinating as well as an evaluating body. In recognition of the fact that environmental protection and environmental planning were relevant to virtually every sector of the planning and development spectrum, the primary responsibility for implementing environmental protection programmes was to be that of the Ministry or offical agency having direct jurisdiction over the sector. For example, the Ministry of Industry was to be primarily responsible for ensuring adequate safeguards against the industrial pollution, the Ministry of Energy was to ensure that the environmental impact from power generation was minimal and the Ministry of Transport was to ensure that the environment was not adversely affected

in the process of developing the transport infrastructure and from the operation of various modes of transport. In short, it was never envisaged that the Department of Environment could be the sole body to be responsible for all aspects of environmental protection in the country. Such a responsibility was considered to be totally impracticable and unfeasible. This was not to say, however, that its "watchdog" role was in any way to be diminished. On the contrary, it was to ensure that all ministries recognised and fulfilled their responsibilities for environmental protection. It was expected to do so by every legitimate means possible, including the imposition of penalties of sufficient severity to evoke the required response. Regrettably, to date, the Ministry of Environment and Forests has avoided its essentially policing responsibilities and has increasingly sought instead the more comfortable role of promoting and undertaking populistic development programmes outside its intended mandate.

2.6 A review of the main recommendations of the Tiwari Committee in 1989 would reveal an extremely uncoordinated and sketchy state of implementation. While the Department of Environment was quickly constituted in November, 1980, and has grown in the last nine years into a large Ministry of Environment and Forests, its growth has been haphazard and ad hoc, since it has simply responded to disparate and sundry demands of various pressure groups, both public and government based on their individual perceptions. There has been no attempt to make a rational and coordinated assessment of the full range of its responsibilities and reorganise it to assume these in a rational and coordinated manner. Nor has there been any assessment of whether it has been effectively discharging such functions as it has assumed. This is clearly reflected in its current "Allocation of Business". Its current responsibilities include administrative charge of a whole range of institutions including the various Surveys of India and a number of other bodies. The Allocation of Business of the Ministry must be reviewed forthwith in its entirety with a view to ensuring that the experience of nine years and the far broader comprehension of existing and emerging environmental concerns in all their range and diversity are assessed and brought foursquarely within the ambit of the Ministry's responsibilities in a well-conceived and coordinated manner. When this is done, it will become evident immediately that the Ministry's assumption of direct economic development responsibilites, of which it is now guilty, will inevitably lead to increasing inattention to its growing environmental protection, ecological security and nature conservation responsibilities. Such economic development activities will in fact come into direct conflict with such responsibilities the singlemost important aspect of which is establishing forest cover, and not tree plantations over one-third of the country, particularly over the hydrogeographic systems, now increasingly recognised to be one of the single-most important ways of bringing about environmental protection and ecological security -

the foundation for the sustained development of the country.

2.7 The Tiwari Committee had recommended that the Prime Minister should be the Minister in charge of the Department of Environment. This recommendation has not been strictly observed, since during two separate periods Shri Bhajan Lal was the Minister-in-charge and subsequently Shri Z.R. Ansari, till the new National Front Government was elected in November, 1989. Ministers and Secretaries in charge of the Environment portfolio have almost without exception tended to regard their charge as being less significant and politically less influential than that of the conventional economic Ministries. Considering the extreme complexity of the responsibilities of this Ministry and consequently the length of time it takes for Chief Executives to comprehend the very broad horizon that come within the range of their responsibilities, and plan appropriate programmes of action, there have been far too frequent changes of Ministers and Secretaries leading to erratic and feeble developments of the Ministry's functions and discontinuities in planning priorities. Since the Department/Ministry first came into existence, there have been no less than five Ministers and six Secretaries. Under these circumstances, continuous and coordinated development of the functions of the Department/Ministry has clearly been impossible. When the Department of Environment was first formed, the environment portfolio was intended, as it should, to be one of the most powerful portfolios of the Cabinet. It was intended that the Department should be the environmental "conscience keeper" of all programmes and projects in every spectrum of national planning, and to exercise veto powers against proposals and the actions of every other Ministry that involved unacceptable damage to the environment.

2.8 It was intended that the Ministry should be responsible for formulating guidelines for national development in each sector of the economy to provide the framework for all planning and development activity by other Ministries and Departments of the Government of India and State Governments. This, of course, has not been the case simply because the public and political opinion in favour of environmental protection and ecological security has never been strong enough. The Department of Environment did not, therefore, receive the support it needed to perform the crucial "watchdog" role intended for it. A large part of the blame for this must rest with the Department/Ministry itself, since it has never set about systematically developing its professional expertise and the administrative competence to carry out its responsibilities, nor could it ever have done so without a far greater understanding of these responsibilities. This is distinct from its political reach which, it was intended, should carry enough authority and credibility to command the respect of all other Ministries of the Government of India and the State Governments.

2.9 One of the most important omissions of the Ministry and its predecessor Departments has been the neglect to implement a major recommendation of the Tiwari Committee, that is, to post Environmental Advisors in each Ministry to advise and caution these Ministries on the environmental imperatives that should guide the formulation of their policies and programmes. These advisors were expected to perform functions similar to that of the Financial Advisor (FA), posted by the Finance Ministry to every other Ministry. These Environmental Advisors, while administratively answerable to the Ministry to which they were posted, were to be functionally responsible to the Ministry of Environment and Forests. When the Department of Environment was being established, it was envisaged that an environmental monitoring, intelligence and early warning system would be created within the proposed Department. This unit was to have developed linkages with voluntary agencies and other people's organisations at the grass-roots level to receive early warning of potentially adverse environment related developments and conflicts. Today, the Ministry of Environment merely reacts belatedly to some of the ad hoc communications received by them on environmental problems from around the country. The bulk of such communications received go unattended simply because the overworked staff have neither the time nor the inclination, and in number of cases the professional competence, nor indeed the infrastructural support to give the indepth thought necessary to such feedback. The Ministry is not geared to even collecting comprehensive background information on such issues, let alone to take suitable corrective action.

2.10 Another major development, that was being advocated and has been repeated frequently ever since the Department/Ministry came into being, was the critical need to establish the Central Land Use Commission and activating the State land use agencies. The only major step in this direction was the creation of the National Land Use and Wastelands Development Council and the National Land Use and Conservation Board, at the time the National Wastelands Development Board was formed by Government Resolution No. 7-22/85 FRY(P) in May, 1985. Both land use bodies were still born. There is no way in which such bodies can function effectively, especially from an ecological point of view without a strong Central authority supported by equally firm State authority to back them.

2.11 Numerous other proposals envisaged for the Department of Environment have also not been implemented. These include:

2.11.1 Formation of a Cabinet Committee on the Environment.

2.11.2 Adoption of a National Environmental Policy Resolution.

2.11.3 Review of the entire gamut of environment related legislation to remove anomalies, strengthen

implementation machineries and where necessary, bring in amendments or new legislation.

2.12 A separate cadre for wildlife conservation would not be necessary if the role of the forest service as recommended in the current report is adopted. By doing so, this would to some extent be in consonance with the primary concern of the National Forest Policy, 1988. Regrettably, the Policy has inherent anomalies and to avoid continued confusion and ecological degradation should be concerned only with ensuring ecological security instead of providing for the management of forests for both ecological and economic requirements. In making provisions for these conflicting roles of forests it has failed to take account the underlying purposes of Government in transferring forests from the Ministry of Agriculture to the Ministry of Environment in the first instance.

2.13 Ultimately, it is not just the structures and administrative arrangements centering around the Ministry of Environment which will ensure that sound environmental protection becomes both the basic and overriding concern of the nation's body politic. The outcome of the efforts of the last few years and in future by groups of dedicated NGOs and individuals to bring "environment" high up on the political agenda will be crucial. Will the Harsuds, the Baliapals, the Kaigas, the Doon Valleys, the Bhopals and the numerous other battlegrounds be able to bring about the needed political consciousness before it is too late? An honest, efficient and concerned Ministry of Environment and Forests will ensure that some of the pain of human suffering and the destruction of the nation's wealth, particularly its forests with all the cataclysmic socio-economic consequences involved, will be minimised as the nation moves forward. This will not be possible, however, without a major "mid-course" correction of the established concepts of development and change the existing mindset of the development planners to a sound understanding of environmental, particularly ecological, principles relevant to the existing and emerging Indian situation.

## 3. REVIEW OF PUBLIC LAND MANAGEMENT SYSTEMS.

3.1 In the earlier chapters, a reference has been made to the need for the reorientation of the objectives of the Forest Department and consequently the reorganisation of both the Indian Forest Service and the State Forest Departments. It has been proposed that the Forest Development Corporations, now largely manned by Forest Department personnel, should be entrusted with the responsibility of providing extension service and assume responsibility for the production of former forest-based produce by farmers of marginal agricultural lands from such lands. The Committee is aware that divergent views prevail on the subject of organisational capabilities of the Forest Department as currently constituted. Clearly,

the Forest Administration is not the most appropriate agency to shoulder the management responsibilities for public lands. The Committee has analysed the past forest policies/practices to appreciate, in its proper perspective, the role played by the Forest Administration in the management and development of public lands entrusted to it. Simultaneously, it has drawn inference from the prevailing condition of public lands/community lands outside the purview of the Forest Department to examine the suitability of other Government organisations for this purpose. It is clear that by entrusting the Forest Department with extra territorial jurisdiction and responsibility the Service has tended to increasingly to neglect its primary responsibility, which is the conservation of forests, particularly the natural forest since, like the Ministry of Environment and Forests, it has found much greater comfort and security in being engaged in direct economic development work rather than being subjected to the hazards, constant discomfiture and often hostile opposition to the protective functions implicit in its forest conservation.

3.2 At present, the administrative control over district revenue lands vests with the District Collector/Magistrate. The present situation is that the Collectors are heavily burdened with multifarious other responsibilities, including maintenance of law and order, which do not permit them to devote adequate time to land management issues. Moreover, the State Governments all over the country have foregone land revenue from most of the land holders on the plea that most of the land holdings are small. The maintenance of land records have been neglected. The role of the Revenue Officers in rural development has become marginalised with the growing political strength at village level. The existing set-up of the Revenue Department has no provision for inducting trained and scientific manpower specifically for the purpose of managing lands for biomass production. The Collector has perforce to depend on other departments for enforcing proper land use management in the villages.

3.3 It is most regrettable that political and other pressures have undermined the Forest Administration, with its professional expertise gained over more than 125 years and with its established and comparatively disciplined and trained structure at grass root level. Were it not for such pressures, the Forest Administration would have succeeded not merely in protecting the full recorded forest area of the country, namely 75.18 million hectares and its forest cover, but could have extended the forest cover under its jurisdiction to one-third of the geographical area of the country as required under the National Forest Policy, 1952. The enormous environmental and ecological benefits that would have accrued to the country are too obvious to require explanation. If the recommendations of this report are accepted, it will now be confronted with the responsibility of undertaking this task under infinitely more difficult circumstances. It

must, however, now undertake this responsibility for which it is clearly the most competent. It should not, however, be saddled with any other extraneous duties. The development of marginal agricultural lands and revenue lands situated in the plains for the production of erstwhile forest produce in the form of fuelwood, fodder and timber and non-timber forest produce should clearly be assigned to the Ministry/Departments of Agriculture and their subordinate Services. Besides other land, the revenue lands in the hills should of course be transferred to the jurisdiction of the Forest Department for reforestation.

3.4 From the point of view of sound management/administration, multiple authorities with differing land-use objectives having jurisdiction over the same area leads to conflict, or at best unsatisfactory compromises. The solution lies in delineating areas required for different purposes, the overriding one being ecological security, and assigning different agencies the responsibility for achieving their objectives within each of their different areas of jurisdiction - the Forest Department's being ecological security through restoring/maintaining optimum forest cover through re-establishing natural regeneration, supplemented by ecologically compatible scientific means, which will lead to achieving forest climax conditions on the hydrogeographic systems of the country.

3.5 The State forest reserves have come under severe biotic pressure over the years. Non-forest public lands, which were specifically earmarked for meeting the bonafide needs of the local people, such as grazing, Nishtar, etc. were over-exploited, neglected and have become seriously degraded. They have been liberally parcelled out for cultivation formally under various schemes or informally through encroachments, human settlement etc. These are neither adequate nor productive enough to cater fully to the domestic biomass needs of the local people, causing rancour and destitution in the countryside. The biotic pressure is found to have shifted from village common lands to forest reserves causing major problems for forest protection for ecological security. Clearly there was need for more perceptive prescriptions for land use based on a clearer understanding of the varying purposes that the different terrains and the bio-geographical functions each should perform. This differentiation must now be made and implementing the different land use objectives now determined should be assigned to each of the existing agencies best equipped to fulfil them.

3.6 Public participation in the protection and management of all lands, particularly community and forest land must be ensured to prevent further degradation and to ensure ecologically compatible development in the interests not only of the village communities and tribals, but most importantly the nation as a whole.

3.7 Strategic land use planning leading to delineating areas for ecological security, genetic resource conservation, agricultural production, grazing and other uses depending on the bio-geographical and agro-climatic location of the lands, must be introduced without further delay using the latest scientific and technological understanding of the fundamentals of the overriding importance of environmental protection.

3.8 Pastures and grazing lands are the most neglected at present. Improving their productivity must be ensured if higher yielding livestock is to be introduced as it must, leading to an overall improvement of the village economy. The State dairy development authorities and Central Government agencies such as the National Dairy Development Board, should be made responsible for this work with active people's participation.

3.9 Growing specialisation in each area of the village economy must be employed but coordinated in a manner that will ensure an optimum level of ecological productivity and long-term ecological security. A overriding coordinating authority will be necessary which will need to have a clear understanding of and be strongly motivated by environmental and therefore ecological concerns. Ideally this would be the District forest authorities, once they have been made aware of and have become keenly concerned with environmental issues at grassroot level rather than forestry. Other economic and social responsibilities if imposed on a single integrated agency, in addition to protection and management of public lands at village level can only lead to compromising achievement in each of them.

## 4. REORGANISATION OF FOREST ADMINISTRATION.

4.1 In Chapter VI it has been proposed that consistent with the major concern of the National Forest Policy, 1988, forests should hereafter be protected and extended to a minimum of one-third the geographical area of the country to cover its hydrogeographic features and form thereby the major bastion of the ecological security system of the country. For the massive task involved, there is no service of the Government better suited than the Indian Forest Service. However, it is essential that it should be modernised, expanded and equipped for the purpose. The IFS will not be able to fulfil this responsibility unless it is completely divested of all the many extraneous functions and duties it now performs and devote itself single-mindedly to the proposed new task which in recent times has been so catastrophically neglected. The extraneous tasks referred to include the responsibility for the production of timber, fuelwood and fodder, covered by so-called Social Forestry, Agro-Forestry and the like, and which must hereafter be confined to marginal agricultural land.

4.2 These tasks must be assumed immediately by the various Central and State Government Agricultural services since the raising of such produce must hereafter be legitimately regarded, as they are, as essentially agricultural activities. However, as Silviculture and Silvipasture extension work may initially be required, and subsequently effective marketing capability will be essential, this role, it is proposed, could best be assumed by the present Forest Development Corporations, the personnel of which should be de-cadred from the Forest Service and transferred to the Ministry/Departments of Agriculture. The nomenclature of these Corporations will then need to be revised to describe their new role; for example "Government Agro-Silvicultural Corporations". The activities of these Corporations would be dovetailed into the State agricultural activities and the Corporation's Cadre will then be responsible for training farmers in scientific and intensive techniques of tree-culture and plantation, genetic engineering, extension work, storage, marketing and all other related activities.

4.3 The Indian Forest Service will need to be reoriented to bring about the major functional change envisaged in its role and responsibilities which, it is urged, should thereafter be devoted exclusively to the protection and vegetative enrichment of the "National Forests" of the country, including securing the cooperation of the public through effectively demonstrating and communicating the enormous ecological benefits that will arise, especially to those living in the vicinity of these forests. Given these new responsibilities, the future training and role of the Indian Forest Service should comprise:

(a) Understanding the biological diversity of the nation's species and of their genetic material, and

the dynamics of land-plant-animal relationship;

(b) Ensuring the protection of the natural vegetative cover of hydrogeographic systems to mitigate the incidence and effects of floods, droughts, soil loss and fertility, sedimentation and loss of downstream lands and habitations;

(c) Designing national and regional conservation strategies to address the explicit forest-related environmental issues at stake;

(d) Assuming full responsibility for the expansion and management of the national network of wildlife parks, sanctuaries and similar reserves to establish a comprehensive system of protected areas to ensure that the country's existing bio-diversity is protected and preserved;

(e) Organising national and international workshops, seminars and conventions, and through well-designed publicity programmes aimed at all key target groups, also through international treaties to establish national and international linkages, to secure the interest and support of not only the Indian public, but the community of nations as a whole in protecting what is an important component of the world's collective natural heritage of biological diversity reposed in India;

(f) Establishing economic criteria and incentives that justify living natural species conservation and getting this officially accepted as a vital form of land use;

(g) Improving the state of scientific and technical knowledge, concerning biological diversity;

(h) Evolving appropriate technology to protect and perpetuate the natural bio-diversity of the country;

(i) Promoting research to determine how bio-diversity and good land use in a conservation area can be maintained in conjunction with multiple use areas in the neighbourhood, as well as with other regional and national goals involved;

(j) Evolving appropriate human capability and management techniques to avoid not only the loss of bio-diversity but demonstrate how, at optimum levels, this contributes to improved land fertility and productivity;

(k) Devising Monitoring and Advance Warning Systems of impending changes and loss of functioning and diversity of natural eco-system and acting as the Government's and the nation's watch dog and conscience keeper of the adverse macro and micro consequences thereof;

(l) Contributing to bringing about greater understanding

and major institutional changes that establish acceptance of the limited niche that human beings can legitimately occupy without detriment to the natural environment and its life-support systems; and

(m) Conducting academic research and training in such fields as bio-genetics, resource and watershed management, based on complementary forest management, taxonomy, animal sciences and ecology, and wildlife management.

4.4 The reorientation of development efforts to make them more responsive to both short and long-term community needs based on stable ecological conditions will essentially require a major reorientation of the bureaucracy as a first order task. To initiate this process will require the redefinition of the roles of the middle level and the district level administration as well as the lower levels, that is, at taluka and village level administration. The manner in which Administration relates to people and the people's willingness to act according to their advise is crucial in the implementation of all land management programmes. The responsibility for the general well being of a defined population is as important as the successful implementation of projects and programmes which have been approved at the State level.

4.5 The district administration is today regarded as the cutting edge for developmental activities. Considering this as the most crucial link in the administration hierarchy, entrusting duties and responsibilities at this level on the basis of approved norms is obviously essential. This will be subject of course to the principle that the responsibility for forest protection and ecological security at the District level is that of the Forest Department. This department will participate in all discussions concerning the area of its responsibility with other district authorities, but the final arbiter will be its own hierarchy.

4.6 Broadly, the district level administration should be educated in the complexities of adopting a holistic environmental/ecological approach to its responsibilities that it can participate effectively in all discussions of the proposed integrated and coordinated multi-disciplinary team when this is placed in position. Ensuring that it adopts an appropriate holistic approach should be the Forest Department's responsibility.

4.7 So far as the existing additional areas to be brought under forest cover are concerned, a senior forest official with adequate understanding of the dynamics of natural ecosystems and who has accepted with conviction the overriding importance of ecological security that forests can provide, should be placed in overall charge of such areas as well as the inter-disciplinary teams

constituted for these areas. His teams should include middle level executives, each in charge of separate activities within the inter-disciplinary approach involved. The areas of concern that would come within the purview of such officers would be conservation and management of areas of bio-diversity and fragile ecosystems, protected areas like Sanctuaries and National Parks including buffer zones, biosphere reserves and other such areas.

4.8 The senior Forest Officers responsible for the above areas should not be responsible for the production and marketing of fuelwood, fodder and timber and cultivated non-timber forest produce (NTFP) on marginal agricultural lands. As proposed elsewhere, responsibility for this must be assumed by the proposed new "Government Agro-Silvicultural Corporation", officered by the existing Indian Forest Service personnel but who must opt for permanent assignment to these Corporations, like IAS officers who have opted for careers in public sector organisations. These Corporations should assume responsibility for maximising tree and fodder production through the use of intensive silvicultural and silvipastural management practices and high quality genetic stock as well as by adopting effective protection and regenerative techniques. These Corporations would function under the overall direction of the Ministry/Departments of Agriculture.

4.9 The areas of jurisdiction of such Corporations would include community lands, roadside and canal side strips, exploited surface mine areas, railway verges, and all unutilised revenue lands. Their responsibilities would also include extension, awareness building, institutional support and welfare activities.

4.10 The "development" of district level hydrogeographic systems based on integrated land use planning, preparation of management plans for distinctive bio-geographical forest areas, which would be coordinated with the Agriculture department's village level development plans, the maintenance of data base, geographical information system, monitoring and evaluation and other related activities should primarily be the responsibility of the Forest Department supported by the other implementing agencies concerned.

4.11 Care must be taken to avoid the risk of the district coordinating authority being guilty of adopting a "tunnel vision" from not wanting to transgress established administrative boundaries. From an ecological point of view, all micro-level, grassroot level plans must form integral components of well-integrated macro-level matrices conceived to ensure ecological security. The conceptual framework for an overall matrix must be emerge from a nationally conceived ecological framework based upon bio-geographic and geoclimatic considerations which

must not be constrained by political and administrative boundaries.

4.12 The following advantages are anticipated in the proposed administrative structure:

4.12.1 Policies and plans will be integrated, hydrogeographic system based, with the overriding concern for ecological security. The traditional concept of classification of forests would be employed in future to determine the degree of ecological enrichment necessary to ensure that forests reach natural ecological climax condition as quickly as possible. Land use for all other purposes, while being basically ecologically oriented will be developed to fulfill their predetermined economic management objectives and these will be transmitted by the local agricultural services to the local village level administration.

4.12.2 Responsibilities for planning and management of public lands at local level, within a Government determined overall ecological framework, should be assumed by local people, supported and guided by experts at district level.

4.12.3 The executive agency, namely, the district coordinating authority will be better equipped to comprehend the entire gamut of policies and programmes at district level to guide their implementation.

4.12.4 Management of non-forest public lands consisting of a matrix of inter-related activities, could be implemented in a more cohesive manner by strengthening the existing organisational set-up at regional and district levels. A parallel concept, coordinated at the level of the senior-most district forest authority, would apply to the management of forest lands for ecological restoration. This would provide additional strength to the present arrangements which prescribe sectoral distribution of duties and responsibilities right from the field to the policy formulation level. Under the proposed set up, there will be only two sectors, the forest and non-forest, and coordinating these at policy level should be comparatively simple.

## 5. THE ROLE OF THE INDIAN FOREST SERVICE AND REORIENTATION OF PERSONNEL.

5.1 By virtue of his exposure to forest situations and experience, the forestor is potentially the best equipped to comprehend all issues arising from the management of forests and in particular the ecological role that forests alone can perform in this country. However,

those who have spent long years practising traditional forestry methods and have not been exposed to the ecological role of forests may have difficulty in fully comprehending and accepting the new thrust of the National Forest Policy, 1988. Well-conceived reorientation programmes for the training of forest personnel at all levels are therefore essential and urgent, to inculcate in them an appreciation of the need for maintaining the maximum area within their charge under rich optimal forest cover. Such programmes will also enable them to gain confidence in their new responsibility for ensuring environmental security and maintenance of the country's ecological balance as the principal purpose of forests, as enshrined in the new National Forest Policy.

5.2 To do justice to these new responsibilities, the strength of the Forest Services must be supplemented substantially at all levels, not only numerically but qualitatively. Since protection and conservation has to be enforced far more rigorously, the technological means of fulfilling this purpose such as improved mobility for detection and apprehending of offences, fire protection capability by modern technology and efficient modern telecommunication systems would have to be provided; all this without undermining the natural values of the forests. The full support of the existing law enforcement agencies will be necessary. Similarly, for quick rehabilitation and enrichment of vegetative cover of degraded lands, the forest research base, oriented to ecological restoration, will have to be greatly strengthened and extension services engaged for the transfer of technology to other land managers.

5.3 The Service's earlier edict of sincere, dutiful but silent functioning, developed over many decades of conventional Indian forestry practice, will need to be fundamentally changed. Forestors will have to develop extension, training and communication skills to ensure far better cooperation and participation from people by convincing them of the much greater benefits they will derive through the proper ecological functioning of forests. They will have to do this both to the immediate beneficiaries, that is, those living in or near the forests, but also the public at large.

5.4 Existing forest research institutions of the Government of India must be restructured to provide the basis for result-oriented work focusing on the ecological role of forests instead of the economic and commercial aspects of forest management as in the past.

## 6. ESTABLISHING NATIONAL FORESTS - THE ROLE AND FUNCTIONS OF THE GOVERNMENT OF INDIA IN THEIR MANAGEMENT.

6.1 In chapter VI, it has been urged that certain forest areas, especially those considered critically important for the protection of the hydrogeographic systems and the conservation of bio-diversity, be designated as NATIONAL FORESTS. In these areas, the normal protection management functions will continue to be discharged by the State Forest Administration. However, it is recommended that overall policies and programmes for such areas should be formulated and implemented by the local authorities under the overall direction and monitoring control of the Central Government, since this alone will lead to ensuring a holistic and integrated approach, instead of resulting in a series of disparate, haphazard and uncoordinated ones in which, inevitably, the overall ecological concerns will be compromised or neglected.

6.2 An apex policy formulation committee should be set up for this purpose led by the Ministry of Environment and Forests in the Government of India. This should act as a policy and guideline formulation committee that would provide overall advise and guidance, leaving the responsibility of routine administration to local executive agencies. The committee should consist of representatives of the Ministries/Departments of Environment and Forests, Agriculture, Rural Development, Welfare, Non-Conventional Energy Sources; representatives of the Planning Commission, National Commission on Scheduled Castes and Scheduled Tribes; Non-Government Organisations and eminent environmentalists. The committee should function under the chairmanship of the Minister for Environment and Forests. It should be serviced by a separate secretariat located in the Ministry of Environment and Forests.

6.3 The following functions are envisaged for the committee:

6.3.1 It will act as the Central apex agency to oversee protection measures particularly in the identified forests and to-be forested areas. It would review these at regular and frequent intervals with a view to suggesting suitable modifications in policies and programmes to be implemented by the respective States and Union Territories to strengthen the country's ecological security.

6.3.2 The committee will assign the responsibility for undertaking socio-economic and environmental appraisals of major developmental projects in the designated areas to the Ministry concerned, but under its overall guidance. If as is hoped, an environmental advisor from the Ministry of Environment and Forests is posted to each economic Ministry, as recommended in the Tiwari Committee report, he/she will act as the environmental "conscience

keeper" of that economic Ministry and be involved at every stage in the formulation of all developmental projects within designated areas which may have a significant environmental impact before these are submitted for clearance to the Ministry of Environment and Forests, and prior to administrative and financial sanction being accorded.

6.3.3 The committee will, in particular, examine and approve perspective plans for the protection and enrichment of designated forest areas.

6.3.4 The committee will consider and put forward recommendations on financial matters such as compensation for the loss of revenue to the States and Union Territories on account of bans on the harvesting of forest produce in the designated forest areas, the quantum of subsidy on distribution of alternate domestic energy supplies to marginal communities, particularly to those living near forests and deprived of the use of these forests. The committee will also determine what additional measures are necessary to compensate these communities. In addition, the committee will examine all other measures necessary, with a view to progressively eliminating biotic pressures on the hydrogeographic systems, which may adversely affect the ecological restoration of these areas.

6.4 It could possibly be argued that the jurisdiction of the committee proposed here might overlap that of the National Land Resources Conservation and Development Commission. This should not however be the case, since the proposed committee will be concerned only with the designated forest areas and should therefore justifiably be assigned this responsibility by any existing commission/body that has overriding jurisdiction. Though it is not possible without a far more in-depth study to set out in full detail the duties and responsibilities of the proposed committee, it is quite clear that in view of the critical importance of the proposed NATIONAL FORESTS in any national land use system, such forests must receive the undivided attention of a high powered body entrusted with sufficient authority to ensure that these remain inviolate from interference and diversion to any short term economic or other purposes. Planning, protection and minimal scientific interference with the functioning of nature's own dynamics in such lands must be closely overseen and monitored by a separate agency under the overall direction of the Ministry of Environment and Forests. For this, the proposed committee is considered to be the most appropriate.

## 7. INSTITUTIONAL ARRANGEMENTS FOR THE MANAGEMENT OF COMMON PROPERTY RESOURCES (CPR).

7.1 As the Ministry of Environment and Forests has till now failed to provide the means, and to carry conviction with the Central Government, and with the State Governments, that exploitation of living natural resources can and should only be decided on a holistic basis rather than ad hoc as has always been the case hitherto, its perception continues to be based on the notion that the under-privileged people's use of such natural resources should be met from their immediate vicinity. This has led to progressive erosion of the living natural resource base of the country and contributed greatly to ecological degradation, which has now reached crisis proportions. Government would however be wholly unjustified in denying such people, for their domestic use, a far greater share of sources of energy and domestic biomass available in the country and now appropriated by vested interests, particularly Industry and Commerce. This contention is particularly valid in the context of restoring the ecological balance. Government would be wholly justified, for instance, in providing such people with a far greater share of available fossil fuels, particularly, natural gas and kerosene, at a highly subsidised price or even free initially to take the pressure off their dependence on natural living resources. In the context of the emerging ecological crisis, brought on by the compulsions of the under-privileged sections of society to erode the living natural resource bases located near their habitats, there is no justification for assigning the lion's share of fossil fuels and the like to Industry and Commerce. The reverse, in fact, would be wholly warranted and only after essential domestic needs are met, should industry enjoy the benefits of such resources but only on a controlled basis. Government would be equally justified in providing fodder and small timber, cultivated by farmers of marginal lands under governmental incentive schemes, at subsidised prices or free of cost to commence with. Any effort aimed at ameliorating the condition of such people must proceed from a recognition of the dynamic relationship between the economic concerns of society as a whole, particularly the poverty groups, and their ecological environment.

7.2 A study by Prof. Madhav Gadgil and others estimates that, hitherto, roughly about one-sixth of the rural population and about one-fifth of the total livestock is directly dependent on public lands. It is likely that a far greater proportion is in fact dependent. However, in the context of the emerging ecological crisis, any conservation strategy must be underpinned by the firm intention to avoid aggravating this crisis and be based, therefore, on meeting the needs, from alternative sources, of those presently responsible for denuding the country's ecological foundations. This can only be done by providing for their basic needs from alternative

sources. A major option is to improve the productivity of available Government revenue lands and marginal agricultural lands, both falling outside the designated forest areas. Substantial portion of such land has been privatised, both legally and illegally. Those areas that are not, are likely to be degraded and these are the lands that comprise Common Property Resources (CPR) which are unevenly distributed between human habitations. A major change in the land tenure systems, now necessary, is a reallocation of CPR so that a reasonable proportion is assigned as far as practicable to every village community, provided this can be done without incursion into designated forest areas. Where this is not possible, alternative sources of basic necessities must be provided from the country's non-renewable natural resource common stock of fossil fuels, as well as non-conventional forms of energy and domestic biomass.

7.3 Diversion of common property lands for various other uses, predominantly for agriculture, has resulted in the rapid deterioration of these areas, leading ultimately to a total loss of fertility. The process has accelerated after Independence. About 2 lakh hectares of culturable degraded lands has been distributed to the poor during the Third and the Fourth Plan periods under a Centrally sponsored scheme. Other allotted lands include 1.78 million hectares made available through the land ceiling laws; 1.87 million hectares of Bhoodan land was similarly distributed. During the last two decades, the total allotment of degraded land, which was under communal use in one form or the other, was between 5 to 6 million hectares. This excludes encroached forest lands which have been allotted to individuals from time to time. This together with progressive degradation of dense forests of the country, which even in the notified forest areas has been reduced to 36.84 million hectares, has resulted in the serious loss of goods and services, particularly environmental, to the country as a whole, and to a major extent to the further impoverishment of the rural poor and tribals who have been so dependent on these resources for their sustenance.

7.4 As far as CPRs are concerned, these are treated as open access resources and being everybody's property little or no management input to secure these areas for common use and sustain their productivity has been made. It is interesting to note here that case studies and analysis of the institutional characterestics relating to common property resource management reveal that less than 10 per cent of the original rules governing CPRs are still in force. Increasingly, most have been used as a resource open to access by all and care for these areas has been characterised by indifference and complete neglect on the part of the villagers. The bulk of management decisions are by-products of other developments, such as factional quarrels in the village, or specific conditions of government grants to the villages. From this perspective, the management or future of CPRs has been tied to their utility to satisfy considerations other

than the intended purposes of CPRs.

7.5 Genuine concern and action to reverse degradation explains only 10 per cent of the efforts to protect the CPR. This could be considerably more if combined with government investments.

7.6 Despite the fact that viable and foolproof management regimes are yet to be evolved for CPRs, a number of institutions have been in existence informally or introduced, often through external intervention, some of which are described, in brief, hereinafter.

7.7 Panchayats are the important institutions involved in the management of CPRs. It is possible that, among other things, the raising of tree and fodder crops and other non-timber forest produce may be entrusted to the Panchayats. Village Forest Committees have been set up by the State Forest Departments in Orissa and other States with a view to associating local people in the management of public lands. Certain studies reveal that these institutions have not progressed beyond the incipient stage. Village woodlots are entrusted to the Committees for protection and management, but they have yet to evolve a mechanism for distribution of the produce of such woodlots.

7.8 Comparatively formal institutions exist in Uttar Pradesh where protection and management of certain forest areas in the hills has been entrusted to Van-Panchayats. In Sivaliks (Haryana), Hill Resource Management Societies have been set up to cater to the needs of certain specific interest groups. Regrettably, it has been largely external agencies which have provided the requisite stimulus in organising these bodies. However, this is not the case in West Bengal, where the Forest Department has set up village protection committees with a view to enlisting the cooperation of the local people in the protection and development of certain earmarked forest areas. These committees consist primarily of the user groups. The members of the committee are permitted to use certain types of forest produce as a consideration for protection and development of the assigned areas. The village protection committees have come up in more than 700 villages during a short span of time.

7.9 Since the concept of ecological security in the interest of the country as a whole has not emerged at the national level and less so at the State, district and panchayat levels, the means of motivating village, block and district authorities to their broader concept and its great advantages to each level has never been considered. These concepts must essentially be based on site specific considerations, involving, therefore, persons with strong ecological convictions and high level conceptual and communication skills to articulate these concerns in ways

in which these will carry conviction with key target groups. To do so merely by promoting short-term self interest, based upon immediate consumption needs, will lead progressively to ecological erosion and ecological concerns being overlooked and increasingly disregarded until these are beyond redemption. Self interest and fulfilment of immediate consumption needs should be focussed on community production programmes, generating basic necessities from predetermined marginal or degraded agricultural lands of little or no ecological significance. This new focus must receive government attention immediately as a matter of the highest priority.

7.10 Internal security, which is synonymous with ecological security and should today be of far graver concern to the country than defence from external aggression, must be ensured if sustainable economic development is to be achieved and ecological bankruptcy and consequently economic bankruptcy is to be avoided. The education of people at large to this end at all levels is fundamental to the achievement of this objective. Experience has shown that the concepts of ecological security are instinctively understood at grass root level. The most difficult to educate are the economic development planners and administrators, who hold the reins of power at the Central and State levels. They are organically conditioned to systems and processes of administration, management and concepts of development that the current dimensions of ecological degradation make outdated and irrelevant. Their re-education, therefore, is of prime importance and a responsibility that the Ministry of Environment and Forests must urgently assume.

7.11 Different types of institutions are involved in the protection and management of certain earmarked public lands. The success of these institutions has varied from region to region. However, the following factors have been found to lead to success:

7.11.1 Areas under management should be comparatively large.

7.11.2 The institutions should represent homogeneous small interest groups with common interests and they should respect traditional social sanctions.

7.11.3 The States should play an important part in protecting the areas and in providing requisite inputs, including financial investment, to improve productivity.

7.11.4 The day to day management and distribution of the produce should be regulated through internally evolved codes and regulations.

7.11.5 There should be security of tenure to the specific user groups.

7.12 After considering various facets and complexities of CPRs, it is felt that:

7.12.1 For all non-forest government lands and community lands, the user groups should be the focal point of management institutions. A triangular arrangement between the users, the Panchayats and the Government should be formulated. Village committees could be formed within the ambit of the Panchayats and entrusted duties and responsibilities for the protection and development of CPRs. The primary function of the Government should be to protect the resource base against over-use and to arrange requisite finances in the initial stages. The Panchayats should act as an intermediary between the user groups and the Government by assuming coordinating and supportive functions.

7.12.2 The Government should commit 25 per cent of the total outlay of rural employment programmes, of whatever forms/shades these be, for the development of CPRs. The produce should not be considered for distribution to outsiders unless the bonafide needs of local user groups are fully satisfied. For the residual produce, the remaining families of the Panchayats should get preference. The Panchayats must be made aware that all net sale proceeds from the produce from CPRs will be theirs, to induce them to safeguard the forest and manage it so that it gives the Panchayats the best return.

7.12.3 The Panchayats should be persuaded to agree to involve the NGOs/Voluntary agencies in the management of CPRs. Such NGOs/Voluntary agencies could prove useful in micro-planning, which should be evolved on the basis of extensive consultations at the Village Panchayat, Block/sub-watershed and District/watershed levels and be based upon the broad ecological parameters determined for State/National levels, of which the district coordinating authority should be fully conversant and be competent to ensure are taken into full account. Micro-level plans should be consolidated to reaffirm that these conform to the predetermined ecological imperatives for the area/region and to make it possible to take a comprehensive overview of the resource base, inputs, outputs and the distribution facilities. Small active local groups, especially of the weaker sections and women, should be encouraged by the Panchayats and the State to take advantage of whatever opportunities, in this context, become available to develop themselves.

7.12.4 The Government should ensure that those dependent on CPRs are not prevented by the managers of such areas to have access to them. This will require strengthening of appropriate policies and the legal base to prevent misappropriation of CPRs, or the goods and services flowing from them, by the more influential and the articulate self serving of the villages. The mechanism for the regulation of use and day to day management should be evolved locally. The people should also be

actively involved in the planning, development and investment/reinvestment processes. Protection of CPRs should be assured by conferring adequate law enforcement powers on the village level committees guarding against infractions in the use of regulations.

7.12.5 Populist programmes like leasing public lands (tree patta schemes) to provide individual usufruct rights of CPR products have not become widely established because these do not provide adequately for the livelihood of the average landless family. Besides these are not expected to bring the poor above the poverty line. Moreover, suitable land is not available to meet the requirements of a significant number of the landless. On the other hand, such schemes are all too often the means for influential individuals to acquire the assigned lands and eventually appropriate them by forced occupation. Tree patta schemes for individual beneficiaries, therefore, do not appear to be the solution to the problem. Group beneficiary schemes may be more workable solution provided that the group undertakes to share the usufruct with the entire village community.

7.12.6 Village and tribal groups, with the exception among the latter of those who are still truly tribal and live in symbiotic relationship with their environment, are almost invariably victims to local political and economic pressures. Those that are, have no alternative but to resort to compromises and adjustments and forego their full rights to secure funds, facilities and other forms of aid. Frequently external agents provoke internal dissensions in organisations or communities of such persons, causing frustration and cynicism in the attitudes of the group members, and consequently stagnation and disintegration of such groups, or are encouraged to indulge in corruption in operating the aid system introduced. This is also due to the absence of a macro-framework in which these local initiatives and external support can be linked and aggregated. The district coordinating authority must take special care to guard against such opportunism and can do so only through a well-informed understanding of formal and informal power structures at local level. Constant and sensitive review and evaluation is essential to ensure that stated objectives are fulfilled.

7.12.7 The ideal policy would be to eventually transfer the management of CPRs to truly representative village level committees after clearly defining what prescriptive rights and informal concessions should be enjoyed by various interest groups within the Panchayats. Simultaneously, careful identification of village level leadership is essential, who can be trained in carrying out the programmes and inculcating in their people an awareness of their rights and responsibilities. Development packages involving investments which produce a reasonably early flow of new benefits should be preferred over the packages involving investments for

higher projected economic benefits in the more distant future.

## 8. INVOLVEMENT OF LOCAL PEOPLE IN THE PROTECTION OF NATIONAL FORESTS.

8.1 With the exception of the true tribal defined by the National Commission of the Scheduled Castes and Scheduled Tribes as primitive tribes, who live virtually a pre-agrarian lifestyle, the rest have in varying degrees been drawn into the mainstream cash economy of the country. Despite the fact that so many of them continue to live in or near the forests, their once deep affinity with their surroundings is progressively diminishing. Their rising levels of aspirations, stimulated by the more affluent sections of their urban countrymen, and the media, as well as vested interests, is encouraging them to assert prescriptive rights to what they increasingly regard as natural resources and commodities available for their personal enjoyment and consumption, and to generate the cash they require to enable them to adopt the lifestyle of their urban exemplars. Their inevitable and growing exploitation of natural forests is quickly leading to the degradation and early elimination of the remaining natural forests, except those that have been brought under close and effective protection. Their essential biomass needs must, without question, continue to be met, but from alternative domestically raised resources; in the case of fuel from the country's available sources of fossil fuels, particularly natural gas now being flared, and what is now allotted to Industry on an unjustified priority basis.

8.2 It is necessary to identify with honesty and great care those communities which truly continue to live in symbiotic relationship with their forest habitat and, therefore, form an integral part of the ecosystem there. Such tribes should be protected from external forces and vested interests which endeavour to exploit them and "civilise" them and therefore alienate them from their surroundings and their symbiotic forest culture. This is not to say that those of them, who wish to do so, should not have the freedom to enjoy the so-called "benefits" of modern life, particularly the younger generations who will, with few and diminishing exceptions, be drawn in this direction in any case. To derive these benefits, however, they should be encouraged and provided the means and incentives to move to villages and towns outside the forest areas, where access to these benefits can really be provided without serious ecological repercussions. This would apply also to the vast majority of the remaining scheduled castes and scheduled tribes, who should have first call on the country's "resources" to ensure their relocation, rehabilitation and absorption in the most congenial manner possible, into the country's socio-economic mainstream.

8.3 The future strategy for the preservation and development of forests in the vicinity of habitations, crucial for sustaining the basic life support systems of the tribal and other rural communities, must take into account issues related to ecological restoration of forest land. Such issues will include rehabilitation of people from the National Parks and Sanctuaries; rehabilitation of families affected by developmental projects; employment and wages; collection, trade and marketing of cultivated non-timber forest produce; leasing of land for the cultivation and supply of produce originating from forests and useful to the local people and village artisans; progressive replacement of Nistar privileges by adequate alternatives developed for urban consumers; livestock improvement programmes; active participation of nearby inhabitants in the protection and restoration of forests motivated by the considerable ecological benefits that flourishing natural forests provide.

8.4 Under the feudal and colonial administration, people were deprived of a major portion of the direct economic benefits of forests while the bulk of such benefits were appropriated by the dominant community. In the post independence era, industry and commerce succeeded in persuading Government to perpetuate these privileges substantially for their own benefit. Until very recent times, the undertanding of the benefits to be derived from the living vegetation was insufficient to influence governmental policy in favour of environmental protection and conservation. The fact that the environmental benefits were far greater in value than the moribund forms represented by the value of its economic products, made no impression on decision makers. Only in recent times have environmental concerns become instrumental in awakening attention to this fact and have been responsible for growing changes in policy, epitomised in the ecological terminology that has found place in all major policy documents of Government, apexing in the National Forest Policy, 1988.

8.5 In recent years, it is being increasingly appreciated that the ecological benefits of forests, though tangible, do not lend themselves to ready interpretation in economic terms and are therefore subjected to merely vague verbal interpretation by those at decision making levels. Consequently, little that is tangible is reflected in practical grassroot terms. The ignorance of economic planners and the bureaucracy, as a whole, of the benefits of restoring the ecological balance and ensuring ecological security is perhaps the major reason for this failure. However, it is remarkable how readily ecological benefits are understood and appreciated at grassroot level, where such understanding is almost instinctive. Explanations and prescriptions for ecological restoration are treated with considerable scepticism at grassroot level by those who have been witness to the scant regard being paid to the promises related to grassroot government intervention, and where

initiated, have not been followed through to a point where the tangible promised benefits have been noticeable, far less achieved.

8.6 Any ecological restoration programme aimed at achieving a measure of ecological security requires, in addition to authoritative protection, the most active, imaginative and evocative extension and public relations long-term programme, carefully tailored to the sensibilities and idiom of the target groups. While the ecological resuscitation of these areas is progressing, local communities must be provided with material assistance to replace those immediate goods and services that they are being deprived access. Ensuring voluntary, indeed enthusiastic willingness to refrain from continuing the use of such areas and preventing such human caused biotic pressures, that had earlier been degrading these areas to continue, is currently referred to as "Social Fencing". This is a critical component of any programme for ecological restoration. The approach and methodology for the successful employment of Social Fencing calls for considerable sociological sensitivities and communication skills, a critical instrument of the tool kit of those charged with the responsibility of organising and implementing ecological restoration programmes.

8.7 After ascertaining the views of various organisations and individuals, the specific measures suggested for adoption for the management of forest areas in the vicinity of habitations are as under:

8.7.1 Local communities should be actively involved in the protection of forests formally and informally. Local institutions should be consulted in the matter of settlement of disputes involving forest land. These would include substitution of Nishtar/privileges by satisfactory alternative resources and other considerations, including replacement of scrub cattle by more productive breeds, establishment of fodder farms and supply of free or concessional fodder and all such other measures necessary that will lead to the removal of human caused biotic pressures from the forest areas to enable rapid natural regeneration to take place through ecological succession. Local communities and individuals, who display exemplary understanding and cooperation in bringing this about for the well-being of all the people in the area/region, should not merely be rewarded but their work and attitude publicised to encourage others to follow their example. This should also be adopted for farmers of marginal lands who are outstandingly successful in achieving high yields in the shortest time possible of fuelwood, fodder and commercial timber. Their continued reward should come from sustained purchasing of their produce by Government and industry at attractive prices.

8.7.2 Tribal and labour cooperatives should be promoted by the proposed "Government Agro-Silvicultural Corporations" and

also by such organisations as Rashtriya Vriksha Mitra Sahayog of the National Dairy Development Board (NDDB), who would be responsible for selecting and developing those individuals from among such cooperatives who display real leadership potential. For the cultivation of marginal agricultural lands purchased and assigned by Government to such cooperatives, they should be granted the net sale proceeds of such produce after all overhead expenditure has been met. During the period land is being developed, statutory minimum wages should invariably be paid to those engaged in the development of the land. The experience of NDDB in five States of the country where tree growers' cooperatives have been set up and the experience elsewhere clearly demonstrated that the rural poor, and there is no reason why this should not apply to tribals, can clearly be organised into effective cooperatives, provided the professional management brought in from outside is imbued with genuine integrity and a strong sense of trusteeship.

8.7.3 As much scientific and technical capability for the development of forest-based produce, on a commercial scale, on marginal agricultural land should be marshalled. The tribal village cooperatives and private farmers should have the option to choose from a wide range of agencies, the ones that will benefit them the most. It is hoped however that the "Government Agro-Silvicultural Corporations" will display the capabilities and characteristics necessary to form the nodal agency to provide technical knowhow in adopting produce growing techniques and in marketing of each particular type of forest produce. Agmarking such produce can reassure the consumer that the final product is not adulterated as is the case with so much processed agricultural produce on the market today. Vigilence by the cooperative society members could be salutory in this respect.

8.7.4 Whatever remaining degraded forest lands exist on the plains, should be made over for rehabilitation of those displaced from the hydrogeographic areas that are to be reforested to buttress ecological security. Such plains lands should, as rapidly as possible, be restored to the highest level of productivity, utilising the special skills and knowledge of the tribal and rural poor and by concentrating upon the cultivation of timber and other forest produce of commercial or potentially commercial value after growing sufficiently for their domestic consumption. Local institutions and NGOs can play an important role in formulating appropriate strategies and suitable plans for such rehabilitation schemes and for marketing of erstwhile forest produce to be grown by such cooperatives. Where necessary, they may also undertake monitoring and evaluation of the work done.

8.7.5 In developing privately-owned marginal agricultural land, land holders should be given financial incentives over long enough period to enable such lands to be brought back to a high level of productivity. The approach

should be to develop bankable propositions to attract institutional financing.

8.7.6 Felling and marketing of trees grown on plains degraded forest and marginal agricultural lands assigned to tribals and the village poor should be permitted without restriction but under the general supervision of the Government and NDDB type cooperatives, so that the interests of members are fully protected. Both such produce as well as the produce from other private marginal agricultural land should be sold and distributed through established government depots in a manner that will ensure not only the best return to the tribal but also that the most deprived sections of the community receive supplies of bare necessities free or at prices they can afford. Since this practice will be open to considerable corruption, careful vigilence will be necessary of those placed in managerial positions who would be entrusted to take the financial decisions involved.

8.7.7 Until commercial supplies of timber and fuelwood become available from marginal agricultural lands, and substitutes to such products are developed in adequate quantities, the public at large must be persuaded to accept the necessity to reduce consumption of wood, timber and other natural biomass, both in rural and urban areas, including housing, fencing of home-steads and agricultural fields and all other traditional uses. Fuelwood should be substituted for fossil fuels, which should be supplied to all communities, accessible by established forms of transport. These and all other measures possible should be taken to rapidly reduce and eliminate pressure on areas performing important ecological functions in which natural biomass plays a crucial role.

8.7.8 Without opening up areas performing important ecological functions for exploitation which will inevitably be the case if for any reason the infrastructure is created, the public distribution system in other areas must be strengthened to operate effectively in the remoter areas. Foodgrain, pulses and all essential needs of the local villages and tribals should be supplied through such systems. Fuelwood, small timber and feed for cattle are essential domestic needs of the local people and should be easily purchased at affordable prices, but in the case of fuelwood and fodder which should hereafter be produced and treated as commodities, should be made available free of cost to those unable to afford the cost of purchase. Wherever efficient tribal institutions exist, these should be employed and district authorities should be responsible for coordinating and ensuring that there is no dearth of supplies.

8.7.9 Extraction or collection of soil, sand, boulders, slates and other minerals from river beds may be permitted under

careful supervision of the irrigation authorities and hydraulic engineers to avoid excessive excavation leading to damaging changes in the configuration of river systems. If unavoidable, such material can be collected by the local people from local sites with the permission of district authorities, but only to meet their bonafide domestic needs. This would not, of course, apply to true tribals living in symbiotic harmony with their surroundings, who would be free to collect their domestic requirements at will. The Forest (Conservation) Act, 1980, and other related legislation would need to be amended accordingly.

8.7.10 Programmes for the development of marginal agricultural plains areas for tribals and rural poor should include cultivation of indigenous medicinal plants, oil-bearing plants and fruit bearing plants and other forest produce that could be used by such people to generate income for themselves by sale through commercial channels as well as for their own use. They should be encouraged and trained in the growing of other forest produce on such land that can further ameliorate their own economic conditions. Proper guidance should be provided to them by local leaders and officials in preparing bankable proposals to obtain institutional financing through the support of the higher State authorities as well as the Central Government.

8.7.11 With the Indian Forest Service assuming their new proposed role and provided with modern equipment and training to carry out their responsibilities efficiently, forest protection should become far more effective and become capable of eliminating all illicit fellings. This will lead rapidly to improving forest cover, and in the near future to the forests achieving climax conditions. A system of cash rewards to foresters as well as others should be instituted for apprehending those engaged in unauthorised extraction of forest produce. All forest based industries presently located in or within the immediate vicinity of National Forests must be removed and no further industries of this nature should be established there.

## 9. STRATEGY FOR THE RESTORATION OF DEGRADED FORESTS.

9.1 One of the important objectives proposed in the National Forest Policy, 1988, is the launching of a massive need-based and time-bound programme for afforestation and tree planting, which it has been suggested should be taken up on all degraded and denuded lands in the country - whether forest or non-forest. In this context, the policy lays special emphasis on fuelwood and fodder development. The policy goes on to propose that such a programme should be implemented on the basis of watershed based micro-plans, on Government as well as private or community lands with people's participation. The policy is at fault in failing to separate the question of supplementing the resources of fuelwood, fodder and timber on the one hand from the overriding need for ecological security.

9.2 Given the present serious degree of ecological degradation, combined with the overwhelming need to meet the fuelwood, fodder and timber requirements of the country, it is clear that in the present situation, and for the foreseeable future, these two objectives are mutually exclusive and therefore call for the assignment of separate land for each purpose. Fuelwood, fodder and timber needs can best be met from private marginal agricultural land using the initiative and private enterprise of the owning farmers, provided adequate financial, marketing and infrastructure support is provided by the Government. Ecological security of the country can only be rationally considered on a regional or at least national basis. Based on the earliest possible restoration of the ecologically climax forests over the maximum possible areas of the hydrogeographic systems of the country, ecological security cannot be achieved by commencing planning this at a micro-level with adverse macro environmental factors unpredictably and suddenly overwhelming all micro-level development works.

9.3 Fortunately, in the vast majority of the degraded hydrogeographic areas of the country, there is considerable remnant endemic root stock and other germplasm which if protected against biotic pressures and if favoured with a short period of favourable climatic conditions, will quickly rejuvenate. If these conditions are supplemented with ecologically compatible restorative work, mainly reseeding, initially with early colonisers/pioneer species endemic to the area, supplemented later with other multistoried endemic species, and avoidance of anything but minimal and strictly essential soil disturbance, these areas will soon be transformed into well vegetated areas capable of performing their full ecological functions. This will provide the necessary ecological security to human habitats on the plains areas, and the agro-economic zones that surround and sustain them. Ecosystems by their very nature, and given minimal human interference, are aggressive and quickly take over areas where human

induced biotic pressures are removed or minimised. All such resurrected area, comprising as is recommended the major hydrogeographic areas of the country, would soon become supplementary refuges for considerable proportion of India's present floral and faunal biodiversity, preserving thereby the country's irreplaceable genetic wealth apart from forming the main buttress against ecological degradation. It would also prevent the inevitable isolation of national parks and sanctuaries into genetic islands surrounded by areas, where development processes inimical to the sustenance of these "islands" would progressively undermine their natural genetic values.

9.4 The support of those living in and around the proposed "National Forests" is critical to the successful enrichment and optimisation of their natural values. Fortunately, the ecological benefits of such values is so readily understood by and explained to these people. It is seldom however communicated effectively since officialdom at all levels is unable to interpret these except in traditional economic terms. The local tribal and village poor have come to realise that these rarely, if ever, will benefit them on an ongoing long-term basis. What is not appreciated by the development planners of the country is that ecological restoration through supporting and strengthening natural regenerative processes will ensure far greater quality and distributive justice than development based upon any contemporary principles and modes of economic development, including the application of virtually all known modern scientific and technological knowledge and skills. This applies as much to India as it does to all Third World countries' rural-based agricultural economies.

9.5 Funding arrangements for reforestation of degraded forests of the hydrogeographic systems should be streamlined to ensure that such programmes do not suffer on account of non-availability of requisite finance. Financial agencies should be identified after careful consideration to avoid making subsequent changes to supplement the funds available from these sources. There must be no ambiguity about the manner in which reforestation programmes are undertaken, and these must be based strictly on criteria that ensures ecological restoration and not through the establishment of economic tree plantations. This will ensure clarity and ease of appraisal in the selection of reforestation projects. With the growing international and national concern for environmental protection, the environmental/ecological benefits and their consequent economic benefits should be clearly brought out in such project proposals so that the selected financial institutions will understand and accept the benefit of providing funding.

9.6 All ecological restoration, silvicultural and silvipastural in all their present range and variety

projects should aim at contributing to the overall ecological security of the country. This will inevitably bring direct and indirect economic benefits to those living in the vicinity of the project areas. All legislation, including the Forest (Conservation) Act, 1980, should strengthen governmental efforts to restore forests as quickly as possible to optimum levels of ecological functioning and nowhere should hamper this work.

9.7 Local institutions should be actively involved in strengthening the role of Government in its efforts to ensure programmes of reforestation work at local level, particularly protection of forest areas that lead progressively to ecological security. Where local expertise exists, it should be employed to develop the production of timber and non-timber forest produce on marginal agricultural lands with encouragement and support by the proposed "Government Agro-Silvicultural Corporations". These Corporations should set up depots of fuelwood and fodder produced from marginal agricultural lands, in consultation with the local people to whom such produce is to be made available so that they are not required to travel long distances to obtain their requirements. This produce should be supplied at costs well within the paying capacity of the local people.

9.8 Government has so far failed to recognise that successful ecological restoration of the hydrogeographical areas set aside as "National Forests" require, as a prerequisite, adequate germplasm of the floral species endemic to each bio-geographic area of the country. This can best be provided by the seed or planting material of these species, systematically collected and stored in seed or germplasm banks located in major centres of these biogeographic areas. The loss of floral biodiversity today is taking place at such a pace that the most urgent action is necessary to save such germplasm before it is lost forever. The surest means of establishing ecological security in these hydrogeographical areas, especially in those areas which have become seriously degraded and now support very little if any vegetation, is to reintroduce the multistoried diverse vegetation that, till recent times, was endemic to such areas. Fortunately, at this present point of time the country still has discrete pockets of natural vegetation endemic to most of the biogeographical regions of the country, which will be invaluable sources from where seed or other plant material can be collected and either used immediately or stored for future use in degraded areas.

9.9 Though it may not be the ideal scientific solution to use the same species of seeds from one provenance for another, the compromise by doing so would be justified on the grounds that in most cases such similar species would stand the greatest chances of germination and survival and would consequently provide the multistoreyed ground cover essential to restore ecological processes and the

ecological functions of these areas, primarily through storing the optimum hydrological regime. This is an area of concern that has been totally overlooked.

9.10 The NWDB set up an Expert Group in March, 1989, to study the existing efforts being made to make available good quality seeds for large scale silviculture and silvipasture activity in the States and to prepare a long-term strategy for seed development for this specific purpose. The Group is expected to make a detailed assessment of the requirements for seeds of trees, grasses, legumes, etc. in view of the future needs and to suggest a strategy and action plan of research and development, including structures, mechanisms and funds needed for this purpose. The Committee's concern must be extended from its limited silviculture/silvipasture concern to a much wider ecological horizon.

9.11 In view of the growing national anxiety at the rapidly deteriorating ecological situation in the country, special attention must be paid to the seed requirements for the prospective country-wide programme for ecological restoration now under consideration. For this, the availability of seed of a considerable range of ecologically compatible multi-storied, diverse species of vegetation, endemic to each biogeographical area of the country, will be critical.

9.12 As is becoming increasingly well understood, ecological security rests squarely on the restoration and maintenance of such natural vegetative cover over a substantial proportion of the degraded tracts of the country. The natural vegetative cover referred to must consist of grasses, shrubs, forbes, lower, middle and top canopy trees. Re-establishing such vegetation will involve the systematic identification of species that once existed in each of the bio-geographical areas, even though many of these species may now no longer exist in some of these tracts. The information required is, it is believed, available in the early Forest Working Plans of most States and from authoritative publications on the flora of India. Having identified the species, it would be then necessary to locate natural forests and other areas that are potential sources of supply of seed and planting material. The biology of each species will need to be carefully studied to determine how the seed should be collected, stored and treated before sowing to ensure maximum germination, and to aid survival.

9.13 What is stated above is admittedly a gross simplification of an extremely complex exercise. However, this becomes essential if effective steps are to be taken to sustain the maximum diversity of the country's existing range of endemic plant species and to utilise them to restore the natural vegetative cover - which are the soundest foundation for the ecological security of the country.

This is an aspect that is now not considered to be of sufficient importance, that would justify the highest priority that it clearly deserves. Ecological security now rates the highest priority in the National Forest Policy, 1988, and therefore justifies the above-mentioned Expert Group's overriding attention. Action along the lines now proposed must be taken on a crisis management basis before the current accelerating extinction of species denies the country the advantage of many of the plant species that still exist, limiting thereby the extent to which the ecological balance can be restored and genetic bio-diversity preserved.

9.14 Optimising natural bio-mass productivity, which should be a major national objective today, requires the maximum endemic bio-diversity. Using the seed and other natural propagating material of endemic species for the purpose, as distinct from employing exotics, is the key to achieving this objective. The kinds of silvicultural/silvipastural/horticultural concerns that are generally expressed are certainly necessary for commercial-cum-economic purposes, but these should not be the responsibility of the Ministry of Environment and Forests, but rather that of the Ministry of Agriculture which it is hoped will shortly become the nodal agency for developing marginal agricultural, as distinct from forest lands, to meet the fuelwood, fodder and timber requirements of the country and to take overall responsibility for Social Forestry and the like.

9.15 The kind of organisation that should assume responsibility for fulfilling the key role for supporting a broad based ecological restoration programme in the country through ensuring the availability of indigenous seed, should be a "Forest Seed Corporation". Such a body should be headed by a senior member of the Forest Service located in the Ministry of Environment and Forests. It should have state-level units which would be responsible for all field based activities, involving the collection, testing, storage and supply of seed an other planting material. This nation-wide activity of the Forest Seed Corporation would include, of course, research and development which would be conducted both at Central and State levels. The Forest Seed Corporation should be conceived to subserve programmes for ecological restoration and germplasma preservation only and NOT that of economic, including commercial interests, whether public or private which would inevitably soon come into conflict with its basic objective.

9.16 The size and scale of operations of this Corporation will be determined by the extent of the proposed "National Forests". Clearly the hydrogeographical area of the country cannot in its entirety be set aside for this purpose. The minimum target the country must set for itself must be that enunciated under the National Forest Policy, 1988, that is, one-third of the total geographical area of the country, which on an empirical

assessment should provide a secure foundation for ecological security. According to the Botanical Survey of India, the total number of vascular plant species is 15,000. There are ten bio-geographical zones in the country, according to the Wildlife Institute of India. These together with other identifiable important parameters should make it possible to determine the size, range and capability of the Corporation's organisational structure that must be set up for this purpose.

9.17 The aforesaid represents only a very tentative outline of a proposal of considerable magnitude and complexity, that is, of ensuring availability of seed of endemic, multi-storied, diverse vegetation for a national ecological restoration programme. A proposal of this nature will have to be analysed in great detail before a clear concept can emerge and a comprehensive proposal formulated.

## 10. INSTITUTIONAL SUPPORT FOR FUELWOOD, FODDER AND TIMBER PRODUCTION ON MARGINAL AGRICULTURAL LANDS.

10.1 It has been estimated elsewhere in this Report that about 10 to 15 million hectares of land would be sufficient to meet the entire demand of commercial and industrial sector. It has been laid down in the 1988 National Forest Policy that forest-based raw material should not be supplied to industries at concessional or subsidised rates. It has also been envisaged in the National Forest Policy, 1988, that forest-based industries should come to an agreement with private marginal agricultural land holders to produce their industrial raw material requirements. Marginally productive agricultural land unsuitable for economic agriculture can be used to meet industrial demand for timber and other non-timber forest produce under arrangements to be evolved through a tie-up between the industry and the growers as is the case with a number of other agriculture-based raw material such as tobacco, sugarcane, cotton, jute and other crops.

10.2 Paper and pulp industry is one of the largest consumers of forest produce such as hardwood, bamboo and grasses. Rainfed or even irrigated land in the range of 2.5 to 5 million hectares is expected to be sufficient to meet the projected raw material demand of the paper and pulp industry between the years 2005 and 2015. Forest-based industries can no longer be allowed to use Government forests for procurement of such raw materials. There are numerous examples of industries successfully inducing private farmers to meet their requirements, and this should hereafter be encouraged to meet the demand for raw material required by the paper industry. Seedlings Farm Projects of WIMCO in the North Indian States are examples worth emulating in this regard. The paper industry must in any event be induced to switch over to the use of

agro-based raw material and within five years at the outside and phase out the use of forest supplied feed stock. Bamboo and most forms of grasses can be readily grown on marginal agricultural land for this purpose.

10.3 Silviculture on private lands can play an equally important role in the production of utility timber for all domestic needs, and provide a very valuable source of income to farmers considering the high prices all forms of timber fetches and is likely to fetch in the future. Fuelwood would be produced as a by-product. Horticulture can also be encouraged for similar purposes in the rural areas as dual purpose cash crops. Silviculture efforts should not be taken to mean merely raising block plantations in private lands. Other models, for example, linear plantations along field bunds, agri-silvicultural pasture practices and tree groves would prove equally useful in reducing the present demand and supply imbalance. Various organisations are involved in programmes to encourage tree farming. Such programmes must be intensified greatly to make them more productive. Suggested measures are as follows:

10.3.1 Tree farming programmes should be encouraged by the State Agricultural Departments through all possible means such as extension, demonstration, mass awakening campaigns, mass communication and particularly through financial incentives. Training and technical know-how and most importantly seed and other form of germ plasm should be readily available to the farmers. Agricultural universities can play a useful role in this respect through their established mechanisms. Various organisations which are active in rural areas, such as voluntary agencies, Mahila Mandals, educational institutions, tree growers' cooperatives, etc. should also be involved in such extension and training activities. A key role in this respect should be assumed by the "Government Agro-Silvicultural Corporations".

10.3.2 In all ecologically sensitive areas and important hydrogeographic systems, however, no tree farming in the accepted sense of the term should be undertaken. Where some artificial planting of endemic vegetation is necessary, including trees, this must aim solely at accelerating the process of ecological succession and restoration. As such, it should be entrusted to the Forest Department as its sole responsibility. The Forest Department should liaise with the State Agricultural Department to ensure that the latter takes up the responsibility of planting fuelwood, fodder and timber on all other unoccupied lands such as unproductive marginal agricultural land, farm bunds, road and railway verges.

10.3.3 The proposed "Government Agro-Silvicultural Corporations" supported by such organisations as Rashtriya Vriksha Mitra Sahayoga set up by the National Dairy Development Board and other voluntary agencies should act as an

interface between the growers and the consumers and industry to facilitate financing and marketing to ensure the best possible returns to the farmer. Arrangements should be made to ensure sustained long-term supply of such produce firstly for domestic consumption and subsequently to industry. If possible, the farmers should be made shareholders in industries to which they supply raw material as in the case of sugar manufacturing cooperatives. New forest-based industries should only be sanctioned in tandem with the growth and availability of such domestic biomass produced on marginal agricultural land.

10.3.4 The pricing policies for forest-based raw material should be so evolved that farmers are assured that all the costs of raising plantations, protection and maintenance would be recovered and a reasonable profit margin would be available to them. Following the National Dairy Development Board pattern, arrangements should be made to ensure immediate payment of sale proceeds to the farmers against supplies and that such proceeds are not withheld for periodic disbursement by the marketing agencies. This will act as an important incentive. The "Government Agro-Silvicultural Corporations" and other organisations can also play a useful role in arranging supplies of seeds, fertilisers, pesticides and farm equipment to farmers at fair costs recoverable from the prices payable to farmers. Supply and demand should be the final arbitrator of the terms of this trade though initially Government and other agencies should purchase at a remunerative price to stimulate production. Concessions on imports of raw material for paper and pulp industry and other forms of wood should be progressively withdrawn to increase demand from indigenous growers and ensure fair market prices for the farmers. The "Government Agro-Silvicultural Corporations" should announce support prices well in advance for the purchase of fuelwood, fodder and timber of different varieties and no purchases should be made at a rate less than such prices.

10.3.5 All adverse legal, administrative and credit restrictions on changes in land-use practices, choice of species and other constraints, which discourage tree farming, that exist, should be removed through suitable amending legislative and administrative measures. However, this should not violate overall parameters for land use to conform to ecological requirements laid down by the Central and State authorities.

10.3.6 Attractive and workable financial packages/credit facilities for tree farming should be evolved by financial institutions to motivate farmers to take up farming of tree crops as land-use practices over long duration of time. Land Development Banks should be asked to provide the maximum assistance by extending credit facilities. The State Governments should take steps to make suitable amendments in the Cooperative Societies Act/Rules so that LDBs extend financial support

even to producers who may not have lands to offer when land is not available for mortgage, as security against loans. If necessary, "Risk Funds" should be created. The existing cumbersome procedure for seeking loans should be simplified.

10.3.7 Every financing and other supporting institutions responsible for generating the production of fuelwood, fodder and timber on agricultural land should engage silviculture/silvipasture experts on their staff. Targets for extending suitable credit facilities for tree and fodder production should be laid down so that financial institutions are required to support the production and marketing of such produce on the same lines as they do for agricultural and horticultural produce. Tree and fodder production should be made one of the important components of the District Credit Plan. Private lands and trust lands should be eligible for grants under the Margin Money Scheme.

10.3.8 The interest rates prescribed by banks for extending credit facilities for projects should be reviewed keeping in view the potential productivity of different agro-climatic zones. NABARD should periodically review differential rates of interest for different regions in the overall ecological interest and should relax its guidelines for refinancing fuelwood, fodder and timber production projects. Also simultaneously efforts should be made to make them commercially viable.

## 11. LEGISLATIVE MEASURES.

11.1 In the words of the Indian Law Institute's Report on "Environment Protection Act - An Agenda for Implementation" - "The absence of effective political will to enforce environmental laws merely creates illusions and mystifications. The laws create an image of social progress which is constantly belied by the every day reality of non-enforcement. Laws which seek to empower the poor very often end up aggravating the powers of the dominant groups. In respect of laws relating to the environment this is particularly true."

11.2 The following are the constitutional provisions binding the executive and the citizen to protect and improve the natural environment:

11.2.1 Article 48A : "Protection and improvement of Environment and safeguarding of forests and Wildlife - The State shall endeavour to protect and improve the environment and safeguard the forests and wildlife of the country".

11.2.2 Article 51A (g) : "Fundamental duties : To protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures".

11.3 The Constitution also empowers the Parliament to legislate on matters related to "Environment". India participated in the UN Conference on Human Environment at Stockholm in 1972 and endorsed the ensuing Declaration. Article 253 of the Constitution read with Entry 13 of the Union List (VII Schedule) refers to implementation of decisions made at any International Conference, Associations or other bodies. The Parliament has already passed the Water (Prevention and Control of Pollution) Act, 1974, the Water (Prevention and Control of Pollution) Cess Act, 1977 and the Air (Prevention and Control of Pollution) Act, 1981, and the Environment (Protection) Act, 1986, under article 253.

11.4 The National Forest Policy, 1988, unfortunately, provides for what in today's context constitutes mutually exclusive and at the present time, in many respects, conflicting objectives, namely both the ecological and economic, especially given the fact that the responsibility for forests was transferred from the Ministry of Agriculture to the Department of Forests and Wildlife (before the Ministry of Environment and Forests was formed), in recognition of the critical environmental role that forests perform. The Ministry of Environment and Forests was set up specifically as a scientific, and not an economic ministry, to administer forests not as a direct economic asset of the country but an ecological one. To a large extent, this is reflected in the National Forest Policy, 1988, but because of the efforts of vested interests and traditional pressure groups, the Ministry of Environment and Forests misguidedly incorporated the economic role when framing the new policy. This anomaly must be corrected forthwith. All formerly forest-based produce must henceforth be considered as domestic biomass, the responsibility for the production of which should revert to the Ministry of Agriculture. If the Ministry of Environment and Forests is to be singleminded and unflinching in the pursuit of its responsibility to act as the watchdog and the environmental conscience keeper of the country and its people, it must under no circumstances be saddled with any economic roles. Also, its environmental role, in which forests perform such a crucial part, must be spelt out far more clearly than is the case in the Environmental Protection Act, 1986.

11.5 The Environmental Protection Act, 1986, must be re-examined and reframed to encompass the whole broad horizon of its responsibilities and should incorporate and supplement the essentially environmental/ecological but NOT ECONOMIC features of all the earlier State and Central Forest Acts. The new Act should also incorporate the essential features of other existing ad hoc legislation relating to protection of land, water and the sustainable use of the life forms these support. All this will call for important constitutional amendments to ensure that the importance of environmental protection, including ecological security, features and is spelt out

adequately as an overriding concern of the nation. It is only when this is done in a manner that reflects the full range of contemporary and foreseeable environmental concerns, can suitable comprehensive legislation be enacted and suitable rules be framed to bring environment to the highest level of governmental priority, that is now necessary, instead of featuring at the subordinate level it does now.

11.6 It is only when there is far wider comprehension and recognition of the full range of environmental concerns confronting the country, and these are spelt out through a detailed study, will these come into far clearer focus, and the Ministry of Environment and Forests able to comprehend the full range of its contemporary responsibilities and organise itself systematically to fulfill these responsibilities. Its present functions have grown during the last eight years largely in response to ad hoc perceptions and pressures rather than a composite overview which it is now possible to visualise. It is against this broad canvass that ecological security and the crucial role of forests in the ecological context can and should be conceived. This is too critical to the socio-economic survival of the country to continue to be left vague or compromised by conflicting objectives. The proposed establishment and role of "National Forests" is crucial to this concern. Within the framework of comprehensive national legislation must complementary state legislation be enacted and appropriate rules framed.

11.7 The Government of India has been contemplating amendment to the Indian Forest Act, 1927, and a committee has been appointed to draft suitable legislation for the entire country. What is important is that the areas to be established as "National Forests" should be clearly defined comprising a minimum of one-third of the total geographical area of the country though ideally as near to the whole of the country's hydrogeographic areas as possible. It is appreciated however that this may not be feasible. The management of this area should aim at ultimately achieving strict protection and restoration to as near endemic ecological climax conditions as possible. The responsibility for achieving this management objective should be that of the Indian Forest Service, which should be burdened with no other responsibilities because of the enormity of the task involved. To fulfill this task alone, the service would need to be greatly strengthened and reoriented through re-training, additional manpower and modern surveillance and protection machinery and equipment. Much closer links would need to be forged with all other law enforcement services of the country, which when necessary must respond to calls for assistence and support from the Indian Forest Service. However, it is hoped that much broader based and intensive environmental awareness programmes that Government should now launch, will quickly enlighten and evoke mass public support to the need for environmental protection and prompt the general

public and local people to come to the aid of the Indian Forest Service in the proposed duties they must now assume. Power for forest survey, resettlements, demarcation, reservation, protection and management should all be well-defined so that the Government can effectively implement the changes proposed in the National Forest Policy, 1988. It is essential that new fuelwood, fodder and timber production and marketing policies should be formulated under the aegis of the Ministry of Agriculture and the power to implement this delegated to Panchayati Raj to reflect the thinking in the devolution of such powers to Panchayati Raj institutions. Future forest legislation should incorporate the following:

11.7.1 Provisions should be made for District/Village Councils and Panchayati Raj institutions to work in close cooperation with the State Forest Service to restore to ecological climax conditions the large tracts of "National Forests" that must be demarcated in the various parts of the country where these should exist, to restore ecological stability. Existing legislation and enforcement is not adequate to ensure protection of these areas. Requisite legislative measures should, therefore, be taken to bring such forest lands into the ambit of forest administration.

11.7.2 Legislation relating to felling of trees falls within the purview of the State Governments. Various States have framed different types of legislation for this purpose. Sometimes such legislation is said to adversely affect the tree plantation and tree farming programmes. A number of Farmers' Action Groups have also agitated against these laws. The Central Government should evolve a model set of rules to be framed under the existing laws to give wide powers to Panchayats as well as to tree growers' cooperatives to make tree growing attractive on non-forest areas. All impediments which appear to cause hardship to citizens in the use of marginal agricultural land for tree growing and thereby create breeding grounds of corruption in the Government or non-Government agencies should be removed by giving the growers the maximum freedom to market such produce in accordance with their own understanding of what brings them the best return. Ecological and environmental role of forests as well as agricultural systems and other forms of land and water use to comply with environmental and ecological imperatives should be clearly enforceable on all non-Government land.

11.7.3 Forest settlement, as prescribed in the existing legislation, involves delays at various stages. In the process not only is forest protection affected but also people are adversely affected. Future legislation for this purpose should ensure that the process of forest settlement is completed without delay. The rights of the individuals as well as the local communities should be studied quickly and in detail in the process of settlement. The Central Government supported by State Governments and local authorities should be made responsible to see that most of the hydrogeographic

areas, which should include all areas upto 300 metres above sea level, and other ecologically fragile plains areas, particularly riparian tracts, are settled as forests. In other areas, panchayats must see that at least one-third of land in each village is constituted as tree and fodder plantations.

11.7.4 Forest legislation should have inbuilt provisions to ensure that the Executive is not empowered to regularise encroachments. Courts like Lok Adalats must see that all public lands are safeguarded. Legislation must have adequate provision to prevent in future areas brought under "National Forests" from being leased to industry or any other agency for the extraction of forest produce. Forest legislation should make overriding provisions for the termination of leases, contracts and such other encumbrances whenever these are desired in the overall interests of the ecological security of the country.

11.7.5 The Forest Act should make it mandatory for the respective State and Union Territory Governments to rescind, after payment of generous compensation, the rights and concessions of the local communities, both rich and poor in the areas demarcated as "National Forests" as well as areas of exceptional ecological fragility.

11.7.6 Legal measures for the protection of forests and wildlife should be made far more stringent than these are at present and these should encompass the "National Forests". But much more important should be to make effective the enforcement mechanism for such measures. This would require suitable rules to be framed, and particularly implemented by the Indian Forest Service against cutting and transit of any vegetation of forest origin from such areas, poaching of wildlife and trade in all articles originating from these forests. Rules and the means of implementation should include mechanisms to effectively prevent the movement of such material across inter-State boundaries, eviction of encroachments; confiscation and forfeiture of tools, equipments and vehicles used for commission of forest offences; stringent rules against any establishment of permanent or portable saw milling, conversion of any products of wild origin and activities likely to lead to undermining the optimum development of natural values of "National Forests".

11.7.7 In shifting cultivation areas, even where rights or ownership are properly defined, arrangements through generous compensation should be made for their resettlement, where such areas fall within "National Forests". There should be a mechanism to ensure that once a particular community has been rehabilitated through permanent resettlement, the area they have vacated should be left to regenerate naturally and through ecologically compatible scientific revegetative processes that accelerate and foreshorten the period required to reach ecological climax conditions.

11.8 Reproduced in Appendix XVI of this Report is Chapter XV - Forests of the Sarkaria Commission Report and excerpts from related Chapter II - Legislative Relations. It is particularly heartening to note that the main thrust of the Sarkaria Commission in regard to forests is by and large so strongly supportive of the underlying concerns and recommendations put forward in this Report. Nevertheless, some comment on the Commission's views and recommendations are necessary.

11.8.1 It is not only "national concerns" that dictate the need for a federal structure with a strong Centre but equally, indeed more so, the dictates of ecological security. Without such a political structure the basis will not exist for a holistic ecological overview to be taken of the country and its organically interlinked ecosystems, and flowing from this to exercise the authority necessary to moderate the insular and parochial demands of regional, State and local interests which, if acceded to would undermine such national ecological structure that remains, thereby aggravating the latent fissiparous tendencies that already exist in the social polity. In this context, the Forest (Conservation) Act, 1980, would, if anything, require strengthening and rigorous enforcement. Since it is very doubtful, with the widespread ecological illiteracy that prevails in the country and the indifference and inefficiency of the administration and law enforcement services, combined with the pervading political corruption, whether the authorities at local level would be able to withstand political and commercial pressures seeking to alienate forest lands and over-exploit the remaining forests.

11.8.2 The Centre has created a nodal organisation to act as the custodian and environmental conscience keeper of the nation - the Ministry of Environment and Forests. This Ministry cannot, however, fulfill its role unless it is structured more purposefully to do so. As stated earlier in the Report, and since the importance of this bears repetition, a major failing has been the neglect to implement a key recommendation of "The Committee for Recommending Legislative Measures and Administrative Machinery for Ensuring Environmental Protection", September, 1980, the report of which has finally led to the formation of the Ministry. The omission is to appoint Environmental Advisors from the Ministry of Environment and Forests to every other Ministry to act as the environmental conscience keepers of the MOE&F, and its eyes and ears, to ensure that overriding environmental concerns are reflected in every Ministry's plans and programmes. This assumes special importance where questions of undermining the ecological role of forests and undertaking measures to establish ecological security are concerned. It was intended that these Environmental Advisors (EA) should participate right from the conceptual stage of development planning of each of the Ministries to which they were posted, to the final formulation of its programmes, schemes and projects. The EAs were to function in a manner similar to that of the Finance Ministry's Financial Advisors posted to each Ministry. This would be the most effective way of

ensuring that the MOE&F's environmental concerns were reflected in the full range of Government's socio-economic responsibilities and activities, and the peoples, which is very far from the case today.

11.8.3 A major recommendation of the current Report is the setting up of NATIONAL FORESTS. The extent and natural (ecological) values of these forests must be considered of vital importance if the country's ecological security is to be rapidly achieved and stabilised. Any development project that transgresses or undermines these natural values must be subjected to the most careful scrutiny. If there is any way of reformulating a project to reduce ecological damage to the very minimum, it must be the bounded duty of those who have conceived the project, to do so. Ecological security must take precedence over all "developmental" concerns, however important, and modifications must be made to ensure conformity with ecological imperatives. Given the determination to do so, it will be found that in most cases, to make such modifications, will be possible. Where additional costs are involved, Government would well be advised to provide for these even at the expense of other sectors. However, the acceptance of such an approach will be possible only if there is genuine appreciation at the highest level and other decision-making levels of the catastophic consequences of the ecological crisis that will be the inevitable sequel to the present accelerating ecological degradation. Unequivocal direction from the highest levels of authority at Central and State levels, accompanied by intensive environmental education, is an essential prerequisite to such purposeful action.

11.8.4 The motto, indeed edict of the entire "development" process, must be festina lente (hasten slowly) until such time as the planners and decision makers of the country understand the overriding importance of ecological security and ensure that this is reflected in the present overall concepts of development.

11.8.5 It appears that the Sarkaria Commission has not appreciated, as so many others have failed or refused to do, including the traditional forester and a number of those in the senior ranks of the Indian Forest Services, that trees alone do not constitute forests and that to "preserve and improve the ecological balance" as the Sarkaria Commission so rightly and unequivocally emphasises, it is essential to recognise that the living <u>forests</u> are of far greater value to the country and its people today than its moribund produce. It is further necessary to recognise that "Social Forestry" does not constitute true afforestation, nor does it lead to the restitution of forests per se. Social Forests constitute merely one of the existing perennial agricultural crops. It is now more important than ever, in the contemporary ecological context, to distinguish between the two and avoid the present continuing confusion that has caused such harm during the last two or three decades through diverting the energies of Forest Department personnel

away from their primary and essential duty, that is, of protecting and preserving the natural values of forests in the larger interests of the ecological and therefore economic security of the country.

## 12. EXTENSION, COMMUNICATION AND CREATING ENVIRONMENTAL CONSCIOUSNESS AND CONCERN.

12.1 Unless there is widespreaad understanding and concern about environmental degradation, particularly at grassroot level, it will be impossible to ensure people's participation in environmental protection in the broadest sense of the term. Their acceptance of the increasingly drastic measures, that are now necessary on a national scale, will never be forthcoming unless people in all parts of the country realise the dire consequences of the growing ecological degradation and the effects this will increasingly have on their lives - individually and collectively.

12.2 Such awareness and concern can only be built up through a carefully designed and well-orchestrated programme launched at national, state and district levels based on a true understanding of the catastrophic consequences of ecological collapse. The conceptual formulation and coordination of programme should be the responsibility of the Ministry of Environment and Forests which must utilise the full range of media available to target every level of society all over the country. A task force for this purpose must be set up at the National level, with supporting units in all states, so that the public is subject to an intensive exposure based upon a realistic and evocative analysis of the way in which ecological degradation is affecting the lives of each and every member of public. Government must carefully integrate into the programme the measures it conceives are necessary to limit and progressively overcome the catastrophic consequences of continued ecological decline. It is hoped that the Government's assessment will be based upon the recommendation put forward in this report highlighting the overriding need for restoring optimum natural forest cover to the hydrogeographic system and explaining the widespread benefits this will soon produce, firstly to the neighbouring communities and then to the nation at large.

12.3 Extension, communication and creating environmental consciousness and concern must therefore be regarded as a very urgent starting point to a national ecological restoration programme that the government may decide to adopt. It must be an ongoing programme of growing intensity if people are to be made amenable to the sacrifices that the nation, through the individual and collective sacrifice that each and everyone must make at this critical point in time if the environmental ameliorative measures advocated in this report are to be

undertaken with the sense of crisis that the ecological situation in the country demands.

## 13. ROLE OF INTERNATIONAL AID ORGANISATIONS.

13.1 Social Forestry was conceived to meet the demand for fuelwood, fodder and small timber for the rural masses and to reduce the pressure on forests. The projects commenced in 1982 and will end in 1991. External donor agencies such as the World Bank, USAID, DANIDA, ODA (UK), SIDA and CIDA participated in this programme. Curretly there are ten externally aided ongoing projects in fourteen States. These projects envisage planting of 12.42 million hectares of Farm Forestry plantations, raising of 0.5 million hectares of village woodlots, 77,600 hectares of strip plantations and rehabilitation of 0.24 million hectares of degraded forest areas. The total cost of these projects runs to over Rs. 99.4 crores. It is claimed that 90 per cent of planting targets were achieved and the survival rate was 50 to 70 per cent. Undoubtedly the biomass generated by these projects added to the total biomass availability in the absence of which there would have been a further drain on the forests. Yet the chief area of success has been plantation of commercial species, like the Euclyptus, which went to meet the demands of industry and construction. With the exception of isolated examples in West Bengal, Tamil Nadu and Andhra Pradesh, the participation of rural masses in raising community woodlots for local self-sufficiency has not been achieved, nor has there been a purposeful thrust towards mitigating the shortages of fuelwood and fodder which would have relieved the pressure on natural forests.

13.2 The reason that international aided social forestry deviated from its original purpose was because development in the Third World has become synonymous with western concepts of sustained development cast in a more insidious form. In turn this implies an assured component of western based aid - technical and/or financial - that inevitably transfers alien modes of economic development and its over-exploitation of natural resources as well as western culture with its ecologically degrading extravagant consumerism, and the need for growing loans to meet the cost of royalties in various forms for the transfer of "modern" technology. This is essentially opportunistic and exploitative of Third World countries.

13.3 Aid, it must always be appreciated, is inevitably linked to the well-being of the countries that finance the international funding agencies. The heart of successful economic and social development lies in the endogenisation of development.

## 14. TECHNOLOGY MISSIONS APPROACH TO "WASTELANDS" DEVELOPMENT - IMPARTING A MANAGEMENT FOCUS!

14.1 Land with its soil, water and associated fauna and flora constitutes the critical resources of the country on which depends the fulfilment of the community's requirements of food, energy and other forms of bio-mass. Between 1951 and 1981, the per capita availability of land declined from 0.9 hectares to 0.5 hectares. The availability of land suitable for cultivation is much less and is likely to decline further to 0.15 hectares per person by the year 2000 due to the increase in population, loss of soil fertility and degradation.

14.2 Optimal utilisation of the available land would essentially require an appropriate land use planning strategy based on factors relating to the limitations of the resources, its productive capabilities and various bio-mass outputs, the ecological spin-off benefits which the country would need for its survival in terms of air, water, forest cover to sustain bio-diversity and the other crucial environmental benefits of food, fibre, commercial plantations, green fodder, fuel, industrial raw material, and all that goes to make for a satisfactory human existence.

14.3 National land use planning has been discussed and advocated for a number of years, to no effect. This is now of over-riding importance. This must be addressed seriously and focussed on the prime objective of maintaining the productivity of the country's eco-system through a series of well-defined protected areas, a nation-wide land use zoning system and regulation of land use. There is need to establish both a National Landuse Commission and a Board to determine and implement overall landuse in the country in which the major concern must be to ensure long-term ecological security - the only foundation on which the sustainable socio-economic development can take place.

14.4 In order to achieve this objective, Government through the Ministry of Agriculture Resolution No. 28-2/90-SC(T) dated February 26, 1983, constituted a two-tier central body, namely, the National Land Board and the National Land Resources Conservation and Development Commission to serve as a policy planning, coordinating and monitoring agency for issues concerning the health and scientific management of the country's land resources. States were also required to set up State Land Use Boards for the purpose of determining and monitoring appropriate land use. Unfortunately, either such State Land Use Boards were not always set up or those that were, failed to function effectively.

14.5 Subsequently, the Government of India superceded this

Central body, vide the Ministry of Environment and Forests Resolution No. 7-22/85-FRY(P) dated May 7, 1985, by appointing a National Landuse and Conservation Board. Under this Resolution, a high-powered National Land Use and Wasteland Development Council was also set up. The Council which continues to exist, but to all intents and purposes is moribund, is the highest policy planning and coordinating agency for all issues concerning the health and scientific management of the country's land resources. It was expected to oversee the work of the National Wastelands Development Board which has now been taken over now by a "National Mission for Wastelands Development" and the National Landuse and Conservation Board which was set up simultaneously. Regrettably, on the basis of certain misconceptions, and probably as a hangover of the past, this latter Board was mistakenly located in and to be serviced by the Ministry of Agriculture and Rural Development, Department of Agriculture and Cooperation. The National Wastelands Development Board was equally mistakenly located in the Ministry of Environment and Forests, Department of Forests and Wildlife, which because of the role and functions envisaged should logically have been located in and serviced by the Ministry of Agriculture.

14.6 The important functions of the National Land Use and Conservation Board were to formulate a national policy and perspective plan on conservation, management and development of land resources of the country, taking into account appropriate landuse, soil capability and other factors; review of the progress of on-going schemes and programmes connected with conservation and development of land resources and the like; coordination of the work of State Landuse Boards; collaboration with the National Wastelands Development Board in matters of common interest; issues related to soil surveys, land assessment, creation of general awareness of problems of proper soil management; liaison with various institutions/agencies in research and development efforts, and other such similar functions. In view of the basic environmental implications involved, all these responsibilities should have logically been the concern of the Ministry of Environment and Forests, under whose guidelines the Board should have functioned.

14.7 The Government of India established the National Wastelands Development Board (NWDB) in May, 1985, primarily to bring under productive use the degraded lands in the country through a massive programme of afforestation and tree planting. The important functions of the NWDB included formulation of perspective plans and programmes for management and development of "wastelands"; identification of "wastelands" in the country; mobilisation of resources for the development of "wastelands" in collaboration with the Central and State Government Departments, agencies, local bodies and voluntary organisations; funding of suitable agencies for "wastelands" development; creation of requisite data base, nurseries, seed banks and other planting material;

promotion of scientific input to the development of "wastelands" including training of requisite manpower.

14.8 The ongoing NWDB programme failed to address the overriding problems of land degradation and deforestation and the growing ecological crisis facing the country nor did its programmes provide the major thrust required for the production of fuelwood and fodder for domestic use laid down in its Charter. A review of the work done under the NWDB programme during the last four years emphasises the need for a more broad-based and multi-disciplinary approach to deal with the serious ecological challenges of land degradation and deforestation that faces the country.

14.9 It should have been apparent to the Government of the day when it conceived NWDB that the major objectives set for it were economic in nature and not ecological. Thus, it would have been appropriate for the Board to be placed in and serviced by the Ministry of Agriculture rather than by the Ministry of Environment. In view of the already serious and growing shortage of fuel, fodder and timber prevailing in the country, the sole objective of the Board should have been to produce these requirements, since neither of the other two institutions constituted under the May 7, 1985, resolution were set up to fulfil this responsibility. If it was tacitly implied that ecological restoration was also the responsibility of NWDB then it was inevitable that the ecological objective would be neglected because of the pressure of demand on it to fulfil its economicfor economic responsibilities. This demand would inevitably lead to the diversion of increasing areas of forest land for economic purposes to the neglect of ecological concerns. Logically these two objectives should have been made the responsibility of two separate institutional structures; ecological being the responsibility of the Ministry of Environment and Forests and the economic being the responsibility of the Ministry of Agriculture.

14.10 What appears to have been overlooked is the reason for the transfer of the responsibility for the management of forests from the Ministry of Agriculture to the Ministry of Environment in 1985. This was because realisation had then dawned on the Government of the overriding ecological role of forests, which was recognised to be far more crucial to the country than the economic. Also the Ministry of Environment and Forests was created as a scientific ministry to act as the Government's watchdog and conscience keeper for the environment of the country and not as an economic ministry. To saddle it with economic responsibility of any description would inevitably be to undermine its central and basic role.

14.11 Instead of correcting its initial error, the Government proceeded to fortify the misconceived "Wastelands" Development Programme by converting it into a Technology

Mission to bring a so-called "management focus" to bear on its operations. Additionally, it was believed that this would also provide a sense of urgency and a qualitative change in its ongoing programmes; integrate financial and institutional resources; accelerate lab-to-land transfer; provide a mechanism for resolution of relevant policy issues and evolve strategies for people's meaningful involvement.

14.12 The overall goals of the Mission are supposed to check land degradation, put wastelands to sustainable use, increase biomass availability, especially fuelwood and fodder and restore ecological balance. In this the past Government was guilty of a grave error of judgement. The whole purpose of a so-called "management focus" and all it was expected to achieve could have been brought about through a greater sense of purpose and direction by the restitution of the former apex body which Government set-up to take care of the environment after the Stockholm Conference of 1972, namely the National Committee on Environmental Planning and Coordination, composed of the Secretaries of all economic and other ministries whose activities impinged directly or indirectly on the environment and headed by the Deputy Chairman of the Planning Commission. To recapitulate briefly, this body was progressively shorn of its authority and responsibilities with the coming into being of the Department of Environment and the growing stature of this Department which felt increasingly threatened and subordinated by this apex body that dictated to it. The NCEPC was therefore converted into the National Committee on Environmental Planning and subsequently into the National Environmental Advisory Committee. This last was systematically neglected largely because of status conflicts between the respective heads of this organisation and the Department of Environment and was therefore left to die an unsung death.

14.13 The Ministry of Environment and Forests, the Department of Forests and Wildlife Resolution of May 7, 1985, also brought into being the high powered National Landuse and Wastelands Development Council with the Prime Minister as the Chairman and the Chief Ministers of all States and Union Territories as Members, with additional Members comprising Ministers/Ministers of State of Central Ministries/Departments of Finance, Agricultural Rural Development, Environment and Forests, Irrigation, Works and Housing, Railways, Industry, Education, the Deputy Chairman of the Planning Commission, the Chairman of the National Landuse and Conservation Board and the Chairman of the National Wastelands Development Board. Because all three bodies were conceived without adequate forethought and planning and were misplaced, they were still-born. Though the National Wastelands Development Board survived for four years, it failed to fulfil its objectives because its basic premises were ill-planned and therefore the institutional structure set up for it and its subsequent direction became fraught with insurmountable problems.

## CONCLUSION

In determining the landuse of the country, the fundamental concern must be to achieve ecological security. This can be brought about by delineating the hydrogeographic systems of the country and ensuring the earliest restoration of ecological climax forests as quickly as possible over a rapidly growing proportion of the area of these systems. This is possible only by systematically eliminating human misuse of these areas by progressively reducing the human habitations there that are today subjecting these areas to growing and devastating ecological pressures. Implementing such a decision will call for measures that will cause enormous anxiety and stress and will therefore arouse great opposition and hostility from both the affluent and poor residents, who have long been established there. Overcoming this will call for statesmanship of the highest order and the utmost ingenuity and resourcefulness on the part of Government at both the Central and State levels.

2. There is, however, no alternative to such an approach if long-term ecological security and concomitant socio-economic development is to be ensured. This may well mean re-enacting the pains of Partition when some 10 million people were uprooted from their native soil. However in this case those involved will be transplanted not so much into an alien but rather into unfamiliar environments. Another major difference will be that the people involved will be aided and supported by a caring and responsible Government, anxious to mitigate human suffering and stress; a Government that will provide the essential creature comforts in the process of transfer and relocation of people to their new environments, and do so in a manner which should enable them to put down roots once again in new, and probably more materially rewarding and stable surroundings.

3. In the gravely stressed environment of today and the limits to human activity that this imposes, the major sacrifices involved in implementing such a decision are unavoidable. A responsible Government with foresight can no longer take the line of least resistance, by deferring timely but drastic action till the full impact of the environmental crisis has descended upon the country because too little was done when it was too late. The major question confronting the Government today is how can the country survive and progressively and sustainably improve the lot and the intrinsic quality of life of its poorest citizens? The answer lies in accepting the fact that the country can only survive as a nation state if equity and social justice prevail and its people accept to live in equilibrium with their environment through sustaining Nature's basic productive processes - the life support systems it provides. The need of the hour is for a Mission-type approach to stem the human tide of ecological destruction, planned and executed by leaders with a strong sense of national concern for the long-term ecological and therefore socio-economic stability of the country.

God, Give us Men!

God Give us Men! A time like this demands

Strong minds, great hearts, true faith and ready hands;

Men, whom the lust of office does not kill;

Men, whom the spoils of office cannot buy;

Men, who possess opinions and a will;

Men, who have honour;

Men, who will not lie.

-- Josiah Gilbert Holland.

No.F.6-5/88-F.P.
Government of India
Ministry of Environment and Forests
Department of Environment, Forests and Wildlife

Paryavaran Bhavan,
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NOTIFICATION

The revised National Forest Policy enunciated in December, 1988, and the amendments to the Forest (Conservation) Act, 1980, also made in December, 1988, have generated considerable discussions in the Parliament and in other fora. In these discussions, the need for better protection and conservation of forests and for ensuring that in implementation, these provisions do not stand in the way of fulfilling the genuine developmental aspirations of the people living in the forest areas has been emphasised. It has been pointed out that the strategy should be aimed at arresting the trend of depletion of forests, ensuring environmental and ecological stability and at ensuring greater security for the livelihood of people especially the rural poor and the tribals.

2. In order to look into these issues and recommend suitable measures, Government hereby set up a committee with the following composition:

| | | |
|---|---|---|
| i) | Shri Duleep Matthai | Chairman |
| ii) | Shri Arvind Netam, M.P. | Member |
| iii) | Shri Simon Tigga, M.P. | Member |
| iv) | Shri P.K. Thungon, M.P. | Member |
| v) | Shri Manikrao Holdya Gavit, M.P. | Member |
| vi) | Shri Swet Hembram, M.L.A. | Member |
| vii) | Shri B.D. Sharma | Member |
| viii) | Shri Brijendra Singh | Member |
| ix) | Shri Naresh Bedi | Member |
| x) | Shrimati Radha Bhatt | Member |
| xi) | Shri Lala Wia | Member |
| xii) | Inspector General of Forests, Ministry of Environment & Forests | Member-Secretary |

3. The terms of reference of the Committee shall be as under:

i) To examine and define, in the national context, the ecological role of forests and the manner in which this should be achieved;

ii) To formulate a conceptual frame-work for forest protection and conservation in the country;

iii) To examine the implementation aspects of the Forest (Conservation) Act, 1980, and the National Forest Policy, 1988, with a view to fulfilling the need for conservation as well as the developmental aspirations of the people, especially those living in and around forest areas;

iv) To propose an implementation strategy and the institutional arrangements including public support systems required for this purpose.

4. The Committee will function with its Headquarters in Delhi and frame its own rules and procedures for functioning. It may visit any area within the country as considered necessary. TA/DA of non-officials would be paid as applicable to Grade I officers of Central Government.

5. The Committee will submit its report within four months from the date of its constitution.

sd/-
(K.M. Chadha)
Joint Secretary to the Government of India

APPENDIX II

Note explaining the objections raised by Shri Arvind Netam and Dr. B.D. Sharma in their letters dated February 7, 1990, and February 8, 1990 :

When the Government of India first decided to set up this Committee in the latter part of 1988, it was primarily intended to study the Ecological Role of Forests and to suggest how this could be ensured and sustained. The Terms of Reference of the Committee were then limited to only (i), (ii) and (iv) of those listed in the Government Notification (Appendix I of this Report). Though the setting up of such a committee was delayed for various reasons, the need for it continued to be of concern to Government. After the tribal "panchas" held a meeting in March 1989, Government finally decided to constitute the Committee adding to the original terms of reference, as the third in order of priority, what in the Government Notification is listed as item (iii). Government also made some revision to the composition of the Committee to accomodate this addition by nominating tribal representatives to the Committee. The terms of reference of the Committee as listed in the Government Notification remained as listed in order of the priorities stated, to ensure that the ecological role of forests should continue to be the Committee's overriding concern.

Despite the Chair's repeated explanations at Committee meetings that Government had set out the terms of reference in the order of priority, the representatives of tribal interests confined their attention largely to the third term of reference. The Chairman repeatedly appealed for members' understanding that the ecological balance of the country was of fundamental concern to the whole Nation and should therefore take precedence over any sectarian interests. Also that in any case the first beneficiaries of true ecological restoration would be the rural poor and tribals, apart from providing the only sound foundation on which the food security of the country of the country could be built.

In responding to the Report in draft form, two members of the Committee representing tribals, Shri Arvind Netam, M.P. and Dr. B.D. Sharma, Commissioner for Scheduled Castes and Scheduled Tribes, placed on record to their unwillingness to be party to the Report unless it was restructured to focus on the special interests of those they represented. The letters of these two members of the Committee to the Chairman follow. Also included are letters received from two other members of the Committee, Shri Naresh Bedi and Shri Brijendra Singh. The Member Secretary, Shri A.G. Oka, has objected to the amendments made by the Chairman to his initial draft as stated in his comments which follow later that with these changes he is unable to accept co-authorship of this Report. No comments from other members have been received. Since it was not possible to secure the desired extension of the term of the Committee to submit its report, as the three dissidents have proposed, nor would this have achieved their purpose without Government first reframing the Committee's terms of reference, the Report is presented and structured in accordance with what was deemed to be Government's wishes and the national interest.

BRIJENDRA SINGH

Member, Standing Committee
Indian Board for Wildlife
Member, Steering Committee
Project Tiger

DELHI
February 12, 1990

Dear Mr. Matthai,

Sub: Draft Report of the Committee on the Ecological Role of Forests and their Protection and Conservation, also meeting the Aspirations of the People living in and around Forest Areas.

Ref: D.O. NO.17-3/89 M.C.

Kindly refer to the above.

I have gone through the draft of the Committee's Report forwarded to me under the above referred to letter.

The draft covers the subjects under the terms of reference in its entirety and brings out the various problems and the related issues in sharp focus.

I am entirely in agreement with the report. Unfortunately for us, as has been underscored in the report, we are now left with only the hard options if further ecological degradation is to be averted and or reversed.

The draft report is a self-contained comprehensive document covering the various facets of the problem at hand. It is now for the government and the political executive to consider the same with the seriousness and objectivity the subject under consideration deserves.

Yours Sincerely,

sd/-

BRIJENDRA SINGH

28, SUNDER NAGAR
NEW DELHI 110 003

Dr. B.D. Sharma

Commissioner for Sch. Castes and Sch. Tribes
West Block 1, Wing 7, 1 Floor
R.K. Puram
New Delhi 110 066

Date 8-2-1990

Dear Shri Matthai,

I have received yesterday the draft report of the Committee sent by the Member Secretary. I have gone through the same with interest. I must place on record my appreciation of the painstaking work which has gone into preparing this document. Your concern for the quality of life of the people and the crisis which the human civilisation is facing in the wake of onslaught of vulgar consumerism is transparent. I must congratulate you for the same.

I may however add that the deep inter-relationship between ecology and people who are directly dependent on the natural resources needs to be brought into greater focus. The tragedy of our system is that it may pick up stray observations which may suit it and overlook those which are not agreeable. The situation at the end of such a "differential action" may be worse than where we began. I am afraid that the report can be interpreted as the plea of excluding the tribals completely from the forests and go in for a fully formal relationship between the two. This, in the present context, will be disastrous.

I have been stating in my brief interventions and also personal discussions that in many areas there is a state of confrontation between tribal and the administration and many areas like South Bastar, Garhchiroli and Adilabad are now outside the authority of State. This has resulted in large-scale deforestation in some pockets which is not in the interest of the tribal, the ecology or the State. The vexed issues of the agricultural lands situated in the forest areas, the human settlements therein some of which have been in existence for many decades and the tribals exclusion from the use of forest which provides bulk of their subsistence will remain largely resolved even after the recommendations are implemented. It may be recalled that it was these issues which were voiced by the tribal panchas from the whole of the country that prompted the Central Government to set up this Committee.

I may also add a procedural point. Any report has its own structure which depends on the central theme which is supposed to be conveyed. Therefore, there has to be a consensus about the central theme before that structure can be built. We did not have an opportunity for arriving at such a consensus in the Committee. As stated above, I am not in agreement with the central theme of the report. Since there is a difference of opinion in relation to the central theme of the report itself, it is not possible to give mere comments and become a party to the report.

It will therefore be necessary that we should discuss the draft in detail in the Committee and arrive at a consensus about the central theme and then rebuild the report with additions, deletions and adaptations, wherever necessary. I can appreciate

the time constraint mentioned by the Member Secretary. Nevertheless, the task assigned to the Committee is so crucial both on human and ecological considerations that some more time will not be out of place. It should be possible for us to prepare a final report by the middle of April. In case this is not possible, it will not be possible for me to be associated with the report of the Committee which may be submitted by you.

With regards,

Yours Sincerely,

sd/-

(P.D. Sharma)

Shri Duleep Matthai
Vice Chairman
National Wasteland Development Board,
81, Lodi Estate,
New Delhi

ARVIND NETAM
Ex-Chairman
Joint Committee on Railways Bill

19, Feroseshah Road
New Delhi 110 001
Phone: 3782233

Dated: 7-2-1990

Dear Shri Matthaiji,

I have just received the draft report of the Committee. I must congratulate you for the analytical framework given in the Report and incisive discussion of the problems. However as you are aware I have been stressing the perceptions of the tribal people on many issues are quite different from the formal stand of others. Therefore, unless they are taken into account fully the analysis and conclusions may be far of the mark. There are a number of major issues discussed in the draft on which there are basic differences which will require reconsideration.

Even though we have had a number of sittings of the Committee, we did not have the opportunity of discussing even the outline of the major recommendations. Now that the draft is ready, which gives us the basis on which we can discuss, I feel that the report cannot be finalised before we meet and consider the same item by item which will require more than one sitting. You may therefore, request the Government of India to extend the date for its final submission. In case this is not possible I will not like to be a party to this report.

With regards

Yours Sincerely,

sd/-

(Arvind Netam)

Shri Duleep Matthai
Vice-Chairman,
National Wasteland Development Board,
81, Lodi Estate,
New Delhi

NARESH BEDI
T.V. Film Producers, Photo Journalists, Wildlife Photographers
L 6 Rajouri Garden,
New Delhi 110 027, India
Phone: 592950, 5430850

13th February 1990

Shri Dileep Matthai
Chairman
National Forest Policy Committee
Paryavaran Bhawan, C.G.O. Complex
Lodi Road, New Delhi 110 003

Dear Shri Matthai,

I have received the draft of the report of the Committee sent to me by the I.G. Forests under cover of his letter D.O. 17-3/89/MC of 2.2.1990.

In the course of my profession I travel the length and breadth of the country and have trained my eyes to see and then to interpret what I see through my medium. Of India's bio-diversity the pretty and the glamourous aspects of my work is what the urban public gets to see. They do not come face to face with degradation and destruction, desertification and destitution which too I get to see and record; and because I record, the steady deterioration over the last few decades is vividly brought home. These aspects are all too often not a living reality even to those who are responsible for the environment and forests because they remain all too long ensconced in their offices in the urban and metropolitan centres.

For the first time in an official report of the Government, I observe the pain and reality of "what is happening out there" brought into clear focus. We have worked together several meetings of the Committee to bring this about, and I must congratulate you for putting it all together in such a lucid manner, through the vast research which has gone into the framing of this report. While unequivocally endorsing what the report states and the ways in which it is stated I must ask the question, how soon will the recommendations be implemented? I have, in the past, seen many reports, some of them quite good, gathering dust. I can only hope and pray that this does not happen to the report of our Committee.

With kind regards,

Yours Sincerely,

sd/-

(NARESH BEDI)

Comments on the English copy have been received from Dr. B.D. Sharma, Shri Arvind Netam, Shri Brijendra Singh and Shri Naresh Bedi. These comments are of mixed nature. The first two members want further time to examine and comment on the report and also want to discuss it in a meeting before the Committee's report is finalised. Comments from the other members, some of whom are MPs, are still awaited. The report should ultimately look like a Committee's report and should later not result in undue criticism in the major fora including the Parliament. This is particularly important as MPs are also involved in the Committee as members. I too find that the Chairman has taken considerable liberty in adding his own personal views. The report as received from the Chairman is at great variance with the draft chapters furnished to the Chairman by me. It is, therefore, not possible for me to accept the authorship of the report in its present form. In case, you desire to submit the report to the Minister of State in the present form, in all fairness, kindly incorporate the views of the various members including mine as given above for the information of the MOS.

sd/-

(A.G. Oka)
February 21, 1990.

Chairman of the Matthai Committee.

APPENDIX III

TOPOGRAPHICAL FEATURES OF INDIA

| | Area in sq.km. |
|---|---|
| (1) Total land mass of India including Sikkim | 3,287,263 |
| (2) The area situated above a height of 300 metres from m.s.l. | 1,852,201 |

The Deccan Plateau is in five Southern States.
The area above 300 metres in these States is as follows:

| | |
|---|---|
| Maharashtra | 246,362 |
| Karnataka | 175,273 |
| Andhra Pradesh | 142,100 |
| Tamil Nadu and Pondicherry | 46,000 |
| Kerala | 13,800 |
| Total | 623,535 |

MAJOR ALTITUDE ZONES
By Regions and States
(Area in Km.)

| Region and State | Plains below 300 m. | Plateaus 300-1,000 m. | Hills 300-2,000 m. | Mountains 2,000-6,000 m. and above | Total Area sq. km. |
|---|---|---|---|---|---|
| WESTERN HIMALAYAS | | | | | |
| Jammu and Kashmir | 6,150 | 90,000 | 13,800 | 112,286 | 222,236 |
| Himachal Pradesh | -- | 1,350 | 18,900 | 35,423 | 55,673 |
| EASTERN HIMALAYAS | | | | | |
| Sikkim | -- | 1,000 | 2,000 | 4,299 | 7,299 |
| Arunachal Pradesh | -- | -- | 24,427 | 59,151 | 83,578 |
| GREAT PLAINS | | | | | |
| Indus Plain | | | | | |
| Punjab | 49,893 | -- | 469 | -- | 50,362 |
| Haryana & Chandigarh | 43,872 | -- | 464 | -- | 44,336 |
| GANGA PLAINS | | | | | |
| Uttar Pradesh & Delhi (1) | 206,985 | 29,225 | 8,438 | 51,250 | 295,898 |
| Bihar (2) | 110,250 | 44,500 | 19,126 | -- | 173,876 |
| West Bengal (3) | 74,893 | 9,960 | 1,000 | 2,000 | 87,853 |
| BRAHMAPUTRA PLAINS | | | | | |
| Assam (4) | 63,301 | -- | 15,222 | -- | 78,523 |
| CENTRAL HIGHLAND | | | | | |
| Madhya Pradesh | 62,550 | 289,541 | 90,750 | -- | 442,841 |
| Orissa (6) | 93,982 | 46,000 | 15,000 | -- | 155,782 |
| WESTERN ARID & SEMI-ARID | | | | | |
| Rajasthan | 205,464 | 94,250 | 42,500 | -- | 342,214 |
| Gujarat | 167,484 | 19,200 | 9,300 | -- | 195,984 |
| NORTH DECCAN PLATEAU | | | | | |
| Maharashtra & | | | | | |
| 2 Union Territories | 65,804 | 152,012 | 94,250 | -- | 312,066 |
| SOUTH DECCAN PLATEAU | | | | | |
| Karnataka | 16,500 | 146,023 | 29,250 | -- | 191,773 |
| Andhra Pradesh | 134,714 | 108,000 | 34,100 | -- | 276,814 |
| Tamil Nadu & Pondicherry (6) | 84,549 | 19,500 | 21,700 | 4,800 | 130,549 |
| Kerala | 25,064 | 9,750 | 4,050 | -- | 38,864 |
| NORTH-EASTERN HIGHLANDS | | | | | |
| Manipur | 2,500 | 8,000 | 11,856 | -- | 22,356 |
| Tripura | 7,027 | 1,950 | 1,500 | | 10,477 |
| Nagaland | 2,550 | 2,400 | 7,827 | 3,750 | 16,527 |
| Mizoram | 1,500 | 15,387 | 4,200 | -- | 21,087 |
| Meghalaya | 5,550 | 4,050 | 12,889 | -- | 22,489 |
| Andaman & Nicobar Islands | 4,962 | -- | 3,331 | -- | 8,293 |
| INDIA | 1,435,576 | 1,092,893 | 486,349 | 272,959 | 3,287,782 |

(1) Includes Uttarakhand of the Himalayas & North-Eastern hilly area of Madhya Pradesh
(2) Includes Chhotanagpur plateau
(3) Includes Darjeeling Himalayas and hills and plateaus of South-West Bengal
(4) Includes hills adjoining the Brahmaputra valley
(5) Includes coastal plains
(6) Includes Nilgiri hills

Source: S.P. Chatterjee
Economic Geography of Asia

Data obtained from :
Dr. P. Nag
Deputy Director
Government of India
National Atlas and Thematic Mapping Organisation
Dept. of Science & Technolog
Calcutta 700 019

ANNEXURE IV

No. 3-1/86-FP
MINISTRY OF ENVIRONMENT AND FORESTS
(Department of Environment, Forests & Wildlife)

Paryavaran Bhawan, CGO Complex,
Lodi Road, New Delhi-110 003.

Dated the 7th December, 1988.

RESOLUTION

NATIONAL FOREST POLICY, 1988.

1. PREAMBLE.

1.1 In Resolution No. 13/52/F, dated the 12th May, 1952, the Government of India in the erstwhile Ministry of Food and Agriculture enunciated a Forest Policy to be followed in the management of State Forests in the country. However, over the years, forests in the country have suffered serious depletion. This is attributable to relentless pressures arising from ever-increasing demand for fuelwood, fodder aand timber; inadequacy of protection measures; diversion of forest lands to non-forest uses without ensuring compensatory afforestation and essential environmental safeguards; and the tendency to look upon forests as revenue earning resource. The need to review the situation and to evolve, for the future, a new strategy of forest conservation has become imperative. Conservation includes preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment. It has thus become necessary to review and revise the National Forest Policy.

2. BASIC OBJECTIVES.

2.1 The basic objectives that should govern the National Forest Policy are the following:-

- Maintenance of environmental stability through preservation and, where necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forests of the country.

- Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, which represent the remarkable biological diversity and genetic resources of the country.

- Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and droughts and for the retardation of siltation of reservoirs.

- Checking the extension of sand-dunes in the desert areas of Rajasthan and along the coastal tracts.

- Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programmes, especially on all denuded, degraded and unproductive lands.

- Meeting the requirements of fuelwood, fodder minor forest produce and small timber of the rural and tribal populations.

- Increasing the productivity of forests to meet essential national needs.

- Encouraging efficient utilisation of forest produce and maximising substitution of wood.

- Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimise pressure on existing forests.

2.2 The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which are vital for sustenance of all lifeforms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim.

3. ESSENTIALS OF FOREST MANAGEMENT.

3.1 Existing forests and forest lands should be fully protected and their productivity improved. Forests and vegetal cover should be increased rapidly on hill slopes, in catchment areas of rivers, lakes and reservoirs and ocean shores and on semi-arid, arid and desert tracts.

3.2 Diversion of good and productive agricultural lands to forestry should be discouraged in view of the need for increased food production.

3.3 For the conservation of total biological diversity, the network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately.

3.4 Provision of sufficient fodder, fuel and pasture, specially in areas adjoining forest, is necessary in order to prevent depletion of forests beyond the sustainable limit. Since fuelwood continues to be the predominant source of energy in rural areas, the programme of afforestation should be intensified with special emphasis on augmenting fuelwood production to meet the requirement of the rural people.

3.5 Minor forest produce provides sustenance to tribal population and to other communities residing in and around the

forests. Such produce should be protected, improved and their production enhanced with due regard to generation of employment and income.

## 4. STRATEGY.

### 4.1 Area under Forests.

The national goal should be to have a minimum of one-third of the total land area of the country under forest or tree cover. In the hills and in mountainous regions, the aim should be to maintain two-third of the area under such cover in order to prevent erosion and land degradation and to ensure the stability of the fragile eco-system.

### 4.2 Afforestation, Social Forestry & Farm Forestry.

4.2.1 A massive need-based and time-bound programme of afforestation and tree planting, with particular emphasis on fuelwood and fodder development, on all degraded and denuded lands in the country, whether forest or non-forest land, is a national imperative.

4.2.2 It is necessary to encourage the planting of trees alongside of roads, railway lines, rivers and streams and canals, and on other unutilised lands under State/corporate, institutional or private ownership. Green belts should be raised in urban/industrial areas as well as in arid tracts. Such a programme will help to check erosion and desertification as well as improve the micro-climate.

4.2.3 Village and community lands, including those on foreshores and environs of tanks, not required for other productive uses, should be taken up for the development of tree crops and fodder resources. Technical assistance and other inputs necessary for initiating such programmes should be provided by the Government. The revenues generated through such programmes should belong to the panchayats where the lands are vested in them; in all other cases, such revenues should be shared with the local communities in order to provide an incentive to them. The vesting, in individuals, particularly from the weaker sections (such as landless labour, small and marginal farmers, scheduled castes, tribals, women) of certain ownership rights over trees, could be considered, subject to appropriate regulations; beneficiaries would be entitled to usufruct and would in turn be responsible for their security and maintenance.

4.2.4 Land laws should be so modified wherever necessary so as to facilitate and motivate individuals and institutions to undertake tree-farming and grow fodder plants, grasses and legumes on their own land. Wherever possible, degraded lands should be made available for this purpose either on lease or on the basis of a tree-patta scheme. Such leasing of the land should be subject to the land grant rules and land ceiling laws. Steps necessary to encourage them to do so must be taken. Appropriate

regulations should govern the felling of trees on private holdings.

4.3. Management of State Forests.

4.3.1 Schemes and projects which interfere with forests that clothe steep slopes, catchments of rivers, lakes, and reservoirs, geologically unstable terrain and such other ecologically sensitive areas should be severely restricted. Tropical rain/moist forests, particularly in areas like Arunachal Pradesh, Kerala, Andaman & Nicobar Islands, should be totally safeguarded.

4.3.2 No forest should be permitted to be worked without the Government having approved the management plan, which should be in a prescribed format and in keeping with the National Forest Policy. The Central Government should issue necessary guidelines to the State Governments in this regard and monitor compliance.

4.3.3 In order to meet the growing needs for essential goods and services which the forests provide, it is necessary to enhance forest cover and productivity of the forests through the application of scientific and technical inputs. Production forestry programmes, while aiming at enhancing the forest cover in the country, and meeting national needs, should also be oriented to narrowing, by the turn of the century, the increasing gap between demand and supply of fuelwood. No such programme, however, should entail clear-felling of adequately stocked natural forests. Nor should exotic species be introduced through public or private sources, unless long-term scientific trials undertaken by specialists in ecology, forestry and agriculture have established that they are suitable and have no adverse impact on native vegetation and environment.

4.3.4 Rights and Concessions.

4.3.4.1 The rights and concessions, including grazing, should always remain related to the carrying capacity of forests. The capacity itself should be optimised by increased investment, silvicultural research and development of the area. Stall-feeding of cattle should be encouraged. The requirements of the community, which cannot be met by the rights and concessions so determined, should be met by development of social forestry outside the reserved forests.

4.3.4.2 The holders of customary rights and concessions in forest areas should be motivated to identify themselves with the protection and development of forests from which they derive benefits. The rights and concessions from forests should primarily be for the bonafide use of the communities living within and around forest areas, specially the tribals.

4.3.4.3 The life of tribals and other poor living within and near forests revolves around forests. The rights and concessions enjoyed by them should be fully protected. Their domestic requirements of fuelwood, fodder, minor forest produce and

construction timber should be the first charge on forest produce. These and substitute materials should be made available through conveniently located depots at reasonable prices.

4.3.4.4 Similar consideration should be given to scheduled castes and other poor living near forests. However, the area, which such consideration should cover, would be determined by the carrying capacity of the forests.

4.3.5 Wood is in short supply. The long-term solution for meeting the existing gap lies in increasing the productivity of forests, but to relieve the existing pressure on forests for the demands of railway sleepers, construction industry (particularly in the public sector), furniture and panelling, mine-pit props, paper and paper board etc. substitution of wood needs to be taken recourse to. Similarly, on the front of domestic energy, fuelwood needs to be substituted as far as practicable with alternate sources like bio-gas, LPG and solar energy. Fuel-efficient "Chulhas" as a measure of conservation of fuelwood need to be popularised in rural areas.

4.4 Diversion of Forest Lands for Non-forest purposes.

4.4.1 Forest land or land with tree cover should not be treated merely as a resource readily available to be utilised for various projects and programmes, but as a national asset which requires to be properly safeguarded for providing sustained benefits to the entire community. Diversion of forest land for any non-forest purpose should be subject to the most careful examinations by specialists from the standpoint of social and environmental costs and benefits. Construction of dams and reservoirs, mining and industrial development and expansion of agriculture should be consistent with the needs for conservation of trees and forests. Projects which involve such diversion should at least provide in their investment budget, funds for regeneration/compensatory afforestation.

4.4.2 Beneficiaries who are allowed mining and quarrying in forest land and in land covered by trees should be required to repair and re-vegetate the area in accordance with established forestry practices. No mining lease should be granted to any party, private or public, without a proper mine management plan apraised from the environmental angle and enforced by adequate machinery.

4.5 Wildlife Conservation.

Forest Management should take special care of the needs of wildlife conservation, and forest management plans should include prescriptions for this purpose. It is specially essential to provide for "corridors" linking the protected areas in order to maintain genetic continuity between artificially separated sub-sections of migrant wildlife.

4.6 Tribal People and Forests.

Having regard to the symbiotic relationship between the tribal people and forests, a primary task of all agencies responsible for forest management, including the forest development corporations should be to associate the tribal people closely in the protection, regeneration and development of forests as well as to provide gainful employment to people living in and around the forest. While safeguarding the customary rights and interests of such people, forestry programmes should pay special attention to the following:

- One of the major causes for degradation of forest land is illegal cutting and removal by contractors and their labour. In order to put an end to this practice, contractors should be replaced by institutions such as tribal cooperatives, labour cooperatives, government corporations, etc. as early as possible;

- Protection, regeneration and optimum collection of minor forest produce along with institutional arrangements for the marketing of such produce;

- Development of forest villages on par with revenue villages;

- Family oriented schemes for improving the status of the tribal beneficiaries; and

- Undertaking integrated area development programmes to meet the needs of the tribal economy in and around the forest areas, including the provision of alternative sources of domestic energy on a subsidised basis, to reduce pressure on the existing forest areas.

4.7 Shifting Cultivation.

Shifting cultivation is affecting the environment and productivity of land adversely. Alternative avenues of income, suitably harmonised with the right landuse practices, should be devised to discourage shifting cultivation. Efforts should be made to contain such cultivation within the area already affected, by propagating improved agricultural practices. Area already damaged by such cultivation should be rehabilitated through social forestry and energy plantations.

4.8 Damage to Forests from Encroachments, Fires and Grazing.

4.8.1 Encroachment on forest lands has been on the increase. This trend has to be arrested and effective action taken to prevent its continuance. There should be no regularisation of existing encroachments.

4.8.2 The incidence of forest fires in the country is high. Standing trees and fodder are destroyed on a large scale and natural regeneration annihilated by such fires. Special precautions should be taken during the fire season. Improved and modern management practices should be adopted to deal with forest fires.

4.8.3 Grazing in forest areas should be regulated with the involvement of the community. Special conservation areas, young plantations and regeneration areas should be fully protected. Grazing and browsing in forest areas need to be controlled. Adequate grazing fees should be levied to discourage people in forest areas from maintaining large herds of non-essential livestock.

4.9 Forest-based Industries.

The main considerations governing the establishment of forest-based industries and supply of raw material to them should be as follows:

- As far as possible, a forest-based industry should raise the raw material needed for meeting its own requirements, preferably by establishment of a direct relationship between the factory and the individuals who can grow the raw material by supporting the individuals with inputs including credit, constant technical advice and finally harvesting and transport services.

- No forest-based enterprise, except that at the village or cottage level, should be permitted in the future unless it has been first cleared after a careful scrutiny with regard to assured availability of raw material. In any case, the fuel, fodder and timber requirements of the local population should not be sacrificed for this purpose.

- Forest-based industries must not only provide employment to local people on priority but also involve them fully in raising trees and raw material.

- Natural forests serve as a gene pool resource and help to maintain ecological balance. Such forests will not, therefore, be made available to industries for undertaking plantation and for any other activities.

- Farmers, particularly small and marginal farmers, would be encouraged to grow, on marginal/degraded lands available with them, wood species required for industries. These may also be grown along with fuel and fodder species on community lands not required for pasture purposes, and by Forest departments/corporations on degraded forests, not earmarked for natural regeneration.

- The practice of supply of forest produce to industry at concessional prices should cease. Industry should be encouraged to use alternative raw materials. Import of wood and wood products should be liberalised.

- The above considerations will, however, be subject to the current policy relating to land ceiling and land-laws.

4.10 Forest Extension.

Forest conservation programme cannot succeed without the willing support and cooperation of the people. It is essential, therefore, to inculcate in the people, a direct interest in forests, their development and conservation, and to make them conscious of the value of trees, wildlife and nature in general. This can be achieved through the involvement of educational institutions, right from the primary stage. Farmers and interested people should be provided opportunities through institutions like Krishi Vigyan Kendras, Trainers' Training Centres to learn agri-silvicultural and silvicultural techniques to ensure optimum use of their land and water resources. Short-term extension courses and lectures should be organised in order to educate farmers. For this purpose, it is essential that suitable programmes are propagated through mass media, audio-visual aids and the extension machinery.

4.11 Forestry Education.

Forestry should be recognized both as a scientific discipline as well as a profession. Agriculture universities and institutions dedicated to the development of forestry education should formulate curricula and courses for imparting academic education and promoting post-graduate research and professional excellence, keeping in view the manpower needs of the country. Academic and professional qualifications in forestry should be kept in view for recruitment to the Indian Forest Service and the State Forest Service. Specialised and orientation courses for developing better management skills by in-service training need to be encouraged, taking into account the latest development in forestry and related disciplines.

4.12 Forestry Research.

With the increasing recognition of the importance of forests for environmental health, energy and employment, emphasis must be laid on scientific forestry reseach, necessitating adequate strengthening of the research base as well as new priorities for action. Some broad priority areas of research and development needing special attention are:

(i) Increasing the productivity of wood and other forest produce per unit of area per unit time by the application of modern scientific and technological methods.

(ii) Revegetation of barren/marginal/waste/mined lands and watershed areas.

(iii) Effective conservation and management of existing forest resources (mainly natural forest eco-systems).

(iv) Research related to social forestry for rural/tribal development.

(v) Development of substitutes to replace wood and wood products.

(vi) Research related to wildlife and management of national parks and sanctuaries.

4.13 Personnel Management.

Government policies in personnel management for professional foresters and forest scientists should aim at enhancing their professional competence and status and attracting and retaining qualified and motivated personnel, keeping in view particularly the arduous nature of duties they have to perform, often in remote and inhospitable places.

4.14 Forest Survey and Data Base.

Inadequacy of data regarding forest resources is a matter of concern because this creates a false sense of complacency. Priority needs to be accorded to completing the survey of forest resources in the country on scientific lines and to updating information. For this purpose, periodical collection, collation and publication of reliable data on relevant aspects of forest management needs to be improved with recourse to modern technology and equipment.

4.15 Legal Support and Infrastructure Development.

Appropriate legislation should be undertaken, supported by adequate infrastructure, at the Centre and State levels in order to implement the policy effectively.

4.16 Financial Support for Forestry.

The objectives of this revised Policy cannot be achieved without the investment of financial and other resources on a substantial scale. Such investment is indeed fully justified considering the contribution of forests in maintaining essential ecological processes and life-support systems and in preserving genetic diversity. Forests should not be looked upon as a source of revenue. Forests are a renewable natural resource. They are a national asset to be protected and enhanced for the well-being of the people and the Nation.

APPENDIX V

MINISTRY OF FOOD AND AGRICULTURE

RESOLUTION

Agriculture

New Delhi, the 12th May, 1952

# NATIONAL FOREST POLICY.

Introduction:

No. 13-1/52-F:- In their resolution NO. 22-F, dated the 19th October, 1894, the Government of India in the late Department of Revenue and Agriculture enunciated in broad outlines the general policy to be followed in the management of State forests in the country. During the interval that has since elapsed, developments of far-reaching importance have taken place in the economic and political fields. The part played by forests in maintaining the physical conditions in the country has come to be better understood. The country has passed through two World Wars which disclosed unsuspected dependence of defence on forests. The reconstruction schemes, such as river-valley projects, development of industries and communications, lean heavily on the produce of forests.

2. While the fundamental concepts underlying the existing forest policy still hold good, the Government of India consider that the need has now arisen for a re-orientation of the forest policy in the light of the changes which have taken place since it was enunciated.

3. Vital National Needs - The National Forest Policy of India is formulated on the basis of six paramount needs of the country, namely:

(1) the need for evolving a system of balanced and complementary land-use, under which each type of land is allotted to that form of use under which it would produce most and deteriorate least;

(2) the need for checking:

(a) denudation in mountainous regions, on which depends the perennial water supply of the river system whose basins constitute the fertile core of the country;

(b) the erosion progressing apace along the treeless banks of the great rivers leading to ravine formation, and on vast stretches of undulating wastelands depriving the adjoining fields of their fertility;

(c) the invasion of sea-sands on coastal tracts, and the shifting of sand-dunes, more particularly in the Rajputana desert;

(3) the need for establishing treelands, wherever possible, for the amelioration of physical and climatic conditions promoting the general well being of the people;

(4) the need for ensuring progressively increasing supplies of grazing, small wood for agricultural implements, and in particular of firewood to release the cattledung for manure to step up food production;

(5) the need for sustained supply of timber and other forest produce required for defence, communications and industry;

(6) the need for the realisation of the maximum annual revenue in perpetuity consistent with the fulfilment of the needs enumerated above.

These vital needs indicate the functions forests are to fulfil, and provide the fundamental basis of the policy governing their future.

4. Functional Classification of Forests. - Having regard to the functions aforestated, the forests of India, whether State or privately owned, may be conveniently classified as follows:

(a) Protection forests, i.e., those forests which must be preserved or created for physical and climatic considerations;

(b) National forests, i.e., those which have to be maintained and managed to meet the needs of defence, communications, industry and other general purposes of public importance;

(c) Village forests, i.e., those which have to be maintained to provide firewood to release cowdung for manure, and to yield small timber for agricultural implements and other forest produce for local requirements, and to provide grazing for cattle;

(d) Tree-lands, i.e., those areas which though outside the scope of the ordinary forest management are essential for the amelioration of the physical conditions of the country.

This classification is merely illustrative and is by no means mutually exclusive. In fact every forest performs more than one function, and has, therefore, to be so managed as to achieve the highest efficiency in respect of the chief functions assigned to it. This functional classification has also no bearing on the classification of forests distinguished in the Indian Forest Act XVI of 1927, which is based on the degree of control exercisable in them.

5. Necessity of Classification. - This broad functional classification of forests is necessary to focus attention on the kind and object of management necessary in each case. Every sizeable forest, whatever its composition, location, or category, serves both a protective and a productive purpose, and in its

utility may be of local, regional, or national significance. The fact, however, must be realised that the country as a whole has a vast stake in the conservation of all forests, irrespective of their functions and ownership, and, therefore, all of them should be administered from the point of view of national well-being.

6. Two Possible Considerations. - Two considerations, plausible, no doubt, at first sight, but, if given undue weight to, destructive of national well-being in the long run, should be combated. They are:

(1) Neighbouring areas are entitled to a prior claim over a forest and its produce.

(2) Agricultural requirement has a preferential claim over forest lands.

7. Claims of Neighbouring Communities. - Village communities in the neighbourhood of a forest will naturally make greater use of its products for the satisfaction of their domestic and agricultural needs. Such use, however, should in no event be permitted at the cost of national interests. The accident of a village being situated close to a forest does not prejudice the right of the country as a whole to receive the benefits of a national asset. The scientific conservation of a forest inevitably involves the regulation of rights and the restriction of the privileges of user, depending upon the value and importance of the forest, however irksome such restraint may be to the neighbouring areas. The Himalayan forests, for instance, are the greatest of national assets; to them we owe the richness of the country. The denudation and under-development of the Himalayan slopes leads to greater intensity and frequency of floods, recurrent erosion, and to coarse detritus being deposited on the fertile submontane tracts. This process inflicts immeasurable loss and misery on the unsuspecting millions in the Indo-Gangetic Plain, and brings about a progressive and permanent impairment of soil fertility, and a cumulative reduction in the agricultural potential of the whole land. While, therefore, the needs of the local population must be met to a reasonable extent, national interests should not be sacrificed because they are not directly discernible, nor should the rights and interests of future generations be subordinated to the improvidence of the present generation.

8. Relinquishment of Forest Land for Agricultural Purposes. - The indiscriminate extension of agriculture and consequent destruction of forests have not only deprived the local population of fuel and timber, but have also stripped the land of its natural defences against dust-storms, hot desiccating winds, and erosion. The old policy, which envisaged the relinquishment subject to certain safeguards honoured only in their breach, of even valuable forest land for permanent cultivation, has resulted in general deterioration of physical conditions to the detriment of national interests, and must, therefore, be given up. In the abstract, the claims of agriculture undoubtedly appear stronger than those of forestry. The notion widely entertained that forestry, as such, has no intrinsic right to land but may be permitted on sufferance on

residual land not required for any other purpose, has to be combated. The role of forests in the national economy, both protective and productive, entitles forests to lay claim to an adequate share of land. The importance of tree lands in the rural economy of this region where agriculture constitutes the main-stay of the vast bulk of population can scarcely be over-emphasized.

9. Land Use. - The correct solution of the land problem is to evolve a system of balanced and complementary land use, under which each type of land is allotted to that form of use under which it would produce most and deteriorate least. A detailed survey of lands with a view to their proper utilization is, therefore, highly desirable.

10. Protection Forests. - "Protection forests" denote forests found, or required, on hill slopes, river banks, sea-shores, or other erodable localities. In such sites, the need for forest cover is dictated by purely protective physical considerations, such as prevention of erosion, conservation of moisture, and control of rushing torrents and floods. The role of such forests in saving the soil from being washed away, and when maintained in catchment areas, in the prevention of floods and maintenance of stream-flow, cannot be over-emphasized. On flat country with loose sandy soil, especially under dry conditions, forests, whether natural or artificial, perform an essential function in minimising wind erosion, fixing the soil and preventing the formation of sand dunes, and mitigating the desiccation of agricultural crops leeward of the tree cover. The National Forest Policy requires, therefore, an immediate and speedy programme for the reconditioning of the mountainous regions, river valleys, and coastal lands by establishing protective forests over larger areas, and preserving the existing ones. The primary object of management of such forests should be to utilise in full their protective influence on the soil, the water regime, and the physical and climatic factors of the locality; and the interests to be thus protected should far outweigh those which it may be necessary to restrict. The scientific management of such "protection forests", wherever possible, should include the production and exploitation of timber within the limits of safety.

11. Reconditioning of Hills and Dales. - The progressive denudation of hillsides with serious repercussions on the fertility of the land, and the growing erosion along the banks of rivers, of which the Yamuna, the Chambal, the Mahi, the Narmada, the Kosi, and the Damodar are notorious examples, constitute the major considerations demanding immediate attention.

12. The Immobilization of the Desert of Rajputana. - Attention also needs to be drawn here to the Rajputana desert, more particularly to the fixation of the shifting sand dunes. Strong winds that develop in this region during the summer, transport vast quantities of sand and salt from the sea and Runn of Cutch, whipping the desert into terrific dust storms, the fury of which is felt throughout north-western India. The desert has spread through the ages causing the "westering" of the Indus and the

"northering" of the Sutlej, meeting an obstruction of sorts only along its eastern confines in the Aravallis. The immobilization of the desert and protection of the remaining fertile belts inside it constitutes one of the planks of the National Forest Policy.

13. National Forests. - "National forests" constitute the basis of India's strength and wealth; for they comprise valuable timber bearing regions the produce of which is indispensable for defence, communications and vital industries. They have to be managed chiefly in the interest of the nation as a whole, and their organization and development is one of the most important functions of the States. Their management on scientific and business lines is essential for maintaining a sustained supply of wood for industry and of large timbers for defence, communictions and other national purposes. The basic policy, so far as such forests are concerned, must be to attain national self-sufficiency in these vital supplies. Future development should, therefore, be directed to that end. Cultivation should not be permitted to encroach upon these valuable timber bearing tracts. The solution of the food problem of an ever-increasing population must be sought primarily in intensive cultivation and not i weakening the very basis of national existence by encroaching upon such forests.

14. Village Forests. - "Village forests" popularly termed fuel forests, are intended, in the main, to serve the needs of the surrounding villages in respect of small timber for housing and agricultural implements, firewood, leaves for manure and fodder, fencing thorns, grazing and edible forest products. The supply for such requirements should be made available at non-competitive rates, provided they are utilised by the villagers themselves and not traded in. The management of such village forests should aim at meeting the present as well as the future needs of the local population. Removal of the produce in excess of its annual growth should not, therefore, be permitted. Restrictions should be imposed in the interests not only of the existing generation but also of posterity. These considerations render the entrusting of the management of village forests to panchayats, without appropriate safeguards, a hazardous undertaking as has been demonstrated in some of the States. The cooperation of panchayats should be enlisted in the protection and creation of village forests, and in the distribution of forest produce assigned to meet the needs of the local population, but not at the cost of economy and efficiency. While the profit motive in the management of these forests should be relegated to the background, there is no justification for allowing them to become a burden on the general tax-payer; the expenses for development and maintenance of such forests must come from their own income.

15. Treelands. - Although "treelands" are not part of regular forests, in a country like India where their increase, management, and development are vital to the needs of the people, they cannot well be left out of any well-considered policy. The Land Transformation Programme of the Government of India envisages the planting of 30 crores of trees in ten years; but this number is very far from about 2,000 crores of trees, which would be necessary to restore the hydrological nutritional

balance of the country. The creation of forests by State Forest Departments on such an elaborate scale is ruled out at present by lack of funds and trained personnel. The only way in which some progress can be achieved is by making the whole nation "tree conscious". Such consciousness will stimulate private efforts at tree planting as has been demonstrated by the success of the National Vana Mahotsava movement. It will also arrest the vandalism which feels no scruples in cutting down valuable trees, and create among the populace an urge to secure the protection of trees - a virtue as much to be desired as it is rare.

16. Scope for Increasing Treelands. - State Governments have a vast scope for an all-round increase in the area under treelands. Defence, Railways, Public Works Departments, Universities and Colleges, District Boards, Municipalities and other local authorities, associations and institutions can lend a helping hand by converting the lands at their disposal into treelands. The new Forests Policy, therefore, envisages a concerted and supreme effort on the part of various Governments and other agencies towards planned afforestation with a view to the enlargement of treelands. The exploration of the possibilities of such a development by the Central State is clearly indicated. A systematic programme of extending existing treelands and establishing new ones should be framed by the Governments concerned. Under the new Policy, it should be the duty of the Forest Departments concerned:

(a) to awaken the interest of the authorities within their region in the development, extension, and establishment of treelands;

(b) to draw up plans for such purposes bearing in mind the need for species of commercial importance;

(c) to establish nurseries and seed stores in each area for the supply of saplings, plants and seeds;

(d) to supervise the planting of trees, and render such technical assistance as may be necessary for the development of treelands; and

(e) to arouse tree consciousness among the people by publicity, by celebrating the Vana Mahotsava, and by encouraging the Vana Premi Sangh.

17. Treelands in Agricultural Areas. - The importance of tree lands in the rural economy of the regions where agriculture constitutes the mainstay of the vast bulk of the population cannot be over-emphasized. Experience gained during the first two Vana Mahotsavas indicated a very considerable response in the countryside, where Government officers had prepared the ground and created the necessary enthusiasm among the people. A campaign inducing villagers to plant trees in village commons and along roadsides, on the condition that they would enjoy the benefit of the fruits, timber, and other produce of trees planted by them has yielded excellent results and is well worth an extended trial. The essence of success in such ventures lies in invoking the willing cooperation of the local villagers, the necessary technical guidance and help being furnished by the

Forest and other Departments. In most localities, a cultivator has no land to utilize for raising trees; there is, however, nothing to prevent him from growing at least a few trees per acre on his own field. Much useful work in this direction has been done in the western districts of Uttar Pradesh where cultivators have raised a fair amount of babul (Acacia arabica) in their fields. Other species may prove to be of equal utility in other regions.

18. Control of Private Forests. - The ownership of private forests in States where they still exist vests in individuals. Such ownership must, however, be regulated in the national interests so that the indiscriminate exercise of individual rights may not prejudice, or endanger, general welfare. Regulation and control of private forests by the State on physical, climatic and economic grounds is, therefore, imperative. Recent legislation in various States has assumed the following pattern:

(1) Owners of private forests should, in the first instance, be given an opportunity to manage their forests in accordance with an approved working plan.

(2) In the case only of recalcitrant owners, who are tempted to sacrifice their capital for immediate gain, should the management of their forests be made to vest in Government by due process of law.

(3) The ownership of such "vested forests" should remain, however, unaffected; and the transfer should relate only to management, the net profits arising therefrom, if any, accruing to the owner.

The object of the legislative measures outlined above stand in grave risk of being defeated by the tendency discernible among owners of private forest to cash in their assets by excessive exploitation of forests for personal ends. In order to arrest such destruction of forests, the National Forest Policy requires that their control and management should be strictly regulated, and where that cannot be done, they should be taken over by the State Government by effective legislation.

19. Proportion of Forest Areas. - The proportion of land to be kept permanently under forests would naturally vary in different regions. Practical consideration suggests, however, that India, as a whole, should aim at maintaining one-third of its total land area under forests. As an insurance against denudation, a much larger percentage of the land, about 60 per cent should be kept under forests for their protective functions in the Himalayas, the Deccan and other mountainous tracts liable to erosion. In the plains, where the ground is flat and erosion is normally not a serious factor, the proportion to be attained should be placed at 20 per cent; and in view of the pressure of agriculture, effort at the extension of treelands should be concentrated on river banks and other convenient places not suitable for agriculture. At the same time it must be realised that even distribution of forests in all physical regions is as important as its overall proportion. In certain localities deficient in forests, therefore, afforestation of marginal lands, and eroded

river and village wastelands, should be undertaken. Forest area in excess of the indicated proportion, if any, should, however, not be sacrificed. To maintain an overall average, it is essential that States better suited for the growth of trees should help to make good the deficiency in those parts where climatic and edaphic factors militate against tree-growth.

20. Wildlife. - The National Forest Policy emphasises the need for affording protection to the animal kingdom and particularly to rare species such as the lion and the great one-horned rhinoceros, which are fast disappearing. While the damage caused by such predators as wild pigs, game and porcupine cannot be denied, the elimination of their natural enemies tends to multiply them. It is necessary, therefore, that bird and animal life should be controlled by special laws and rare fauna preserved by setting sanctuaries and large-scale national parks. For this purpose, a Central Board for Wildlife has been constituted by the Government of India in the Ministry of Food and Agriculture Resolution No.7-110/51-F, dated 4th April, 1952.

21. Grazing. - The controversial question of grazing in State forests calls for a clear definition of policy. Speaking generally, all grazing in forests, particularly unlimited or uncontrolled grazing, is incompatible with scientific forestry. At the same time, grazing does take place in forests and must be accepted as a hard fact. There are indeed circumstances in many regions where a moderate amount of grazing does little direct harm, and may even do a great deal of indirect good in reducing the risk of fire and in suspending regression at a desirable stage. But efficient forest management requires that grazing should be regulated as regards the time and place, as also the number of cattle admitted. The formulation of the grazing policy should be based on the followng cardinal principles:-

(a) Continuous grazing on the same areas by large herds is destructive of the better strains of grasses and leads to a deterioration of the grass complex. Wherever it is permitted and is in great demand, efforts should be made to introduce rotational grazing, the benefits of which should be explained and demonstrated to the villagers.

(b) Cheap forest grazing has a demoralising effect and leads to the vicious spiral of reckless increase in the number of cattle, in adequate forest grazing, reduced quality of the herds and further increase in the numbers to offset the fall in quality. Free and indiscriminate forest grazing is, therefore, a serious disservice to cattle breeding. The notion that a farmer's wealth must be reckoned in terms of the number of cattle he owns, regardless of quality, is one of the causes of India's uneconomic cattle wealth and must be combated.

(c) Grazing should not be looked upon primarily as a source of revenue. But the simple and obvious way of regulating and controlling grazing as also improving the quality of both grazing and cattle themsleves, is to institute a reasonable fee for the privilege of grazing.

(d) Grazing must not be allowed in regeneration areas and

young plantations during such periods as the seedlings require for establishment; otherwise they stand in danger of being browsed or trampled upon.

(e) Grazing incidence should be kept at a minimum in "Protection Forests".

22. Sheep and Goats. - Experience gained in India and elsewhere points to the imposition of restrictions on sheep grazing in forests, and the total exclusion of goats therefrom. The damage to young plants caused by the browsing of these animals is often irreparable, and their admission into the forest is incompatible with the aims and objects of forest management. The creation of special fodder reserves under strict rotational control is indicated for the purpose.

23. Shifting Cultivation. - The damage caused to forests by shifting cultivation in certain areas must be guarded against. To wean the aborigines, who eke out a precarious living from axe-cultivation moving from area to area, away from their age-old and wasteful practices, requires persuasion, not coersion; missionary, not an authoritarian, approach. Possibilities of regulating shifting cultivation by combining it with forest regeneration (Taungya) to the benefit of both should be fully explored. Success in this direction largely depends on enlisting the cooperation of the cultivators and gaining their confidence and in showing consideration to their needs and wishes.

24. Sustained Yields. - With a view to conserving forest resources in perpetuity, the new Forest Policy requires scrupulous regard for sustained yield in the management of all classes of forests. The fluctuations in the annual outturn of forests upset State budgets, industries, and other 'nationa' enterprises; all working plans, therefore, should aim at confining them within the narrowest limits. This aspect assumes even greater significance in case where private owners manage their own forests. The compilation of all sound working plans, therefore, requires:

(a) the calculation of increment so that what is annually put on is annually cut, leaving the original assets intact or improved;

(b) the preparation of maps, and investigations on the propagation and tending of various species, their increment, the optimum conditions of their growth and the regulation of yield;

(c) carefully planned afforestation schemes to replace inferior tree growth by valuable species of commercial importance.

Each State, therefore, should set up a permanent organization to deal with working plans - their compilation, and revision and deviations from them, research and statistics, as well as to conduct detailed surveys of available forest resources which are a sine qua non for a sound forest management.

25. Forest Administration. - The efficiency of forest administration depends directly on the adequacy of the forest laws, the training and calibre of the professional forest services, and the progress of research on both the biological and the utilisation aspects of forestry.

26. Forest Legislation. - So far as forests under the control of the Central Government and of Part A States are concerned, adequate forest legislation exists in the Indian Forest Act and the Madras Forest Act. In some of the Part B States, there are forest regulations having the force of law. But there are some Part C States where forest laws do not exist. It is necessary, therefore, that States without a proper Forest Act should enact legislation at an early date on the lines of the Indian Forest Act, or validate that Act for their territory. Several States have already enacted legislation for the control of private forests; it is desirable that States which have no such laws should enact them early. While framing legislation for private forests, States should not overlook the need for providing adequate staff for enforcing its provisions.

27. Forest Education. - Forestry courses are at present conducted for Forest Rangers and Superior Forest Officers at the Forest Research Institute and the Colleges. The States would be well-advised to continue taking advantage of the facilities provided by the Central Government at Dehra Dun, associated with the well-equipped Forest Research Institute, which enjoys a world-wide reputation. A common forest education is a very effective means of inculcating an esprit de corps among forest officers; of developing a common outlook in forestry matters; and of ensuring concerted and integrated policies throughout the country. Openings in the profession of forestry being limited, the decentralisation of forest education will militate against economy and efficiency, encourage fissiparous tendencies, create unemploymnent, and render planned development of forest resources difficult.

28. Training of Field Staff. - Attention has also to be directed to the proper training of lower executive staff on whose technical skill ultimately depends the proper execution of forest schemes and their extension. The tendency to start schools which are not properly equipped should be discouraged. It is necessary that contiguous States should combine and co-operate in establishing well-equipped and up-to-date training schools for the purpose of meeting their needs in the most economical manner.

29. Services. - The idea held in some quarters that since forests grow by themselves, they need no technical management is based on ignorance. Inadequacy of technical personnel, and weakening of the professional standards of the men called upon to manage forests, would be followed not only by a loss of revenue but also by a general degradation of the forests, resulting in reduced output of forest produce and in deterioration of physical conditions.

30. Forest Research. - Investigations in the biological aspects of forestry, among others Silviculture, Botany, and Entomology, have naturally leaned heavily upon the cooperation of Forest Departments of the various States, most of which have an organization of their own for the purpose. The maintenance of a research organization in each State commensurate with its resources and requirements is in the interests of efficient forest management of the country as a whole. Research in the utilization of forest produce has, on the other hand, always been initiated and conducted at the Forest Research Institute where special equipment for the purpose exists. This balanced arrangement ensures both efficiency and economy. The Institute also is naturally the centre for specialized education in forest industries; and special technical courses in paper and plywood technology, wood preservation, timber seasoning and other cognate subjects have been organised to meet the demands of industry for technicians.

31. Liaison with Industry. - There is also considerable scope for improvement in securing the utilisation of the results of research on forest products by commercial and industrial interests. For ensuring closer contact between the Forest Research Institute and the interests utilizing timber and forest products, liaison and publicity arrangements at the Institute need to be strengthened.

32. Popular Goodwill, Cooperatives and Forest Workers. - While forest legislation, forest education, and forest research constitute the basis for sound forest management, the welfare and goodwill of the people in the neighbourhood of forests provide the firm ground on which it stands. No forest policy, however well-intentioned and meticulously drawn up, has the slightest chance of success without the willing support and cooperation of the people. The recognition of their rights to forest produce at concession rates, or, free of royalty, is not by itself enough. What is necessary is to instil in the people a direct interest in the utilisation of forests. Intermediaries who exploit both the forests and local labour for their own benefit may with advantage be supplanted gradually by forest labour cooperative societies which may be formed to suit local conditions. Once the local population learns to look upon the forest as a means of its livelihood, a great step forward will have been taken.

33. Forest Budgets. - Forestry is a long range enterprise and it becomes incumbent upon State Governments to secure for it freedom from the vagaries of the annual budget. A steady flow of funds is indispensable for sustained forest operations such as, replacement of what is removed annually, improvement of remaining crops, development of communications for opening up remote areas, and protective measures; they have to be based on phased schemes which should not be set aside lightly. Budget cuts made from year to year to meet the exigencies of State finances can only be made at the expense of continuity in forest management - apart from other benefits - and at the sacrifice of forest revenue and other benefits in the coming year. The creation of a sinking fund, therefore, by investing a portion of the revenue in Government securities, more particularly during boom years, would not only ensure availability of funds for replacement and

development costs, but may also be made to act as an equalizing fund to be drawn upon in lean years to prevent a fall in revenue. The immediate profit motive should be rigidly ruled out; for, this urge may endanger the supply of large and special timber for defence and industry and lead to a disturbance of climatic conditions seriously affecting agriculture. The adoption of rotations to produce large-sized timber is often of greater importance to the general economy of the country than that of rotations which yield the maximum rate of interest in forest investments.

34. Policy - an enunciation of general principles. - While the discretion of State Governments to regulate the details of forest administration in their respective territories is left unfettered, the general principles of the above forest policy should, in paramount national interests, be observed by them in framing their policies and legislation for the conservation of their forest resources. The forest policy of every State should be so framed as not to impinge adversely upon the general economy and physical balance of an adjoining State. It should be in consonance with the general principles underlying the Forest Policy laid down by the Centre for the preservation and development of the nation's forest resources which are so vital to its general well-being.

APPENDIX VI

THE OLD FOREST POLICY
(Extract taken from pp. 155-162 of F.D.Code, 6th Edn.)
Circular No.22-F., dated 19th October, 1894.

Read -

Circular Resolution of this Department, No.17-105 A., dated 15th July, 1891.

Chapters VIII and IX of Dr.Voelcker's Report on the Improvement of Indian Agriculture.

Review of Forest Administration in British India for 1892-93 by the Inspector General of Forests.

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Resolution.- In Chapter VIII of his report on the improvement of Indian Agriculture, Dr. Voelcker dwells at length upon the importance of so directing the policy of the Forest Department that it shall serve agricultural interests more directly than at present; and in his Review of Forest Administration for 1892-93, the Inspector General of Forests discusses in some detail the principles which should underlie the management of State forests in British India. While agreeing, generally, with the principles thus enunciated by the Inspector General of Forests, the Government of India think that it will be convenient to state here the general policy which they desire should be followed in this matter more especially as they are of opinion that an imperfect apprehension of that policy has, in some recent instances, been manifested.

2. The sole object with which State forests are administered is the public benefit. In some cases the public to be benefited are the whole body of tax-payers; in others, the people of the tract within which the forest is situated; but in almost all cases the constitution and preservation of a forest involve, in greater or less degree, the regulation of rights and the restriction of privileges of user in the forest area which may have previously been enjoyed by the inhabitants of its immediate neighbourhood. This regulation and restriction are justified only when the advantage to be gained by the public is great; and the cardinal principle to be observed is that the rights and privileges of individuals must be limited, otherwise than for their own benefit, only in such degree as is absolutely necessary to secure that advantage.

3. The forests of India, being State property, may be broadly classed under the following headings:

(a) Forests the preservation of which is essential on climatic or physical grounds.

(b) Forests which afford a supply of valuable timbers for commercial purposes.

(c) Minor forests.

(d) Pasture lands.

It is not intended that any attempt should be made to class existing State forests under one or other of these four heads. Some forests may occupy intermediate positions, and parts of one and the same forest may fall under different heads. The classification is useful only as affording a basis for the indication of the broad policy which should govern the treatment of each class, respectively; and, in applying the general policy, the fullest consideration must be given to local circumstances.

4. The first class of forests are generally situated on hill slopes, where the preservation of such vegetation as exists, or the encouragement of further growth, is essential to the protection from the devastating action of hill torrents on the cultivated plains that lie below them. Here the interests to be protected are important beyond all comparison with the interests which it may be necessary to restrict; and, so long as there is a reasonable hope of the restriction being effectual, the lesser interests must not be allowed to stand in the way.

5. The second class of State forests include the great tracts from which our supply of the more valuable timbers - teak, sal, deodar and the like - is obtained. They are for the most part (though not always) essentially forest tracts, and encumbered by very limited rights of user; and, when this is the case, they should be managed mainly on commercial lines as valuable properties of, and sources of revenue to, the State. Even in these cases, however, customs of user will for the most part have sprung up on the margins of the forest; this use is often essential to the prosperity of the people who have enjoyed it; and the fact that its extent is limited in comparison with the area under forest renders it the more easy to continue it in full. The needs of communities dwelling on the margins of forest tracts consist mainly in small timber for building, wood for fuel, leaves for manure and for fodder, thorns for fencing, grass and grazing for their cattle and edible forest products for their own consumption. Every reasonable facility should be afforded to the people concerned for the full and easy satisfaction of these needs, if not free (as may be possible where a system of regular cuttings has been established), then at low and not at competitive rates. It should be distinctly understood that considerations of forest income are to be subordinated to that satisfaction.

There is reason to believe that the area which is suitable to the growth of valuable timber has been over-estimated, and that some of the tracts which have been reserved for this purpose might have been managed with greater profit both to the public and to the State, if the efforts of the Forest Department had been directed to supplying the large demand of the agricultural and general population for small timber, rather than the limited demand for merchants for large timber. Even in tracts of which the conditions are suited to the growth of large timber it should be carefully considered in each case whether it would not be

better, both in the interests of the people and of the revenue, to work them with the object of supplying the requirements of the general, and in particular of the agricultural, population.

6. It should also be remembered that, subject to certain conditions to be referred to presently, the claims of cultivation are stronger than the claims of forest preservation. The pressure of the population upon the soil is one of the greatest difficulties that India has to face, and that application of the soil must generally be preferred which will support the largest numbers in proportion to the area. Accordingly, wherever an effective demand for culturable land exists and can only be supplied from forest areas, the land should ordinarily be relinquished without hesitation; and if this principle applies to the valuable class of forests under consideration, it applies a fortiori to the less valuable classes which are presently to be discussed. When cultivation has been established, it will generally be advisable to disforest the newly-settled area. But it should be distinctly understood that there is nothing in the Forest Act, or in any rules or orders now in force, which limits the discretion of Local Governments, without previous reference to the Government of India (though, of course, always subject to the control of that Government) in diverting forest land to agricultural purposes even though that land may have been declared reserved forest under the Act.

7. Mention has been made of certain conditions to which the application of the principle laid down in the preceding paragraph should be subject. They have for their object the utilisation of the forest area to the greatest good of the community. In the first place, the honey-combing of a valuable forest by patches of cultivation should not be allowed; as the only object it can serve is to substitute somewhat better land in patches for sufficiently good land in large blocks, while it renders the proper preservation of the remaining forest area almost impossible. The evil here is greater than the good. In the second place the cultivation must be permanent. Where the physical conditions are such that the removal of the protection afforded by forest growth must result, after a longer or shorter period, in the sterilization or destruction of the soil, the case falls under the principle discussed in paragraph 4 of this Resolution. So, again, a system of shifting cultivation, which denudes a large area of forest growth in order to place a small area under crops, costs more to the community than it is worth, and can only be permitted, under due regulation, where forest tribes depend on it for their sustenance. In the third place, the cultivation in question must not be merely nominal, and an excuse for the creation of pastoral or semi-pastoral villages, which do more harm to the forest than the good they reap from it. And, in the fourth place, cultivation must not be allowed so to extend as to encroach upon the minimum area of forest which is needed in order to supply the general forest needs of the country, or the reasonable forest requirements, present and prospective, of the neighbourhood in which it is situated. In many tracts cultivation is practically impossible without the assistance of forests, and it must not be allowed to destroy that upon which its existence depends.

8. It has been stated above that the forests under consideration are generally, but not always, free from customs of user. When, as sometimes happens, they are so intermingled with permanent villages and cultivation that customary rights and privileges militate against their management as revenue-paying properties, the principles laid down at the end of paragraph 5 of this Resolution should be observed, and considerations of income should be made secondary to the full satisfaction of local needs. Such restrictions as may be necessary for the preservation of the forest, or for the better enjoyment of its benefits, should be imposed; but no restriction should be placed upon reasonable local demands, merely in order to increase the State revenues.

9. The third class of forests include those tracts which, though true forests, produce only the inferior sorts of timber, or the smaller growths of the better sorts. In some cases the supply of fuel for manufactures, railways, and like purposes, is of such importance that these forests fall more properly under the second class, and must be mainly managed as commercial undertakings. But the forests now to be considered are those which are useful chiefly as supplying fuel and fodder or grazing for local consumption; and these must be managed mainly in the interests of the population of the tract which supplied its forest requirements from this source. The first object to be aimed at is to preserve the wood and grass from destruction; for user must not be exercised so as to annihilate its subject, and the people must be protected against their own improvidence. The second object should be to supply the produce of the forests to the greatest advantage and convenience of the people. To these two objects all considerations of revenue should ordinarily be subordinated.

10. It must not be supposed from the preceding remarks that it is the intention of the Government of India to forego all revenue from the large areas that are valuable chiefly for the fuel and fodder which they yield. Cases must be distinguished. Where the areas in question afford the only grazing and the only sypply of fuel to villages which lie around or within them, the necessities of the inhabitants of these villages must be treated as paramount, and they should be satisfied at the most moderate rates and with as little direct official interference as possible. But where the villages of the tract have already ample pasture grounds attached to their cultivation and owned and managed by themselves and where the Crown lands merely supplement their pastures, and afford grazing to a nomad pastoral population, or to the herds that shift from one portion of the country to another with the changes of the season, Government may justly expect to reap a fair income from its property. Even in such cases, however, the convenience and advantage of the graziers should be studiously considered, and the inhabitants of the locality, or those who habitually graze over it, should have a preferential claim at rates materially lower than might be obtained in the open market. It will often be advantageous to fix the grazing demand upon a village or a nomad community for a year or a term of years. The system, like every other, has difficulties that are peculiar to it; but it reduces the interference of petty officials to the lowest point, and minimizes their opportunities for extortion and oppression. Where grazing fees are levied per capita, free passes are often

given to a certain number of cattle. In such cases the cattle which are to graze free should include, not only the oxen which are actually employed on the plough, but also a reasonable number of milch cattle and calves. A cow or a buffalo is as much a necessity to a cultivator using the word necessity in a reasonably wide sense, as is a plough-bullock; and in many parts the oxen are bred in the village.

11. In the portions of his report which are referred to in the preamble to this Resolution, Dr. Voelcker strongly recommends the formation of fuel and fodder preserves, and the Government of India have repeatedly urged the same policy upon Local Governments. The question whether any particular area can be made to support a greater number of cattle by preserving the grass and cutting it for fodder, or by permitting grazing upon it, is one that must be decided by the local circumstances of each case. But when it has been decided, the issues are by no means exhausted. It has been stated in para 9 above that one main object towards which the management of these minor forests should be directed is, the supply of fuel and fodder "to the greatest advantage and convenience of the people". In doing so, due regard must be had to their habits and wishes. It may be that strict preservation and periodical closures, or the total prohibition of grazing, will result in the largest yield both of fuel and fodder in the form of hay. But that is of small avail if the people will not utilize the increased supply in the form in which it is offered to them. The customs of generations alter slowly in India; and though much may and should be done to lead the people to their own profit, yet it must be done gently and gradually - always remembering that their contentment is no less important an object than is their material advantage. It must be remembered, moreover, that the object of excluding grazing from the preserves in question is the advantage of the neighbourhood; and that the realization of a larger income than grazing would yield, by preserving the produce, only to sell it to the highest bidder for consumption in large towns at a distance from the preserve, is not always in accordance with the policy which the Government of India have inculcated. Here again circumstances must decide. It may be that the local supply of fuel or fodder, independently of the reserved area, is sufficient in ordinary years for the needs of the neighbourhood. In such a case, the produce may legitimately be disposed of in such years to the greatest advantage, reserving it for local consumption only when the external supply runs short. Finally, the remarks regarding agency in para 12, and the more general considerations that are discussed below in para 13 of this Resolution, apply in full force to areas thus reserved for the supply of fuel and fodder.

12. The fourth class of forests referred to are pastures and grazing grounds proper, which are usually forests only in name. It is often convenient, indeed, to declare them forests under the Act, in order to obtain a statutory settlement of the rights which the State on the one hand, and private individuals or communities on the other, possess over them. But it by no means follows as a matter of course that the lands should be subjected to any strict system of conservation, or that they should be placed under the management of the Forest Department. The question of agency is purely one of economy and expediency; and the Government of India believe that in some cases where these

lands are managed by the Forest Department, the expenditure on establishment exceeds the revenue that is, or at any rate the revenue that ought to be, realized from them.

The following remarks apply, not only to forest lands under the Act, whether administered by the Forest Department or not, but also to all Crown waste, even though not declared to be forest. Here the interests of the local community reach their maximum, while those of the general public are of the slightest nature. It follows that the principles which have been already laid down for the management of minor forests apply, if possible, with even greater force to the management of grazing areas, pure and simple.

13. The difficulties which arise in connection with these areas are apt to present themselves in their most aggravated form where the tenure of land is ryotwari. In zamindari tracts the Crown lands generally assume the second of the two forms indicated in para 10 of this Resolution. But where the settlement is ryotwari, every survey number of field that is unoccupied or unassigned is in the possession and at the disposal of Government, and trespass upon it prima facie forbidden. In some cultivated tracts these unoccupied and waste lands are the only source available from which the grazing requirements of the resident population can be met. The Government of India are clearly of opinion that the intermixture of plots of Government land which are used for grazing only, but upon which trespass is forbidden, with the cultivation of occupancy or proprietary holders, is apt to lead to extreme abuses and especially so when these plots are under the management of the Forest Department. The inferior subordinates of the Forest Department are perhaps as reliable as can be expected on the pay which we can afford to give; but their morality is no higher than that of the uneducated classes from which they are drawn; while the enormous areas over which they are scattered and the small number of the controlling staff render effective supervision most difficult. It is not right, in order to protect the grass or the grazing dues on plots of waste scattered over the face of a cultivated distict, to put it into the power of an underling to pound, or threatern to pound, cattle on the plea that they have over-stepped the boundary between their owner's field and the next. Still less right is it to permit the exercise of the power of compounding offences allowed by section 67 of the Forest Act to depend upon the mere report of a subordinate servant, or to expose him to the temptations which such a power holds out. Where the interests involved are sufficiently important, it may perhaps be necessary to accept the danger of extortion while minimizing as far as possible the opportunities for it. But in the case under consideration the interests involved are trifling, while the opportunities are unlimited.

14. It is to be distinctly understood that the Government of India do not desire that grazing should looked upon primarily as a source of income. But it by no means follows that all revenues from scattered Government lands should be relinquished. It is, indeed inadvisable that this should be done, as to do so would give the raiyats an interest in opposing allotment and making things unpleasant for new occupants. But the objections to

direct management which have just been pointed out are reduced to a minimum or altogether avoided, when the management is placed in the hands of the resident cultivators or of representatives from among them. It will generally be possible to lease or otherwise manage the unoccupied lands of a village through the agency of the community not, indeed, at the highest price which they are ready to pay to escape such evils as have just been alluded to but at a moderate estimate of their value to them fixed in view of the fact that herds and flocks which cannot exist without grazing, are often a necessary condition of the successful conduct of that cultivation upon which the Government land-revenue is paid. In no case should fields that have been relinquished be let to outsiders at a reduced asssessment for grazing purposes for then we might have speculators taking up such fields, mainly in order to make what they can out of trespassing cattle.

15. One more point of principle remains to be noticed. The procedure under Chapter IV of the Indian Forest Act, whereby forests are declared to be protected, has been in certain cases regarded by the Government of India as a provisional and intermediate procedure designed to afford time for consideration and decision with the object of ultimately constituting so much of the area as it is intended to retain, a reserved forest under Chapter II, and of relinquishing the remainder altogether. The Act provides two distinct procedures. By the more strict one under Chapter II existing rights may be either settled, transferred, or communicated and this procedure will ordinarily be applied to forests of the first and second classes indicated in para 3 of this Resolution. By the second procedure under Chapter IV rights are recorded and regulated and this procedure will often be properly followed where the rights to which the area is subject are extensive and the forest is to be managed mainly in the interests of the local community. It will ordinarily be applied to forests of the third and fourth classes. This second procedure may indeed be provisional, and introductory to reservation under Chapter II, but there is in the Forest Act nothing repugnant to giving it a larger and even a permanent operation. As regards Government the chief difference between the two procedures is that new rights may spring up in a protected but not in a reserved forest, and that the record-of-rights framed under Chapter II is conclusive while that framed under Chapter IV only carries a presumption of truth. It is believed that this presumption offers ample security where the object of regulating the rights is to provide for their more beneficial exercise rather than to override them in public interest. As regards the people the chief difference is that, speaking broadly, in a reserved forest everything is an offence that is not permitted, while in a protected forest nothing is an offence that is not prohibited. In theory it is possible to frame the permission and the prohibition as to make the results identical in the two cases, but in practice it is almost impossible to do so. If it were not so, the distinction drawn by the Legislature would be unnecessary and meaningless. It is only where the public interests involved are of sufficient importance to jusify the stricter procedure and the more comprehensive definition of forest offences that the latter should be adopted.

16. The Governor General in Council desires, therefore, that

with regard both to fuel and fodder preserves and to grazing areas pure and simple, and specially to such of them as lie in the midst of cultivated tracts, it may be considered in each case whether it is necessary to class them, or, if already so classed, to retain them as forest area; and if this question is decided in the affirmative, whether it would not be better to constitute them protected rather than reserved forests.

17. Such are the general principles which the Government of India desires should be observed in the administration of all State forests in British India. They are fully aware that the detailed application of these principles must depend upon an infinite variety of circumstances which will have to be duly weighed in each case by the local authorities, to whose discretion the decision must be left. One of the dangers which it is most difficult to guard against is the fraudulent abuse of concessions for commercial purposes, and only local considerations can indicate how this can best convert. The Government of India recognize the fact that the easier treatment in the matter of forest produce which His Excellency in Council desires should be extended to the agricultural classes may, especially in the case of true forest areas, necessitate more careful supervision in order that the concession may be confined within its legitimate limits. But, on the other hand, they think that in some Provinces it will render possible a considerable reduction of existing establishment and they desire that this matter may be carefully considered with reference to what has been said above in paragraph 12. They know also in some Provinces forest policy is already framed on the lines which they wish to see followed, in all. But the Governor General in Council believes that Local Governments and Administrations will be glad to receive the assurance now given them that the Supreme Government will cordially support them in recognizing and providing for local requirements to the utmost point that is consistent with Imperial interests. Where working-plans or plans of operation are framed for forests, the provisions necessary for this purpose should be embodied in them. The exercise of the rights that have been recorded at settlement will necessarily be provided for in these plans. Where further concessions are made by the way of privilege and grace, it will be well to grant them for some such limited period as ten years, so that they may, if necessary, be revised from time to time as the circumstances on which they were moulded change.

APPENDIX VII

MINISTRY OF LAW, JUSTICE AND COMPANY AFFAIRS
(Legislative Department)

New Delhi, the 27th December, 1980

The following Act of Parliament received the assent of the President on the 27th December, 1980, and is hereby published for general information:-

# THE FOREST (CONSERVATION) ACT, 1980

No.69 of 1980

An Act to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto.

Be it enacted by Parliament in the Thirty-first Year of the Republic of India as follows:-

1. Short title, extent and commencement. - (1) This Act may be called the Forest (Conservation) Act, 1980.

   (2) It extends to the whole of India except the State of Jammu and Kashmir.

   (3) It shall be deemed to have come into force on the 25th day of October, 1980.

2. Restriction on the dereservation of forests or use of forest land for non-forest purpose. - Notwithstanding anything contained in any other law for the time being in force in a State, no State Government or other authority shall make, except with the prior approval of the Central Government, any order directing:-

   (i) that any reserved forest (within the meaning of the expression "reserved forest" in any law for the time being in force in that State) or any portion thereof, shall cease to be reserved;

   (ii) that any forest land or any portion thereof may be used for non-forest purpose.

Explanation : For the purposes of this section, "non-forest purpose" means breaking up or clearing of forest land or portion thereof for any purpose other than reafforestation.

3. Constitution of Advisory Committee. - The Central Government may constitute a Committee consisting of such number of persons as it may deem fit to advise that Government with regard to -

(i) the grant of approval under section 2; and

(ii) any other matter connected with the conservation of forests, which may be referred to it by the Central Government.

4. Power to make rules. - (1) The Central Government may, by notification in the Official Gazette, make rules for carrying out the provisions of this Act.

(2) Every rule made under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or both Houses agree that the rule should not be made, the rule shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

5. (1) The Forest (Conservation) Ordinance, 1980, (17 of 1980) is hereby repealed.

(2) Repeal and Saving. - Notwithstanding such repeal, anything done or any action taken under the provisions of the said Ordinance shall be deemed to have been done or taken under the corresponding provisions of this Act.

(Department of Environment, Forests and Wildlife)
New Delhi, the 28th December, 1987.

G.S.R. 14 - In exercise of the powers conferred by sub-section (1) of section 4 of the Forest (Conservation) Act, 1980 (69 of 1980), the Central Government hereby makes the following rules to amend the Forest (Conservation) Rules, 1981, namely:-

1. (1) These rules may be called the Forest (Conservation) Amendment Rules, 1987.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Forest (Conservation) Rules, 1981 (hereinafter referred to as the said rules), after rule 2, the following rules shall be inserted, namely-

"2A. (1) Composition of the Committee.- The Committee shall be composed of the following Members:-

(i) Inspector General of Forests,
Ministry of Environment and Forests. - Chairman

(ii) Additional Inspector General of Forests, Ministry of Environment and Forests. - Member

(iii) Joint Commissioner (Soil Conservation), Ministry of Agriculture. - Member

(iv) Three eminent environmentalists (non-officials) - Members

(v) Deputy Inspector General of Forests (Forest Conservation), Ministry of Environment and Forests - Member-Secretary

(2) Additional Inspector General of Forests shall act as the Chairman in the absence of Inspector General of Forests.

B. Terms of appointment of non-official members shall be as follows:-

(i) A non-official member shall hold his office for a period of two years.

(ii) A non-official member shall cease to hold office if he dies, resigns, becomes of unsound mind, becomes insolvent or is convicted by a court of law on a criminal offence involving moral turpitude.

(iii) Any vacancy in the membership caused by any reason mentioned in sub-rule (ii) shall be filled by the Government for the unexpired portion of 2 years term.

(iv) Travelling and daily allowances shall be payable to the non-official memnbers of the Committee at the highest rate admissible to the Government servants of Group A under the rules and orders made by the Central Government and for the time being in force.

Provided that the payment of travelling allowance and daily allowance to a member who is a Member of the Parliament or a Member of a State Legislature shall be regulated in accordance with the Salary, Allowance and Pension of Members of Parliament Act, 1954 or the respective provisions of law pertaining to the Members of the concerned State Legislature."

3. In rule 3 of the said rules.- (a) for sub-rule (1) and sub-rule (2), the following shall be substituted, namely-

"(1) The Chairman shall call the meeting of the Committee as often as necessary, but not less frequently than once in a month.

(2) The meetings of the Committee shall normally be held at New Delhi. However, in a case where the Chairman is satisfied that inspection of site or sites of forest land proposed to be used for non-forest purposes would be necessary or expedient in connection with the consideration of the proposal or proposal received under sub-rule (1) of rule-4, he may direct that the meetings of the Committee will be held at a place other than New

Delhi from where such inspection of site or sites can be undertaken conveniently."

(b) for sub-rule (4), the following sub-rule shall be substituted, namely-

"(4) Every question upon which the Committee is required to advise shall be considered at its meeting provided that in urgent cases, if the meeting of the Committee cannot be convened within a month, the Chairman may direct that necessary papers may be sent to the Members for their opinion by a stiuplated date."

(c) after sub-rule (4), the following shall be inserted, namely-

"(5) The quorum for the meeting of the Committee shall be three."

4. In rule 4 of the said rules, for sub-rule (2), the following sub-rule shall be substituted, namely -

"(2) Every proposal referred to in sub-rule (1) shall be sent to the following address, namely -

Secretary to the Government of India, Department of Environment, Forests and Wildlife, Paryavaran Bhavan, Central Government Offices Complex, Lodi Road, New Delhi - 110 003."

5. In rule 5 of the said rules, for sub-rule (1), the following sub-rule shall be substituted, namely -

"(1) The Central Government shall refer every proposal received by it under sub-rule (1) of Rule 4 to the Committee for its advice thereon."

(No.5-5/86-FC)
R.S.BISHT, Under Secretary.

NOTE: The principal rules were published vide G.S.R. No.719, dated the 1st August, 1981 in part II, section 3, sub-section (i) of the Gazette of India.

APPENDIX VIII

MINISTRY OF LAW AND JUSTICE
(Legislative Department)

New Delhi, the 19th December, 1988.

The following Act of Parliament received the assent of the President on the 17th December, 1988 and is hereby published for general information:-

THE FOREST (CONSERVATION) AMENDMENT ACT, 1988
No.69 of 1988

(17th December, 1988)

An Act to amend the Forest (Conservation) Act, 1980.

Be it enacted by Parliament in the Thirty-ninth year of the Republic of India as follows:-

1. Short title and commencement. - (1) This Act may be called the Forest (Conservation) Amendment Act, 1988.

(2) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint.

2. Amendment of Section 2. - In section 2 of the Forest (Conservation) Act, 1980 (hereinafter referred to as the principal Act),-

(a) after clause (ii), the following clauses shall be inserted, namely:-

"(iii) that any forest land or any portion thereof may be assigned by way of lease or otherwise to any private person or to any authority, corporation, agency or any other organisation not owned, managed or controlled by Government;

(iv) that any forest land or any portion thereof may be cleared of trees which have grown naturally in that land or portion, for the purpose of using it for reafforestation;"

(b) for the Explanation, the following Explanation shall be substituted, namely:-

Explanation - For the purpose of this section "non-forest purpose" means the breaking up or clearing of any forest land or portion thereof for -

(a) the cultivation of tea, coffee, spices, rubber, palms, oil-bearing plants, horticultural crops or medicinal plants;

(b) any purpose other than reafforestation,

but does not include any work relating or ancillary to conservation, development and management of forests and wildlife, namely the establishment of check-posts, fire lines, wireless communications and construction of fencing, bridges and culverts, dams, water holes, trench marks, boundary marks, pipelines or

other like purposes."

3. Insertion of new sections 3A and 3B. - After section 3 of the principal Act, the following sections shall be inserted, namely:-

"3A. Penalty for contravention of the provisions of the Act. - Whoever contravenes or abets the contravention of any of the provisions of section 2, shall be punishable with simple imprisonment for a period which may extend to fifteen days.

3B. Offences by authorities and Government departments. - (1) Where any offence under this Act has been committed-

(a) by any department of Government, the head of the department; or

(b) by any authority, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the authority for the conduct of the business of the authority as well as the authority;

shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render the head of the department or any person referred to in clause (b), liable to any punishment if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1) where an offence punishable under the Act has been committed by a department of Government or any authority referred to in clause (b) of sub-section (1) and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the head of the department, or in the case of an authority, any person other than the persons referred to in clause (b) of sub-section (1) such officer or persons shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly."

APPENDIX II

CLASSIFICATION OF AREA & IRRIGATED AREA IN INDIA (as on January 2, 1989)

| Heading | 1950-51 | 1960-61 | 1970-71 | 1980-81 | 1981-82 | 1982-83 | 1983-84 | 1984-85 | 1985-86 | % of total reporting area (1985-8 |
|---|---|---|---|---|---|---|---|---|---|---|
| I. GEOGRAPHICAL AREA | 328.73 | 328.73 | 328.73 | 328.73 | 328.73 | 328.73 | 328.73 | 328.73 | 328.73 | |
| II. REPORTING AREA FOR LAND UTILISATION STATISTICS (1 TO 5) | 284.32 | 298.46 | 303.76 | 304.17 | 304.28 | 304.11 | 304.19 | 304.31 | 304.58 | 100. |
| 1. Forests | 40.48 | 54.05 | 63.92 | 67.42 | 67.42 | 67.35 | 67.33 | 66.39 | 66.75 | 21. |
| 2. Not Available for Cultivation (A+B) | 47.52 | 50.75 | 44.64 | 39.65 | 39.73 | 39.95 | 40.35 | 40.70 | 40.64 | 13. |
| A. Area under Non-Agricultural Uses | 9.36 | 14.84 | 16.48 | 19.60 | 19.63 | 19.82 | 20.19 | 20.46 | 20.49 | 6. |
| B. Barren and Un-Culturable Land | 38.16 | 35.91 | 28.16 | 20.05 | 20.10 | 20.13 | 20.16 | 20.24 | 20.15 | 6. |
| 3. Other Uncultivated Land excluding Fallow Land (A+B+C) | 49.45 | 37.64 | 35.06 | 32.19 | 32.08 | 31.85 | 30.89 | 31.45 | 31.24 | 10. |
| A. Permanent Pastures & Other Grazing Lands | 6.68 | 13.97 | 13.26 | 12.00 | 12.05 | 11.96 | 11.97 | 12.00 | 11.98 | 3. |
| B. Land Under Misc. Tree Crops & Groves not included in Net Sown Area | 19.83 | 4.46 | 4.30 | 3.49 | 3.62 | 3.55 | 3.47 | 3.57 | 3.54 | 1. |
| C. Culturable Waste | 22.94 | 19.21 | 17.50 | 16.70 | 16.41 | 16.34 | 15.45 | 15.88 | 15.72 | 5. |
| 4. Fallow Lands (A+B) | 28.12 | 22.82 | 19.88 | 24.61 | 23.05 | 24.17 | 22.87 | 24.87 | 24.89 | 8. |
| A. Fallow Lands other than Current Fallows | 17.44 | 11.18 | 8.76 | 9.79 | 9.56 | 9.35 | 9.18 | 9.51 | 9.96 | 3. |
| B. Current Fallows | 10.68 | 11.64 | 11.12 | 14.82 | 13.49 | 14.82 | 13.69 | 15.36 | 14.93 | 4. |
| 5. Net Area Sown (6-7) | 118.75 | 133.20 | 140.27 | 140.30 | 142.00 | 140.80 | 142.75 | 140.90 | 141.06 | 46. |
| 6. Total Cropped Area (Gross Cropped Area) | 131.89 | 152.77 | 165.79 | 173.10 | 177.05 | 173.40 | 180.17 | 176.42 | 177.32 | |
| 7. Area sown more than once | 13.14 | 19.57 | 25.52 | 32.80 | 35.05 | 32.60 | 37.42 | 35.52 | 36.26 | |
| 8. Cropping Intensity (%) | 111.07 | 114.69 | 118.19 | 123.38 | 124.68 | 123.15 | 126.21 | 125.21 | 125.71 | |
| III. NET IRRIGATED AREA | 20.85 | 24.66 | 31.10 | 38.84 | 39.76 | 40.72 | 41.96 | 41.78 | 41.76 | |
| IV. GROSS IRRIGATED AREA | 22.56 | 27.98 | 38.20 | 49.88 | 51.60 | 52.12 | 53.94 | 54.06 | 53.98 | |

* 1985-86 figures are provisional

** Cropping intensity is obtained by dividing the gross cropped area by the net area sown

Source:
Directorate of Economics & Statistics
Dept. of Agriculture & Cooperation

APPENDIX I

ALL INDIA LAND UTILISATION STATISTICS - SELECTED CATEGORIES.

(as on January 2, 1989) (million hectares)

| YEAR | NET SOWN AREA | GROSS SOWN AREA | AREA SOWN MORE THAN ONCE (3-2) | NET IRRIGATED AREA | GROSS IRRIGATED AREA | AREA IRRIGATED MORE THAN ONCE (6-5) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1950-51 | 118.75 | 131.89 | 13.14 | 20.85 | 22.56 | 1.71 |
| 1951-52 | 119.40 | 133.23 | 13.83 | 21.05 | 23.18 | 2.13 |
| 1952-53 | 123.44 | 137.67 | 14.23 | 21.12 | 23.30 | 2.18 |
| 1953-54 | 126.81 | 142.48 | 15.67 | 21.87 | 24.36 | 2.49 |
| 1954-55 | 127.85 | 144.09 | 16.24 | 22.09 | 24.95 | 2.86 |
| 1955-56 | 129.16 | 147.31 | 18.15 | 22.76 | 25.64 | 2.88 |
| 1956-57 | 130.85 | 149.49 | 18.64 | 22.53 | 25.71 | 3.18 |
| 1957-58 | 129.08 | 145.83 | 16.75 | 23.16 | 26.63 | 3.47 |
| 1958-59 | 131.83 | 151.63 | 19.80 | 23.40 | 26.95 | 3.55 |
| 1959-60 | 132.94 | 152.82 | 19.88 | 24.04 | 27.45 | 3.41 |
| 1960-61 | 133.20 | 152.77 | 19.57 | 24.66 | 27.98 | 3.32 |
| 1961-62 | 135.40 | 156.21 | 20.81 | 24.88 | 28.46 | 3.58 |
| 1962-63 | 136.34 | 156.76 | 20.42 | 25.66 | 29.45 | 3.79 |
| 1963-64 | 136.48 | 156.96 | 20.48 | 25.89 | 29.71 | 3.82 |
| 1964-65 | 138.12 | 159.23 | 21.11 | 26.60 | 30.70 | 4.10 |
| 1965-66 | 136.20 | 155.28 | 19.08 | 26.34 | 30.90 | 4.56 |
| 1966-67 | 137.23 | 157.35 | 20.12 | 26.91 | 32.68 | 5.77 |
| 1967-68 | 139.88 | 163.74 | 23.86 | 27.19 | 33.21 | 6.02 |
| 1968-69 | 137.31 | 159.53 | 22.22 | 29.01 | 35.48 | 6.47 |
| 1969-70 | 138.77 | 162.26 | 23.49 | 30.20 | 36.97 | 6.77 |
| 1970-71 | 140.27 | 165.79 | 25.52 | 31.10 | 38.19 | 7.09 |
| 1971-72 | 139.72 | 165.19 | 25.47 | 31.55 | 38.43 | 6.88 |
| 1972-73 | 137.14 | 162.15 | 25.01 | 31.83 | 39.05 | 7.22 |
| 1973-74 | 142.42 | 169.87 | 27.45 | 32.55 | 40.28 | 7.73 |
| 1974-75 | 137.79 | 164.19 | 26.40 | 33.71 | 41.74 | 8.03 |
| 1975-76 | 141.65 | 171.29 | 29.64 | 34.59 | 43.36 | 8.77 |
| 1976-77 | 139.48 | 167.34 | 27.86 | 35.15 | 43.55 | 8.40 |
| 1977-78 | 141.95 | 172.23 | 30.28 | 36.55 | 46.03 | 9.48 |
| 1978-79 | 142.98 | 174.80 | 31.82 | 38.06 | 48.31 | 10.25 |
| 1979-80 | 138.93 | 169.58 | 30.65 | 38.52 | 49.21 | 10.69 |
| 1980-81(P) | 140.30 | 173.10 | 32.80 | 38.84 | 49.88 | 11.04 |
| 1981-82(P) | 142.00 | 177.05 | 35.05 | 39.76 | 51.60 | 11.84 |
| 1982-83(P) | 140.80 | 173.40 | 32.60 | 40.72 | 52.12 | 11.40 |
| 1983-84(P) | 142.75 | 180.17 | 37.42 | 41.96 | 53.94 | 11.98 |
| 1984-85(P) | 140.90 | 176.42 | 35.52 | 41.72 | 54.08 | 12.36 |
| 1985-86(P) | 141.06 | 177.33 | 36.27 | 41.76 | 53.98 | 12.22 |

(P) Provisional

* Figures are not strictly comparable over time due to change in coverage, concept and definition

APPENDIX II

| State/U.T. | Forest Area burnt (in hectares) 1986 | 1987 | 1988 | Total burnt area in last 3 years | Average annual loss (hectares) | Total wealth loss in 3 yrs (Rs. Lakhs) | Average annual wealth loss (Rs. Lakhs) |
|---|---|---|---|---|---|---|---|
| Andhra Pradesh | 1,275.68 | 869.93 | 511.94 | 2,657.55 | 885.85 | - | - |
| Assam | - | - | - | 0.00 | 0.00 | - | |
| Arunachal Pradesh | 844.00 | 494.00 | 323.00 | 1,661.00 | 553.67 | 37.11 | 12.37 |
| Andaman & Nicobar | - | - | - | 0.00 | 0.00 | - | - |
| Bihar | - | - | - | 0.00 | 0.00 | - | - |
| Chandigarh | - | - | - | 0.00 | 0.00 | - | - |
| Dadra & Nagar Haveli | 93.00 | 348.00 | 29.00 | 470.00 | 156.67 | 0.85 | 0.28 |
| Goa, Daman & Diu | - | - | - | 0.00 | 0.00 | - | |
| Gujarat | 29,342.00 | 8,095.00 | 5,050.00 | 42,487.00 | 14,162.33 | - | |
| Himachal Pradesh | 8,598.69 | 825.31 | 4,005.20 | 13,429.20 | 4,476.40 | 48.75 | 16.25 |
| Haryana | 1,499.00 | 146.00 | 618.00 | 2,263.00 | 754.33 | 20.36 | 6.79 |
| Jammu & Kashmir | 2,891.00 | 1,248.00 | 3,313.00 | 7,452.00 | 2,484.00 | 2.01 | 0.67 |
| Karnataka | 433,333.33 | 433,333.33 | 433,333.33 | 1,299,999.99 | 433,333.33 | - | - |
| Kerala | 454.54 | 890.69 | 1,695.36 | 3,040.59 | 1,013.53 | 8.54 | 2.85 |
| Lakshadweep | - | - | - | 0.00 | 0.00 | - | |
| Maharashtra | 10,978.00 | 3,490.00 | 3,813.00 | 18,281.00 | 6,093.67 | 10.34 | 3.45 |
| Madhya Pradesh | 12,282.13 | 17,422.56 | 21,960.97 | 51,665.66 | 17,221.89 | 10.34 | 3.45 |
| Manipur | - | - | - | 0.00 | 0.00 | - | - |
| Mizoram | 5,750.00 | 5,750.00 | 5,750.00 | 17,250.00 | 5,750.00 | - | - |
| Meghalaya | - | - | - | 0.00 | 0.00 | - | - |
| Nagaland | - | - | - | 0.00 | 0.00 | - | - |
| Orissa | 893,841.00 | 924,184.00 | 978,639.00 | 2,796,664.00 | 932,221.33 | 1,006.05 | 335.35 |
| Punjab | 811.70 | 285.25 | 584.70 | 1,681.65 | 560.55 | 2.28 | 0.76 |
| Pondicherry | - | - | - | 0.00 | 0.00 | - | |
| Rajasthan | 3,271.00 | 1,439.01 | 1,072.32 | 5,782.33 | 1,927.44 | 0.19 | 0.06 |
| Sikkim | 666.66 | 666.66 | 666.66 | 1,999.98 | 666.66 | 6.00 | 2.00 |
| Tamil Nadu | 956.00 | 1,126.46 | - | 2,082.46 | 694.15 | 0.25 | 0.08 |
| Tripura | - | - | - | 0.00 | 0.00 | - | - |
| West Bengal | - | - | - | 0.00 | 0.00 | - | |
| Uttar Pradesh | 15,870.61 | 11,668.11 | 11,742.66 | 39,281.38 | 13,093.79 | 21.79 | 7.26 |
| Total | 1,422,758.34 | 1,412,282.31 | 1,473,108.14 | 4,308,148.79 | 1,436,049.60 | 1,174.86 | 391.62 |

Source:
Ministry of Environment & Forests.

APPENDIX XII

(Extracts from a paper presented at the Indian Science Congress at Cochin in February, 1990)

## AMAZONIA DEFORESTATION AND CLIMATE CHANGE

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Abstract :

A coupled numerical model of the global atmosphere and biosphere has been used to assess the effects of Amazon deforestation on the regional and global climate. When the tropical forests were replaced by degraded grass (pasture) in the model, there was a significant increase in surface temperature and a decrease in evapotranspiration and precipitation over Amazonia. In the simulation, the length of the dry season also increased; such an increase could make re-establishment of the tropical forests following massive deforestation particularly difficult.

The distribution of global vegetation was traditionally thought to be determined by local climate factors, especially precipitation and radiation. This view has been modified because controlled numerical experiments with complex models of the atmosphere showed that the presence or absence of vegetation can influence the regional climate. One implication of these results is that the current climate and vegetation may co-exist in a dynamic equilibrium that could be altered by large perturbations in either of the two components. The high rate of deforestation in the Brazilian portion of Amazonia from 25,000 to 50,000 sq.km. per year might thus be expected to have an effect on the regional climate. If deforestation were to continue at this rate, most of the Amazonian tropical forest would disappear in 50 to 100 years.

Removal of the Amazonian forest would also have tremendous effects on species diversity and atmospheric chemistry. The Amazon basin is host to roughly half of the world's species, and the intensity and complexity of plant-animal interactions and the rapid nutrient cycling in the soils make the region vulnerable to external disturbances. The Amazon is also an important natural sink of ozone and plays an important role in global tropospheric chemistry. The present study is mainly confined to the assessment of the effects of deforestation on the physical climate system.

Quantitatively estimating the effects that large changes in terrestrial ecosystems can have on temperature, circulation and rainfall has been difficult because the equilibrium climate is determined by complex interactions among the dynamical processes in the atmosphere and thermodynamic processes at the Earth-atmosphere interface. Realistic models of biosphere have only

recently been developed that can be coupled with realistic models of the global atmosphere. In this paper, we describle the use of a coupled atmosphere-biosphere model to investigate the consequence of the removal of Amazon forest on climate.

In the simulations, we assumed that the tropical forest cover is replaced by a degraded pasture. On the basis of observed changes in soil characteristics in deforested areas, we also assumed that the soil in the deforested regions are disaggregated, and that as a result, values of the soil hydraulic conductivity and water storage capacity available for transpiration are greatly reduced in the upper part of the soil profile.

We have used a high-resolution global model of the atmospheric circulation that describes and predicts atmospheric temperature, pressure, wind and humidity at 18 different, unequally-spaced levels between the surface and 30 km. The horizontal resolution of the model at each level is about 1.8 degree latitude by 2.8 degree longitude. The large scale topography and sea surface temperature (SST) are prescribed. The diurnal cycle is treated explicitly in the model and both the convective and large scale saturation rainfall are calculated. For radiative calculations, zonally symmetric clouds are prescribed rather than generated by the model. The global vegetation distribution at each land grid point is defined by 1 of 12 vegetation types and each vegetation type is defined by a set of morphological, physical and physiological parameters. There are three soil layers in the model: a thin evaporating upper layer, the root zone, and a recharge zone. In the biosphere model, the wind speed, air temperature, incident radiative flux, and precipitation as calculated from the atmospheric model are used to predict the time rate of change of the model variables; canopy temperature; ground temperature; deep soil temperature; liquid water stored on canopy foliage and ground cover foliage; and the wetness of the surface thin layer, root zone, and recharge zone. Runoff, soil moisture, and sensible and latent heat fluxes are calculated as diagnostic outputs of the model.

We first integrated the coupled atmosphere-biosphere model for 1 year with normal prescribed global climatologicl boundary conditions of vegetation distribution, in which the Amazonian region is covered with tropical forests; we refer to this integration as the control case. We then repeated the integrations for 1 year in which all the previous global climatological boundary conditions remained the same except over Amazonia, where the tropical forests were replaced by a degraded pasture cover consisting mainly of grass; we refer to this integration as the deforestation case. In both the control and the deforestation cases, the global SST distribution remained inadvertently fixed for the whole integration period and corresponded to the climatological mean value for December.

The changes over Amazonia in the deforestation case, in effect, resulted in the alteration of a series of climatologically significant parameters. Relative to the tropical forest, the degraded pasture cover is calculated to have a higher albedo, lower roughness length, higher stomatal resistance, a shallower

and sparser root system, and lower available soil moisture storage capacity. The parameters for the control case were obtained from a literature survey and from an analysis of two years of in situ flux measurements, whereas the parameters for the deforestation case were extracted from reports on field work carried out in deforested areas.

The model integrations were started from an atmospheric state on 15 December, when the initial soil moisture in the region could be assumed to be at or near saturation in both cases, and integrations were carried out for 12.5 months. The results are in terms of 12-month averages ( 1 January to 31 December); the first 2 weeks of model integration are ignored. The annual cycle of temperature, precipitation, and evapotranspiration are shown as monthly averages.

Surface and soil temperatures are warmer by 1 to 3 degrees C in the deforestation than in the control cases. The relative warming of the deforested land surface and the overlying air is consistent with the reduction in evapotranspiration and the lowewr surface roughness length. This result is in agreement with results of an earlier simulation experiment and some observations for tropical forests.

The increase in surface temperature calculated in the deforestation case is reflected in diffferences in the surface energy budget for the two cases. The absorbed solar radiation at the surface is reduced in the deforestation case ( 186 W/m sq.) relative to the control case ( 204 W/m sq.) because of the higher albedo (21.6 per cent) for grassland compared to forest (12.5 per cent). The higher surface temperature in the deforestation case gives rise to to more outgoing long-wave radiation from the surface compared to the control case, so that the amount of net radiative energy available at the surface for partition into latent and sensible heat flux is considerably smaller in the deforestation case. Additionally, the reduced soil moisture storage capacity in the deforestation case has the effect of reducing the time-averaged transpiration rate, also, in the deforestation case, less precipitation is intercepted and re-evaporated as the surface roughness and the canopy water holding capacity of the pasture are relatively small.

The reduction in calculated annual precipitation by 642 mm and evapotranspiration by 496 mm suggests that changes in the atmospheric circulation may act to further reduce the convergence of moisture flux in the region, a result which could not have been anticipated withiout the use of a dynamic model of the atmosphere. Increased surface and soil temperature produce some increase in the sensible heat flux (about 10 to 20 W/m sq. not shown); however, even the increased warming of the near surface air is not sufficient to increase the convergence of air (and moisture) into the region in the simulation.

Because evapotranspiration from the forest is one of the important sources of water vapour for precipitation in the Amazon,a reduction in evapotranspiration is expected to lead to a

reduction in precipitation. However, because of the complexity of the atmosphere-biosphere system and the continuous interactions of dynamical and hydrological processes, a reduction in evaporation might be compensated for by an increase in moisture flux convergence. Our experiments indicate that such a compensation will not occur for the Amazon and that there is even a further decrease in convergence of the large scale moisture flux. Whether this result is model-dependent can only be resolved by additional experiments and comparision with results from other models.

The difference in monthly mean surface temperature, precipitation, evapotranspiration, and evapotranspiration minus precipitation for the control and deforestation cases are consistently of the same sign but of different magnitude for each of the individual months. This consistency is partly a result of the large area for spatial averaging; similar time series for different, smaller subregions of Amazon will show more variability from one season to the other. The value of evapotranspiration minus precipitation increased in the deforestation simulation. Runoff was also reduced in the deforestation case because the decrease in precipitation was more than the decrease in evapotranspiration.

A few significant changes in global circulation were also evident in the deforestation simulation, especially over North America; however, climatic fluctuations over the Northern midlatitudes are generally large in nature as well as insimulations even without any forced perturbations, and thus the anomalies may not be directly a result of the deforestation simulation. Moreover, the artificial constraint of time - invariant SST fields makes it difficult to draw any definitive conclusions about the global effects of Amazon deforestation from this study.

The most significant result of this study is the simulated reduction in precipitation over Amazonia, which is larger than the corresponding regional reduction in evapotranspiration, implying that the dynamical convergence of moisture flux also decreased as a result of deforestation. The spatial and temporal coherence of the decrease in precipitation implies that the deforested case is associated with a longer dry season. The lack of an extended dry season apparently sustains the current tropical forests, and therefore, a lengthening of the dry season could have serious ecological implications. Among other effects, the frequency and intensity of forest fires could increase significantly and the life-cycles of pollination vectors could be perturbed.

These results suggest that a complete and rapid destruction of the Amazon tropical forest could be irreversible. Changes in the region's hydrological cycle and the disruption of complex plant animal relations could be so profound that once the tropical forests were destroyed, they might not be able to re-establish themselves.

(Note : References and illustrations have been excluded)

APPENDIX XIII

Some of the important tribes of India:

| State/U.T. | Tribal Communities | Population | Percentage of (2) to the State tribal population |
|---|---|---|---|
| | (1) | (2) | (3) |
| Arunachal Pradesh | Adi, Mishmi, Miri, Mamba, Apatani, Dafla, Bangro, Aka, Miji, Menpa, Bangui, Sherdukpen, Pugan, Sulung | 71,844 | 16.28 |
| Andhra Pradesh | Sughlis, Valmiki, Yenadis, Yerukalas, Konda Reddis, Manna Dhora, Bagata, Goudu, Kondhs, Kulia, Porja, Rona, Reddi Dhoras, Savuras, Andh, Gond, Thoti, Kanira, Gudaba, Pradhan | 2,291,807 | 82.55 |
| Assam | Deori, Bora-Kachari, Kachari, Lalung, Mean, Miri, Radha, Dimasa, Garo, Hmar, Ahasi, Mikiro, Naga, Hojai, Kuki | Not Available | |
| Bihar | Binjhla, Binijhia, Gond, Kisan, Mahali, Baiga, Munda, Oraon, Sauria Paha, Kharwar, Chero, Chik Baraik, Lohra, Parhaiya, Khond, Mahli, Gandia, Karmali | 1,870,379 | 32.19 |
| Gujarat | Koli, Rabari, Siddi, Bhil, Pomla, Rathawara | 1,966,244 | 40.56 |
| Karnataka | Jenu Kuruba, Kadu Kuruba, Paniyan, Iruliga, Soligaru, Kuruba, Maratha, Yerava | 253,859 | 13.90 |
| Kerala | Pulayan, Kattunayakan, Paniyan, Kurichchan, Irular, Eravallan, Kedar, Mudugar, Malakkuravan, Malai Vedan, Palliyar, Yerava | Not Available | |
| Madhya Pradesh | Gond, Kokru, Pardhan, Baiga, Bharia-Bhumia, Bhaina Bhunjia, Kamar, Binjhwar, Keer, Halba, Kondhs, Korwa, Majhwar, Sawar, Nagesia, Kawar, Kairwar, Pao, Bedia | 6,634,883 | 55.35 |

| | | | |
|---|---|---|---|
| Maharashtra | Dhanka, Naikda, Rathwara, Dhodia, Chodhara, Dubla, Gamit, Kathodi, Koraku, Vitolia, Kolidhor, Kol, Koli Mahadev, Bhil, Bhijala, Gond, Pardhan, Damor | 3,283,190 | 56.88 |
| Manipur | Angami, Chotha, Hmar, Kabui, Kach Naga, Koirao, Kom, Koireng, Lamgang, Mao, Maram, Maring, Mizo, Monsang, Moyon, Paite, Purum, Ralte, Sema, Simte, Tangkhul, Thadou, Vaiphul, Zou | 320,276 | 82.55 |
| Meghalaya | Dimasa, Garo, Hajong, Man, Hmar, Mikir, Mizo, Naga, (Khasi excluded) | 7,825 | 12.20 |
| Mizoram | Chakma, Dimasa Kachari, Garo, Khasi, Naga, Mizos, Unclassified | 461,913 | 99.89 |
| Nagaland | Naga, Synteng, Dimasa, Kulki | 7,825 | 12.20 |
| Orissa | Karia, Paroja, Saora, Kolha, Konda Dhora, Koya, Lodha, Munda, Pentia, Khond, Mirdhas, Bhottada, Bhuiya, Binjhal, Gond, Ho, Jaung, Bhumiji, Kisan, Santal, Bhunija | 3,648,517 | 61.68 |
| Pondicherry | Irular | Not Available | |
| Rajasthan | Bhil, Damor, Garasia | 1,929,793 | 46.13 |
| Tamil Nadu | Irular, Kattunayakan, Kadar, Paniyan, Shaloga, Malasarm Kaniyan, Malayali, Ten Kuruba | 120,637 | 23.19 |
| Tripura | Chaimal, Chakma, Garoo, Halam, Jamatia, Khasia, Kulki, Mag, Munda, Naotia, Orang, Riang, Santal, Uchai, Mizo | 247,375 | 42.37 |
| West Bengal | Details not available | Not Available | |
| Himachal Pradesh | Gaddi, Gujjar | 104,282 | 53.80 |
| Total | | 23,623,521 | 45.75 |

Source: Informal.

Note: The Primitive Tribal Groups can be defined to have certain distinct traits such as:
(i) Pre-agricultural level of technology;
(ii) Low level of literacy; and
(iii) Stagnant or diminishing population.

Based on these norms, 74 communities have been identified so far with an approximate total population of 16 lakhs. Their State-wise distribution is Andhra Pradesh (12), Bihar (9), Gujarat (5), Karnataka (2), Kerala (5), Madhya Pradesh (7), Maharashtra (3), Manipur (1), Orissa (12), Rajasthan (1), Tamil Nadu (6), Tripura (1), Uttar Pradesh (2), West Bengal (3) and Andaman and Nicobar Islands (5).

Source: Ministry of Welfare.

The dependence of these communities on forest resources to meet their daily requirements of fruits and roots, game and birds, raw material for construction of huts and trades is total. Most of the communities are unfamiliar with the monetised economy. In view of their "backwardness", the Government of India is providing cent per cent assistance out of Special Central Assistance for Development of these "primitive" groups since 1975-76.

In view of their symbiotic relationship with and total dependence upon forests there is need to protect their livelihoods and safeguarding their interests in the context of the Forest (Conservation) Act, the 1988 Forest Policy and the Forest (Conservation) Act, 1980 as amended in 1988.

APPENDIX XIV

Livestock Census, 1982
(in thousands)

| State/U.T. | Cattle | Buffaloes | Sheep | Goats | Pigs | Horses/ Ponies |
|---|---|---|---|---|---|---|
| Andhra Pradesh | 13,220 | 8,704 | 7,519 | 5,559 | 786 | 14 |
| Assam | 6,750 | 558 | 46 | 1,729 | 578 | 16 |
| Arunachal Pradesh | 168 | 12 | 20 | N.A. | 213 | N.A. |
| Bihar | 16,213 | 4,641 | 1,322 | 12,221 | 1,043 | 111 |
| Gujarat | 6,994 | 4,443 | 2,357 | 3,300 | 172 | 28 |
| Goa, Daman & Diu | 132 | 44 | 1 | N.A. | 73 | N.A. |
| Haryana | 2,342 | 3,369 | 758 | 608 | 250 | 29 |
| Himachal Pradesh | 2,174 | 616 | 1,091 | 1,060 | 8 | 17 |
| Jammu & Kashmir | 2,325 | 563 | 1,909 | 1,004 | 3 | 97 |
| Karnataka | 11,300 | 3,648 | 4,792 | 4,547 | 319 | 24 |
| Kerala | 3,097 | 409 | 7 | 2,004 | 127 | (a) |
| Madhya Pradesh | 27,117 | 6,435 | 959 | 7,572 | 474 | 112 |
| Maharashtra | 16,162 | 3,972 | 2,671 | 7,705 | 302 | 49 |
| Manipur | 747 | 138 | 14 | 42 | 368 | 1 |
| Meghalaya | 550 | 29 | 26 | 186 | 207 | 8 |
| Mizoram | 49 | 4 | 1 | N.A. | 77 | N.A. |
| Nagaland | 151 | 9 | (a) | 62 | 248 | (a) |
| Orissa | 12,930 | 1,333 | 1,990 | 4,931 | 418 | 1 |
| Punjab | 3,263 | 4,590 | 611 | 700 | 226 | 106 |
| Rajasthan | 13,505 | 6,043 | 13,431 | 15,479 | 180 | 30 |
| Sikkim | 173 | 4 | 11 | 96 | 30 | 1 |
| Tamil Nadu | 10,365 | 3,212 | 5,537 | 5,246 | 694 | 10 |
| Tripura | 680 | 16 | 5 | 343 | 103 | 2 |
| Uttar Pradesh | 26,152 | 15,785 | 2,307 | 9,686 | 2,282 | 212 |
| West Bengal | 15,658 | 987 | 1,365 | 10,915 | 768 | 22 |
| Andaman & Nicobar | 36 | 12 | - | N.A. | 96 | N.A. |
| Chandigarh | 7 | 19 | 1 | N.A. | 3 | N.A. |
| Dadra & Nagar Haveli | 45 | 3 | 1 | N.A. | (a) | N.A. |
| Delhi | 52 | 177 | 3 | N.A. | 21 | N.A. |
| Lakshadweep | 3 | - | - | N.A. | - | N.A. |
| Pondicherry | 93 | 9 | 9 | N.A. | 3 | N.A. |
| TOTAL | 192,453 | 69,784 | 48,764 | 95,253 | 10,072 | 899 |

(a) Less than 500
N.A. Not Available

Source: Directorate of
Economics & Statistics

APPENDIX XV

BUSINESS ALLOCATION OF THE MINISTRY OF ENVIRONMENT AND FORESTS.
(An Extract from the Business Allocation of the Government of India.

Ministry of Environment and Forests
Department of Environment, Forests and Wildlife

1. Environment and Ecology, including environment in coastal waters, in mangroves and coral reefs but excluding marine environment on the high seas.

2. Botanical Survey of India and Botanical Gardens.

3. Zoological Survey of India.

4. National Museum of Natural History.

5. The Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974)

6. The Water (Prevention and Control of Pollution) Cess Act, 1977 (36 of 1977)

7. The Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981)

8. Biosphere Reserve Programme.

9. National Forest Policy and Forestry Development in the country, including Social Forestry.

10. Forest Policy and all matters relating to forests and forest administration in so far as the Andaman and Nicobar Islands are concerned.

11. Indian Forest Service.

12. Wild life preservation and protection of wild birds and animals.

13. Fundamental research including coordination thereof and higher education in Forestry.

14. Padmaja Naidu Himalayan Zoological Park.

15. National Landuse and Wastelands Development Council.

16. National Wastelands Development Board.

17. National Assistance to Forestry Development Schemes.

APPENDIX XVI

EXCERPTS FROM THE SARKARIA COMMISSION REPORT ON CENTRE-STATE RELATIONS (Chapters on "Legislative Relations" and "Forests").

## CHAPTER II : LEGISLATIVE RELATIONS.

### 1. INTRODUCTION.

2.1.01 The Union Powers Committee, in their report on July 5, 1947, to the President of the Constituent Assembly declared that the "soundest framework for our Constitution is a federation with a strong Centre". At the same time, they ruled out the idea of framing a Constitution on the basis of a Unitary State as "it would be a retrograde step, both politically and administratively". We have discussed earlier in Chapter I on "Perspective", why the Constituent Assembly opted for a "strong Centre" and at the same time, decided to decentralise and distribute powers between the Union and the States on the federal principle. It is not necessary to recapitulate all we have said there. Suffice it to say, that a strong Centre was considered necessary, not only to protect the independence and preserve the integrity and unity of the country but also to coordinate policy and action between the Union and the States on basic issues of national concern.

2.17.07 Entry 17 A, List III - "Forests"

Entry 17 B, List III - "Protection of wild animals and birds".

In 1952, the Union Government formulated the National Forest Policy. The Policy set a target of bringing one-third (that is, about 100 million hectares) of the total area of India under forest cover. About 75 million hectares were found recorded as under forest cover. The States, however, did not seriously implement this Policy. The depletion of forests continued. Apart from the pressures of human and cattle population and the increasing demand for firewood, timber and fodder, one of the main causes which led to deforestation was the diversion of forest land to non-forestry purposes. We are informed by the Government of India that contrary to the National Forest Policy, during the period of 30 years between 1951-1980, that is, before the Forest (Conservation) Act, 1980, came into force, approximately 4.5 million hectares of the forest land were officially diverted for non-forestry purposes. The average annual rate of such diversion works out to 1.5 lakh hectares. Extensive deforestation and degradation of vegetation caused an alarming destabilisation of the hydrological cycle resulting in rapid run-offs in the form of flood waters. It also led to progressive shrinkage of the habitat of wild animals and birds and erosion of genetic diversity in the recognised ecological sub-divisions of the country. Eighty-one species of mammalian fauna and some species of birds were on the verge of extinction. The welfare of tribals, who are ecologically and economically inseparable from the forest, was also put in jeopardy. The adverse effects and implications of deforestation, extended far

beyond the territorial boundaries of the States. The problems and mischief resulting from deforestation had assumed national dimension. There was thus ample justification for transferrring "Forests" to the Concurrent List to enable Parliament to pass the Forest (Conservation) Act, 1980. The primary object of this Act is to check indiscriminate diversion of forest land for non-forestry purposes. The Union-State problems or difficulties in the administration of this Act, have been dealt in the Chapter on "Forests".

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## CHAPTER XV : FORESTS.

### 1. INTRODUCTION.

15.1.01 The National Forest Policy lays down that out of 329 million hectares of geographical area in India, at least one-third, i.e., about 100 million hectares should be covered by forests. Studies made by the National Remote Sensing Agency have revealed that in three years, 1972-75, forest area actually covered was only 55.5 million hectares (16.9 per cent of the geographical area). The extent of forest cover declined further and was only 46 million hectares in 1980-82 (14.10 per cent of the geographical area). Thus, over a period of 7 years, the reduction in forest area was of the order of 9 million hectares, i.e., about 2.8 per cent of the geographical area of the country. This rapid depletion of forest resources is a matter of utmost concern for the nation.

### 2. CONSTITUTIONAL ARRANGEMENTS.

15.2.01 The subject "Forests" was originally enumerated in the State List. The Forty-second Amendment to the Constitution (1976) transferred the subject from the State List to the Concurrent List. (Entry 17A of List III).

15.2.02 The Forest (Conservation) Act, 1980, was enacted by Parliament to prevent further indiscriminate deforestation. Its "Objects and Reasons" stated, inter-alia, that "Deforestation causes ecological imbalance and leads to environmental deterioration. Deforestation had been taking place on a large scale in the country and it has caused wide-spread concern."

15.2.03 Section 2 of the Act provides: "Notwithstanding anything contained in any other law for the time being in force in a State, no State Government or other authority shall make, except with the prior approval of the Central Government, any order directing -

(i) that any reserved forest (within the meaning of the expression "reserved forest" in any law for the time being in force in that State) or any portion thereof, shall cease to be reserved;

(ii) that any forest land or any portion thereof may be used for any non-forest purpose".

The explanation to Section 2 states that for the purposes of that

section, "non-forest purpose" means "breaking up or clearing of any forest land or portion thereof for any purpose other than re-afforestation." There is no delegation to the States under the Act and all proposals touching Forests have now to be submitted for approval of the Union Government.

## 3. COMPLAINTS OF THE STATES.

15.3.01 The main complaint of the State Governments relates to the restrictions imposed under Section 2 of the Forests (Conservation) Act on the executive powers of State Governments. Prior to the Forest (Conservation) Act, 1980, the State Governments were totally free to determine all matters relating to dereservation, but the Act of 1980 resulted in total centralisation. This has provoked a State Government to observe that "in the matter of dealing with forests, we seem to be swinging from one extreme to another". Most of the State Governments have drawn attention to the difficulties faced by them in the execution of vital, urgent development projects like irrigation and power projects owing to delays in approval of deforestation proposals involved in these projects. They point out that even small schemes get delayed as the States have no powers to approve deforestation to any extent.

15.3.02 Except for two State Governments, there has been no criticism in regard to the transfer of the subject "Forests" to the Concurrent List. One of them has argued that since this change has been made, no big improvement in respect of planting, care, conservation and development of forests has been observed and the steady loss of the forests cover continues to be a "serious national problem." According to this State Government, the real solution lies in creating a strong public awareness about the role of forests in the country's economy and ecology as well as taking effective measures against unauthorised exploitation of forests. According to it, afforestation is eminently suitable for utilisation of voluntary labour and for useful deployment of manpower under the special employment programmes. The other State Government has stated that there is no justification for having this Entry in the Concurrent List. Both the State Governments have suggested that the subject "Forests" should be transferred back to the State List by restoring Entry 19 which was deleted by the Forty-second Amendment.

15.3.03 It is an incontrovertible fact that deforestation in India has been going on at an alarming rate. Even one of the State Governments, which has asked for the transposition of Entry 17A back to the State List, concedes that the loss of forest cover continues to be "a serious national problem". It inevitably follows from this admission that conservation of forests or maintenance and adequate development of forest cover is not a matter of exclusive State concern. Therefore, this matter cannot be put back in the State List to remain a matter of exclusive State jurisdiction. It is obviously a matter of common and concurrent interest to the Union and the States. In fact, the Union Legislature has occupied only one aspect of this concurrent field, viz., "conservation of forests" by enacting the Forest (Conservation) Act, 1980. Except to the extent covered by this Act, the legislative and executive competence with respect to the remaining aspects of the subject "Forests", remains with the

States. The Forest (Conservation) Act leaves the planting development, extension and care of forests to the States. Even exploitation of the reserve forests in a scientific manner and appropriation of the income from those forests is with the States. If the States are unwilling or unable to extend the forestation or develop the forests and usefully deploy the manpower under the special employment programmes, that is no argument for transfer of "forests" back to List II. It rather cuts the other way. We have discussed this issue in detail in the Chapter on "Legislative Relations".

15.3.04 Suggestions from the States to overcome the difficulties being faced by them can be summarised as follows:

(i) A measure of delegation to the States. One State has suggested delegation of powers by relaxation of provision of Section 2 of the Act upto 10 hectares to the State Governments.

(ii) Provision for blanket clearance for projects like construction of power transmission lines where damage to forest areas is minimal.

(iii) Major irrigation and power projects are scrutinised by the various agencies like Central Water Commission, Central Electricity Authority, etc. Thereafter they have to be considered by the concerned Departments and the Planning Commission before final approval is given. Scrutiny of the proposals relating to Forests should be carried out by the Ministry of Environment and Forests for these major projects at the same time, so that once a project has been examined from all aspects, and approved and cleared, the State Government need not approach the Union Government again for clearance under Section 2 of the Act.

15.3.05 The Ministry of Environment, Forests and Wildlife, in their reply, have pointed out that the procedure for approval under Section 2 of the Act has since been streamlined and most of the projects are now cleared expeditiously. They have further asserted that delay in giving clearance under Section 2 is largely due to States' furnishing incomplete information.

15.3.06 The reply from the Ministry of Environment, Forests and Wildlife of the Government of India also mentions that, "a Working Group was constituted to examine and suggest simplification of the procedure under the aforesaid Act ... As recommended by the Working Group, detailed guidelines have again been issued to all States and Union Territories. The cases relating to surveys and investigation, in forest areas, which do not involve cutting of trees are not required to be referred to the Central Government. Further, the procedure for laying of transmission lines or pipes for water supply, which do not involve felling of trees, has been simplified. However, it has been noticed that in spite of clear guidelines, correct and complete proposals are very often not submitted by the States."

## 4. ANALYSIS OF VIEWS.

**15.4.01 We have considered the criticism and suggestions of the State Governments in the light of the above. Only two State**

Governments want that "Forests" should be transferred back to the State List. We have already noted that the subject "Forests" was placed in the Concurrent List by the Constitution (Forty-second Amendment) Act, 1976. The Constitution (Forty-fourth Amendment) Act, 1978, which in many respects nullified the effect of the Forty-second Amendment, was introduced after a general agreement had been reached among different political parties. It is pertinent that it did not retransfer "Forests" from the Concurrent to the State List.

15.4.02 The Ministry of Environment, Forests and Wildlife has drawn attention to the fact that during the period 1951-52 to 1979-80, 4.3 million hectares of forest land was officially diverted to non-forest purposes. During the seven years, 1975-82, about nine million hectares of forests were lost. Obviously, in the period immediately preceding the enforcement of the Forest (Conservation) Act, 1980, large-scale denudation of forests took place. Pressures on forest area due to increasing population are well-known. Availability of fire-wood falls far short of the demand. It has been pointed out by the Ministry of Environment, Forests and Wildlife that in 1978, guidelines were issued by Government of India laying down that all proposal involving use of forest land exceeding 10 hectares, should be referred to them for prior concurrence. Unfortunately, it was observed only in breach. The Forest (Conservation) Act, 1980, has enabled the Government of India to drastically reduce the diversion of forest land to non-forest uses.

15.4.03 Today, there is much greater appreciation of the need for a countrywide approach in regard to forest conservation measures. In many parts of the country the adverse consequences of destructions of forests are already being felt. We are, therefore, of the view that it would be a retrograde step to transfer back the subject of "Forests" to the State List.

15.4.04 The main complaint of the State Governments, as already noted, is in respect of delay in clearance of projects referred to the Union Government under Section 2 of the Act. Some State Governments have given specific instances of delays. Five of the States have pointed out the difficulties arising out of total centralisation of authority under Section 2 of the Act. Absence of any delegation to the States, according to them, has resulted in a situation where even small works in forest areas, some of which may be urgent in nature, frequently get held up.

15.4.05 On the other hand, according to the Ministry of Environment, Forest and Wildlife of the Government of India, the main reasons for delay are:

(i) Incomplete proposals;

(ii) Lack of coordination between different Departments of the States/Union Territories and their Forest Deparement;

(iii) Absence of monitoring of cases by States/Union Territories; and

(iv) Non-adherence to time-limits by States/Union Territories at their level (2 months for processing and 3 weeks for furnishing clarification, additional information) sought by Union Government.

15.4.06 The Ministry of Environment, Forests and Wildlife has i their reply stated that since the enactment of the Act, a littl more than two thousand proposals for diversion of forest land t non-forest purposes were received by the Department upto the end of February, 1986. Of these, only 71 cases are pending, out o which only 13 are pending for more than two months. The information also shows that a large number of cases (871 out o 2068) were treated as "closed" because of the incomplet information given by the State Governments. There are only fou cases pending for more than six months.

15.4.07 There may be several reasons for treating cases referred under Section 2 of the 1980 Act as "closed". It could be after full consideration of all the issues involved or it could be du lack of follow-up action from the States. However, it i important to ensure that no genuine cases of development work ar held up.

15.4.08 On the other hand, four State Governments have given u the details of long pending cases (for more than 6 months) under Section 2 of the Forest (Conservation) Act. In one State, the number appears to be unusually large. About 205 cases out of 27 referred to under Section 2 of the Act are stated to be pending. This apart, the practice of disposing off an unusually larg number of such cases, not on merits but as "closed" for want o complete information from the State Governments, is not a desirable course of action. Certainly, it is not conducive t smooth and harmonious working of Union-State relations. We do not intend to go into the merits of these cases. Our purpose i referring to this information is to highlight the point that th expeditious clearance of projects, is being plagued by procedura problems between the Union and State Governments. Mere shiftin of responsibility is not going to give results. The sooner these problems are sorted out the better it will be for the country as a whole. It will surely expedite project implementation.

15.4.09 In view of a large number of cases having been "closed , there is need for reviewing them to identify the reasons. W recommend that a senior officer of the Ministry of Environment Forests and Wildlife should examine all such cases which have been disposed off as "closed", identify the reasons and inform the States. Cases which are required to be followed up by the States should be reopened and decided on their merit after discussion with the representatives of the concerned State Governments.

15.4.10 We note that the Ministry of Environment, Forests and Wildlife, has issued certain administrative guidelines to the State Governments in regard to the submission of proposals for approval of Government of India under Section 2 of the Act. We have also been informed that certain time-limits have been fixed for expediting disposal of such proposals. States have been asked to process the proposals within two months. Three weeks have been allowed for furnishing clarifications and additional information elicited by the Government of India. These are welcome steps but are not adequate. It would be advantageous if a bi-annual review of pending cases is carried out in consultation with the State Governments. Such a step would eliminate unnecessary correspondence and make for speedy disposal of cases. States could be informed in advance about th

documents and information required. Since the review will be bi-annual, the States will get ample time to respond to the queries.

15.4.11 We note that in the existing arrangements, there is no delegation at all to the States in regard to diversion of reserve forest areas to non-forest uses or inter-change of forest and non-forest areas. As a result, a large number of proposals have necessarily to be sent to the Government of India. The question for consideration is whether any delegation is necessary and desirable in this regard. States have expressed unhappiness over the fact that even for every minor schemes like sinking of a well or building a small school in a tribal village involving diversion or interchange of very small piece of reserve forest land to such non-forest purposes, proposals have to travel all the way from the Panchayat/Block level to the Government of India. The adverse impact on local development activities can well be imagined.

15.4.12 We are, therefore, of the view that certain amount of delegation to the States is necessary.

15.4.13 It has been argued that all these years the States were free to de-reserve forest lands and extensive damage has been done and the only way to deal with the situation is for the Union Government to assume all powers in this regard. It is necessary in this connection to distinguish between illicit felling of trees and dereservation or interchange by the States. The former requires to be checked with utmost severity. This calls for a high degree of cooperation and coordination between the Union and the States. The centralisation of powers in regard to dereservation of forests will not yield the desired results in controlling illicit felling. All States are agreed on the need to conserve our forests. Many experts and eminent persons, who appeared before us, also emphasised the need to conserve the forest resources. States have been entrusted with a wide range of functions under the Forest Act, 1927. Indeed, States are responsible for all matters relating to forests and only in regard to diversion of reserved forests, they can not approve any proposal except with the prior consent of the Union Government. States are, however, primarily responsible for the upkeep of forests, prevention of illicit felling and taking of punitive action against the offenders and the like. We have already noted that in 1978, prior to the passing of the Forest (Conservation) Act, 1980, States had been requested to send all proposals involving dereservation of 10 hectares and more to the Government of India for clearance.

15.4.14 We recommnd that powers should be delegated to the States to divert, to a small extent, say not exceeding 5 hectares of reserved forest lands which are urgently required for specific public purposes.

15.4.15 However, freedom to act should not be interpreted liberally. We have already referred to the depredations in the forests and the massive depletion of forest resources due to dereservation and illegal felling. The Union Government and all the State Governments have spoken unequivocally in favour of conservation of forests. The State Governments should, therefore, exercise utmost caution in the exercise of the powers recommended to be delegaed to them. A thorough technical scrutiny of the proposals by the Forest Department of the State

Governments is a must and it should, among other things, ensure that only the minimum area required is permitted to be deforested. A positive approach to the problem is necessary. The States should as a rule arrange for afforestation of an equivalent area. Cases which are not of urgent nature or involve dereservation of an area more than 5 hectares will naturally be processed for clearance of the Department of Environment and Forests as per existing provisions. Our observation about the need to afforest equal area affected by deforestation will apply equally to such cases also. We have already suggested a bi-annual review of cases pending with Government of India to be held jointly. This opportunity should be made use of to review the action taken by the States under the delegated authority and assess to what extent the afforestation of equivalent areas has been effectively carried out.

15.4.16 Conservation and improvement of forest resources is of utmost importance to the nation. The fast growing demand for timber and other forest produce requires a systematic and multi-pronged approach to sustain continuous supply and simultaneously preserve and improve the ecological balance. Many of the required elements of policy already find place in the Social Forestry Policy. It is obvious that a concerted action by both the Union and the States is called for in implementing them. We would like to emphasise that along with the restrictions on indiscriminate felling of trees and use of forest land, the positive aspects involving, inter alia, schemes of afforestation and development of substitutes for forest produce are equally important. In this connection, we have taken note of a study on "Forestry and the law" conducted by Shri Chhatrapati Singh at the Indian Law Institute, New Delhi (December 1986), which has highlighted that at the field level a more systematic and purposive implementation of forestry policy is called for. For this, the observed incompatability and anomalies between legislation and orders passed at various levels need to be removed. Among other things, the above mentioned study has emphasised that the Acts should rationalise planting and felling of trees on private land; rationalise transit rules wherever necessary, especially in areas away from forests; permit purposive allotments of land, such as leasing out denuded forest lands to private individuals or groups; a better understanding of the intent of the Forest (Conservation) Act, 1980, in the guidelines of Government of India, etc.

Without embarking upon an indepth appraisal of these suggestions, on merits, we feel it necessary to point out that since some of them or their aspects directly impinge upon matters in the State List, their successful implementation depends, in no small measure, on adoption of a procedure based on close consensus and cooperation between the Union and the States.

15.4.17 The next suggestion for consideration is that clearances under Section 2 of the Act should be given along with approvals of other agencies in case of major projects. States have cited instances of major projects which though cleared by the Government of India, have yet been held up for want of clearance under Section 2 of the Forest Act. Such situations can be avoided if a comprehensive study of all collateral aspects and incidental needs and likely effects on the forests and ecology of the site and surroundings of a contemplated project is made, considered, coordinated, and approved at the time of project

clearance by the Government of India.

15.4.18 We recommend that clearance under Section 2 of the Forest (Conservation) Act, should be given as far as possible simultaneously with the project clearance by the Government of India.

15.4.19 A lot of effort and time would be saved if the Central agencies are associated with the formulation of large projects/ schemes involving reserve forests, right from the beginning, so that adequate measures not only to compensate but also to improve forest resources can be built into them, ab initio.

## 5. RECOMMENDATIONS.

15.5.01 In view of a large number of cases referred under Section 2 of the Forest (Conservation) Act, 1980, having been "closed" there is need for reviewing them to identify the reasons. A senior officer of the Ministry of Environment, Forests and Wildlife should examine all such cases which have been disposed off as "closed", identify the reasons and inform the States. Cases which are required to be followed up by the States should be reopened and decided on their merits after discussion with the representatives of the concerned State Governments. (Para 15.4.09)

15.5.02 Powers should be delegated to the states to divert, to a small extent, say not exceeding 5 hectares of reserved forest lands, which are urgently required for specific public purposes. (Para 15.4.14)

15.5.03 Conservation and improvement of forest resources is of utmost importance to the nation. A concerted action by both the Union and the States is imperative. At the same time, it is necessary to ensure that development efforts are not hampered. A bi-annual review of pending cases should be carried out in consultation with each State Government concerned. This occasion should also be utilised for reviewing the sanctions by virtue of powers recommended by us, to be delegated to them. (Paras 15.4.15 and 15.4.16)

15.5.04 In the case of large projects involving significant extent submersion of reserved forests or their diversion to non-forest uses, clerance under Section 2 of the Forest (Conservation) Act, 1980 should be given as far as possible simultaneously with the project clearance by the Union Government. Agencies of the Union Government may be associated, right from the beginning, with the formulation of the project so that adequate measures not only to compensate for the loss of reserved forests but also to improve forest resources, can be built into them ab initio. (Paras 15.4.17 to 15.4.19)

APPENDIX XVII

No. 7-22/85-FRY (P)
Government of India
Ministry of Environment & Forests
(Department of Forests and Wildlife)

Krishi Bhavan, New Delhi
dated the 7th May, 1985

RESOLUTION

1. By Resolution No. 28-2/80-SC(T), dated the 26th February, 1983, the Ministry of Agriculture announced the decision to set up a two-tier Central Body, namely, the National Land Board and the National Land Resources Conservation and Development Commission, to serve as a policy planning, coordinating and monitoring agency for issues concerning the health and scientific management of the country's land resources.

2. With a view to placing proper emphasis on the twin objectives of proper land use and the development of wastelands, it has now been decided that the National Land Board, reconstituted as the National Land Use and Wastelands Development Council, should be under the chairmanship of the Prime Minister. It has also been decided to set up the following two separate bodies under the National Land Use and Wastelands Development Council (NLWC):

   (i) The National Land Use and Conservation Board (NLCB) to be located in the Ministry of Agriculture and Rural Development, Department of Agriculture and Cooperation, New Delhi, replacing the existing National Land Resources Conservation and Development Commission.

   (ii) National Wastelands Development Board (NWDB) to be located in the Ministry of Environment and Forests Department of Forests and Wildlife, New Delhi.

3. The composition, role and functions of the National Land Use and Wastelands Development Council (NLWC) and the two Boards under it are given in the following paragraphs:

4. NATIONAL LAND USE AND WASTELANDS DEVELOPMENT COUNCIL

4.1 Composition

| | | |
|---|---|---|
| (i) | Prime Minister | Chairman |
| (ii) | Chief Ministers of all States/UTs | Members |
| (iii) | Ministers/Ministers of State of Central Ministries/Departments of:<br>- Finance<br>- Agriculture & Rural Development<br>- Environment & Forests<br>- Irrigation<br>- Works & Housing | Members |

- Railways
- Industry
- Education

| | | |
|---|---|---|
| (iv) | Deputy Chairman, Planning Commission | Member |
| (v) | Chairman, National Land Use and Conservation Board | Member |
| (vi) | Chairman, National Wastelands Development Board | Member |

The Chairman may coopt any other person as Member of the Council, as may be necessary.

Secretaries to Government in the Department of Forests and Wildlife and the Department of Agriculture and Cooperation will attend all meetings of the Council. The Secretariat of the Council will be located in the Prime Minister's Office and Joint Secretary to the Prime Minister will service the Council as its Secretary.

4.2 Role and Functions:

The Council will be the highest policy planning and coordinating agency for all issues concerning the health and scientific management of the country's land resources. It will oversee the work of the National Wastelands Development Board and the National Land Use and Conservation Board. Recommendations of these Boards which involve larger policy issues will be placed before the Council for taking a final view.

4.3 Meetings of the Council:

The Council shall meet at least once a year.

5. NATIONAL LAND USE AND CONSERVATION BOARD

5.1 Composition

| | | |
|---|---|---|
| (i) | Deputy Chairman, Planning Commission | Chairman |
| (ii) | Chairman, National Wastelands Development Board | Member |
| (iii) | Member-in-Charge of Agriculture, Planning Commission | Member |
| (iv) | Chairman, Advisory Board on Energy | Member |
| (v) | Secretaries - Departments of: Irrigation, Works & Housing, Rural Development, Environment, Forests & Wildlife, Finance (Expenditure), Mines, Shipping & Transport, Railways, Industries and Planning Commission | Members (11) |
| (vi) | Director General, Indian Council of Agricultural Research | Member |

| | | |
|---|---|---|
| (vii) | Chairman, Central Water Commission | Member |
| (viii) | Chief Planner, Town & Country Planning Organisation, Ministry of Works & Housing | Member |
| (ix) | Agriculture Commissioner, Department of Agriculture and Cooperation | Member |
| (x) | Economic & Statistical Advisor, Dept. of Agriculture & Cooperation | Member |
| (xi) | 5 Representatives from States (one from each Region). Membership to be rotated within the Region amongst the member States on yearly basis, representatives to be nominated preferably by the concerned State Land Use Boards. | Members (5) |
| (xii) | 6 experts in the field of soil conservation, flood control, land reclamation, development of desert/hill areas/drought prone areas, town & country planning, rural development, environment, etc. | Members (6) |
| (xiii) | Secretary (Agriculture & Cooperation) | Member-Secretary |

5.2 Role and Functions:

(i) Formulate a National Policy and Perspective Plan for conservation, management and development of land resources of the country, taking into account appropriate land use and soil capability and other factors.

(ii) Make an overall review of the progress of implementation of ongoing schemes and programmes connected with conservation and development of land resources, soils and allied matters.

(iii) Consider and review proposals concerning soil surveys and general assessment of land resources.

(iv) Sponsor studies, to organise regional and national deliberations/seminars/workshops through various agencies in collaboration with State Land Use Boards, Universities, research institutes, etc.

(v) Take measures for creating a general awareness about the importance and problems of proper soil management

(vi) Consider measures for ensuring that good agricultural land is not indiscriminately diverted to non-agricultural purposes.

(vii) Coordinate the work of State Land Use Boards.

(viii) Act in full collaboration with the National Wastelands Development Board in regard to matters of common interest.

(ix) Consider and undertake all other measures necessary for promoting the scientific management of land use and conservation.

5.3 Location:

The Board will be located in and serviced by the Ministry of Agriculture and Rural Development (Department of Agriculture and Cooperation) at New Delhi.

6. NATIONAL WASTELANDS DEVELOPMENT BOARD

6.1 Composition

The composition of the Board will be as follows:

| | | |
|---|---|---|
| (i) | Dr. (Mrs.) Kamla Chowdhry | Chairperson |
| (ii) | Chairman, Advisory Board on Energy | Member |
| (iii) | Three Members of Parliament | Members |
| (iv) | Secretaries to the Government of India in the Departments of:<br>- Agriculture & Cooperation<br>- Rural Development<br>- Environment | Members |
| (v) | Secretary, Finance (Expenditure) | Member (Finance) |
| (vi) | Secretary, Department of Agricultural Research and Education and Director General, Indian Council of Agricultural Research | Members |
| (vii) | Special Secretary (Forests and Wildlife) and Inspector General of Forests | Member |
| (viii) | Representatives of Voluntary Agencies, Cooperative Institutions etc. (not exceeding six) to be nominated by the Chairperson of the Board in consultation with the concerned agency | Members |
| (ix) | Secretary, Department of Forests and Wildlife | Member-Secretary |

The Board may coopt experts as may be necessary.

6.2 Role and Functions:

The principal aim of the Board shall be to bring under productive use, wastelands in the country through a massive programme of afforestation and tree planting. To this end,

it will undertake the following main functions:

(i) Formulate within the overall National Policy, Perspective Plan and Programmes for the management and development of wastelands in the country.

(ii) Identify the wastelands in the country to be covered under the programme of the Board.

(iii) Review the progress of implementation of programmes and schemes for the development of wasteland by different agencies within and outside the Government.

(iv) Approve projects and schemes for the development of wastelands through Government and other agencies.

(v) Consider and fund projects and schemes of appropriate agencies for wastelands development.

(vi) Promote, encourage and finance development of wastelands in the country through the active involvement of non-Government organisations, Voluntary Agencies and the public at large, including the landless.

(vii) Collaborate with the Central and State Government departments, agencies, local bodies and Voluntary Agencies with a view to mobilising manpower, funds and other inputs required for wastelands development programmes.

(viii) Sponsor development of appropriate technology and management practices for wastelands development.

(ix) Create a reliable data base and documentation centre on related aspects of wastelands development.

(x) Promote a network of nurseries and "Seed Banks" to supply quality certified planting material and seeds.

(xi) Promote training programmes and training materials for workers at various levels for optimal development utilisation of wastelands.

(xii) Prepare budgetary requirements for the Board and its wastelands development schemes.

(xiii) Interact with financial institutions for funding wastelands development programmes.

(xiv) Create general awareness in favour of wastelands development, specially through the education system.

(xv) Take up studies of set up expert groups for the purpose of preparing projects/schemes/papers, reports, etc. on specified schemes.

(xvi) Act in collaboration with the National Land Use and Conservation Board in regard to matters of common concern.

(xvii) Consider and undertake all other measures necessary for promoting the development of wastelands.

6.3 Location:

The Board will be located in and serviced by the Ministry of Environment and Forests (Department of Forests and Wildlife) at New Delhi.

Sd/-
(T.N. SESHAN)
Secretary to the Government of India

APPENDIX XVIII

(The following "Goa Guidelines" were contained in a statement prepared by an Experts Group formed by the United Nations University in the context of its project on international law, common patrimony and inter-governmental equity).

GOA GUIDELINES ON INTER-GENERATIONAL EQUITY.

The Advisory Committee established to the United Nations University Project on "International Law, Common Patrimony and Inter-generational Equity" adopts, on the basis of the major study undertaken, the following statement:

The increasing concerns over the depletion of natural resources and the degradation of environmental quality and the recognition of the need to conserve the natural and cultural heritage have evoked responses at all levels: national, regional and international; governmental and non-governmental. These concerns have been expressed in new political initiatives, in incipient economic adjustments and in significant developments in the legal field.

One innovative response to these concerns is represented by the present project which attempts to introduce for the first time in a systematic and comprehensive manner, a long-term temporal dimension into international law as a complement to the traditional spatial dimension.

This temporal dimension is articulated through the formulation of the theory of "inter-generational equity"; all members of each generation of human beings, as a species, inherit a natural and cultural patrimony from past generations, both as beneficiaries and as custodians under the duty to pass on this heritage to future generations. As a central point of this theory the right of each generation to benefit from and develop this natural and cultural heritage is inseparably coupled with the obligation to use this heritage in such a manner that it can be passed on to future generations in no worse conditions than it was received from past generations. This requires conservation and, as appropriate, enhancement of the quality and of the diversity of this heritage. The conservation of cultural diversity is as important as the conservation of environmental diversity to ensure options for future generations.

Specifically, the principle of inter-generational equity requires conserving the diversity and the quality of biological resources, of renewable resources such as forests, water and soils which form an integrated system, as well as of our knowledge of natural and cultural systems. The principle requires that we avoid actions with harmful and irreversible consequences for our natural and cultural heritage and that we dispose of nuclear and other wastes without unduly shifting the costs to coming generations.

Planetary rights and planetary obligations follow from the principles of equity governing the relationship between generations. These pertain to valued interests of past, present and future generations, covering natural and cultural resources. They will become enforceable as they find expression in customary and conventional international law. In case of violations, claims should be raised on behalf of present and future generations. There is a complementarity betwen recognized human rights and the proposed international rights.

To implement inter-generational rights and obligations, the following strategies are proposed: a) representation by States not only of present but also of future generations; b) designation of ombudsmen or commissioners for protecting the interests of future generations; c) monitoring systems for cultural and natural resources; d) conservation assessments giving particular attention to long-term consequences; e) measures to ensure use of renewable resources and ecological systems on a sustainable basis; f) commitment to scientific and technical research to advance the purposes set out above and g) programmes of education and learning at all social levels and age groups especially the young generations. It is particularly important to give attention to the proper functioning and maintenance of facilities and services. It is crucial not only to establish services and facilities for conserving natural and cultural resources but also to take appropriate measures for maintaining them.

National institutions and decision-makers and international organizations concerned with conservation and development of natural resources and cultural systems shoudld be encouraged to integrate as a matter of course the inter-generational perspective in their activities and in the elaboration of international principles and agreements respecting our common heritage.

GOA, INDIA, 15 FEBRUARY, 1988.

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* The Members of the Advisory Committee acted in their own personal capacity.

## APPENDIX XIX

### VALUE OF A TREE - A NEW CONCEPT.

(An extract from Prof. T.M. Das' presidential address at the Section of Agricultural Sciences at the Sixty-eighth session of the Indian Science Congress at Varanasi in 1981).

Plants have been helping to maintain the quality of the environment and rendering various valuable services to our society. But these services, unfortunately, have not been properly recognised or assessed in terms of mathematical figures. These lapses on our part not only reduce the real value of trees, but also enhance their destruction in our environment.

In our society, the determination of the value of any object is awfully arbitrary. Some times it loosely follows the rule of demand and supply, some times the assessment is made on the basis of cost benefit ratio. But in many cases there is hardly any such rule or a standard yard-stick. Quite often, we remain totally blind, particularly with regard to the value of natural resources and the value of a tree is one of them.

When we estimate the value of a pair of bullocks, we count the total service they render during their life time. But in the case of trees, we only count the total weight and quality of timber or fruit or biomass it produces. Other commodities that have been produced by the tree or other services that are being derived from the tree in our society are totally overlooked. If we were to calculate these items at the rate of current market price, the value of a tree would have increased by more than 300 times (Das 1980 b, 1980 c).

Trees can be conveniently grouped into three categories. (i) Small trees that grow upto 5 tonnes (including root, stem, branches and leaves). (ii) Medium trees that weigh from 5 tonnes to 50 tonnes. (iii) Large trees that are over 50 tonnes. The weight of the largest tree (Sequoia gigantea) was recorded as 6,167 tonnes. Let us consider the value of the various services rendered by an average tree of 50 tonnes during the 50 years of its life time.

Production of Oxygen: During photosynthesis, six molecules of oxygen are liberated with every molecule of glucose synthesized. Some amount of oxygen is used up by the tree for its respiration. But the rate of oxygen production by the tree is far greater than the rate of oxygen consumption, hence the balance is being stored up in the atmosphere.

The total amount of oxygen produced by a 50 tonnes medium size tree is at least one tonne per year (depending on the species and climatic condition). The present market price of this amount of oxygen is Rs.5,000/- (@ Rs.5/- per kg.). If the tree were to live for 50 years, the total value of its oxygen production would be amounting to Rs.2,50,000/-. We do not add this value when we assess the price of a tree. It should be borne in mind that we are not yet capable of producing oxygen at such a large scale so as to maintain its balance in the atmosphere. If we were to buy our own oxygen which we consume every day, most of us would have to spend all our daily earning

on this commodity alone.

Control of Air Pollution: We are not as yet technically developed enough to make any large scale artificial arrangement to clean and purify air and depend mainly on plants for this service. If we were to replace this function of a tree with some artificial means, an enormous amount of capital expenditure with expenditure of energy and manpower would be necessary. The energy used for this purpose would also create pollution of some form. A most conservative calculation indicates that only the running cost for such artificial arrangement would amount to Rs.10,000/- per year, per tree, totalling Rs.5,00,000/- for 50 years.

Control of Soil Erosion and Maintenance of Soil Fertility: A medium sized tree with the help of its complex network of root system checks the erosion of minute soil particles from the basal ground area of about 10m X 10m = 100 sq.m (depending on the species and the soil type). Tree also maintains soil fertility by adding organic material through leaf shedding and other exudations. In the absence of the tree most of the eroded soil particles would ultimately deposit in the bottom of the rivers or dams, reducing their normal water holding capacity and causing widespread flooding involving a great monetary loss. If we were to replace this normal function of a tree by employing manpower and applying organic manure to the ground, the approximate total annual cost would be Rs.5,000/- and during the 50 years it would amount to Rs.2,50,000/-.

Recycling of Water and Control of Humidity: An enormous quantity of water is regularly recycled with the help of a tree. During the production of one gramme of dry matter, 300 to 1,000 gramme of ground water is transpired through the leaf surfaces. This bulk of water is much higher than the total evaporated water from the soil occupied by the tree base. The transpired water increases the humidity and decreases the temperature of the atmosphere and helps the formation of clouds and eventually rainfall. In absence of the tree if we were to pull this amount of water from the underground reserve, we would have to install a fairly large centrifugal pump and spend extra energy and manpower to run the pump. Apart from the initial expenditure which would involve a large amount of capital, its running costs alone would approximately be Rs.6,000/- annually, amounting to Rs.3,00,000/- for the 50 years.

Bird and Animal Shelter: On an average, ten pairs of birds and six pairs of squirrels and a large number of insects and other non-flowering plants like mosses, algae, fungi and lichens get shelter in a medium sized tree. If we were to rear these birds, squirrels, insects and other non-flowering plants with our own resources, we would have to engage manpower incurring a large capital expenditure. The yearly maintenance cost alone would come to Rs.5,000/- at least, and in 50 years it would total Rs.2,50,000/-.

Protein Conversion: The green matter that is produced by a medium size tree is just enough to meet the daily feed of a pair of kids. At the end of the year, the average increase of weight of these two kids will be 25 kg and the corresponding value of meat at the present market price (@Rs.16/- per kg) would be Rs.400/-. Hence, during the 50 years the total value of animal

protein conversion would amount to Rs.20,000/-.

The value of services rendered by a tree of 50 tonnes during 50 years: (Prices of timber, fruits and flowers have not been computed)

| | | |
|---|---|---|
| 1. | Production of Oxygen | Rs. 2,50,000/- |
| 2. | Control of Air Pollution | Rs. 5,00,000/- |
| 3. | Control of Soil Erosion and Soil Fertility | Rs. 2,50,000/- |
| 4. | Recycling of Water and Control of Humidity | Rs. 3,00,000/- |
| 5. | Bird and Animal Shelter | Rs. 2,50,000/- |
| 6. | Protein Conversion | Rs. 2,50,000/- |
| | | Rs. 15,70,000/- |

Hence, the real value of a 50 tonnes medium size tree, after adding prices of all these items of produce and benefits it renders during the years of life time, will come to Rs.15,70,000/- or 15.7 lakhs, which is equivalent to 12 kg of pure gold (@ Rs.1,300/- per 10 gm) or that of a palatial building. The assessment has been made following rather conservative calculation. Trees generally survive for 100 years, life span of 400 to 500 years is not very uncommon. Redwood trees (Sequoia spp.) remain alive for 2,000 to 3,000 years. Here only 50 years of service has been computed exempting all capital expenditure, only running costs of the artificial arrangements which are to be used in lieu of a tree have been counted. Hence, according to my estimation, it is the lowest possible value of a 50 tonne tree.

A medium size tree as per current market rate would hardly fetch, on an average, more than Rs.5,000/- which is only 0.3 per cent of the real value of the tree, but more often it is simply destroyed for a nominal price. When a tree is cut down, the damage it inflicts is rather permanent in nature and cannot be recovered immediately. What is more significant, it is not a personal loss (strictly speaking the personal loss, if any, is limited to only 0.3 per cent of the total loss). It is a loss to the whole community, every individual of the locality has to share and suffer from this loss.

The utter ignorance coupled with influx of population has made people to choose short-term material benefits regardless of future irreparable ecological damage to their society. Due to large-scale logging, many species of trees are now under the threat of total extinction. Although endangered animals receive greatest public attention and sympathy, plant extinctions are more damaging and therefore more significant ecologically. Recently, the International Union for the Conservation of Nature and Natural Resources (IUCN) estimated that about 10 per cent (20,000 to 30,000) of the flowering plants of the world are to be in danger of being rare or under threat towards total extinction. According to Dr. P.H.Ray, Director, Missouri Botanical Garden, a disappearing plant species takes with it 10 to 30 dependent species, such as various other species of insects, higher animals and even other plants.

APPENDIX XX

## THE BOOK OF GENESIS.
(from the Old Testament of the Bible)

Chapter 1, Verses 25 to 30.

25. And God made the beast of the earth after his kind, and cattle after their kind, and every thing that creepeth upon the earth after his kind: and God saw that it was good.

26. And God said, Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.

27. So God created man in his own image, in the image of God created he him; male and female created he them.

28. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air; and over every living thing that moveth upon the earth.

29. And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.

30. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat: and it was so.

TERMINOLOGY

Afforestation: A strictly agricultural operation of establishing a tree crop by artificial means on an area from which forest has always or long been absent.

Agro-Forestry: Has no relation with forests but represents growing perennials on the same land unit as crops/grasses, either in a spatial arrangement or in temporal sequence, to make the maximum economic use of a parcel of land.

Area under non-agricultural uses: All lands occupied by buildings, roads and railways or under water, that is, rivers and canals and other lands put to uses other than agriculture.

Aquifer: The underground formation of water deposits.

Barren and unculturable land: All barren and unculturable land like mountains, deserts, etc. Land which cannot be brought under cultivation, except perhaps but at a high cost, shall be classed as unculturable whether such land is in isolated blocks or within cultivated holdings.

Biomass: The term is used in its more accurate definition to represent both phytomass(plant life in all its forms including microflora) and zoomass (animal life which includes animals, birds, reptiles, insects, marine and aquatic life and microfauna) all of which are mutually interactive and complementary and essential to the progressive development of optimum biomass productivity leading to ecological climax conditions. The total weight of the living components (producers, consumers and decomposers) in an ecosystem at any moment, usually expressed as dry weight per unit per area.

Canopy: Cover of branches and foliage formed by the crowns of trees in a forest.

Community: An aggregation of living organisms without reference to its ecological status.

Community Forestry: No relationship to Forests but represents growing and protecting of trees on non-private and often non-forest lands which are known as revenue lands.

Culturable Waste: All lands available for cultivation whether not taken up for cultivation or taken up for cultivation once, but not cultivated during the current year and the last five years or more in succession. Such lands may be either fallow or covered with shrubs or jungle which are not put to any economic use (these may be assessed or unassessed and may be in isolated blocks or within cultivated holdings). Land once cultivated but not cultivated for five years in succession shall also be included in this category at the end of the five years.

Current fallows: Cropped areas which are kept fallow during the current year. For instance, if any seedling area is not cropped again in the same year it may be treated as current fallow.

Fallow land other than current fallows: All lands which were taken up for cultivation but are temporarily out of cultivation

for a period of not less than a year and not more than five years. The reasons for keeping a land fallow may be one of the following (i) poverty of cultivators, (ii) inadequate supply of water, (iii) malarial climate, (iv) silting of canal and rivers, and (v) unremunerative nature of farming.

Farm Forestry: Practice of growing trees by farmers on private lands. A misnomer and has nothing per se to do with Forests.

Forests: A natural forest of a multistoried stands of vegetation comprising grasses, shrubs, etc. together with lower, middle and top canopy trees endemic to an area.

Geographical area: The latest figure of geographical area for the State/Union Territory/District as furnished by the Central Statistical Organisation based on the Surveyor General of India's data.

Government Agro-Silvicultural Corporations : The term is suggested to describe Forest Development Corporations in their new role, in which they will assume responsibility for production and marketing of fuelwood, timber and non-timber forest produce raised on marginal agricultural lands.

Grassland: A community in which grasses predominate; trees are either altogether absent or present in relatively small number.

Hydrogeographic Systems: Hydrogeographic systems are the land formations (topographic features) that control and influence water flow and determines the distribution of water flow from the rainfall of the country.

Miscellaneous tree crops and groves not included in the net area sown: All cultivable land which is not included under "Net area sown" but put to some agricultural use. lands under casuarina trees, thatching grasses, bamboo bushes and other groves for fuel, etc., which are not included under orchards shall be classed under this category.

Natural Forest: True forests as described under Forests above.

Net sown area: The area sown with crops and orchards, counting areas sown more than once in the same year only once.

Nishtar: Community rights.

Panchayat: Village council, lowest form of local Government, consists of elected members headed by a chairman.

Panchayat lands: Non-private lands under the control of village council.

Pastures: Open access lands meant for grazing, often highly degraded.

Patta: Literal meaning is contract, and refers to leasing of Government land on specific terms, also means title deed to land.

Permanent pastures and other grazing lands: All grazing lands, whether they are permanent pastures and meadows or not, village common grazing lands.

Plantation: A tree or other such crop raised artificially either by sowing or planting.

Reforestation: Regeneration of felled or otherwise cleared forest lands.

Revenue lands: Lands under the control of revenue department; these are non-forest and non-private lands, often highly degraded.

Social Forestry: A misnomer. Has nothing to do with forests per se but represents programmes of growing trees to satisfy rural needs of fuelwood, fodder and small timber and to enhance farmers' incomes.

Tendu: Diospyros Melanoxylon; used as wrappers of tobacco to produce bidi, an Indian cigarette.

Tribal Community: A homogenous group having the same dialect, territory, religion and endogamy.

Tribals: Nomadic or now settled people who till recent times lived by hunting and gathering of forest products.

Wildlife: All undomesticated forms of flora and fauna. The term includes animals, and microflora and fauna which form part of any habitat.

Zamindari: System of land ownership by non-cultivators, which has now been legally abolished.

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