WORKING PAPER

Marketing the Environment

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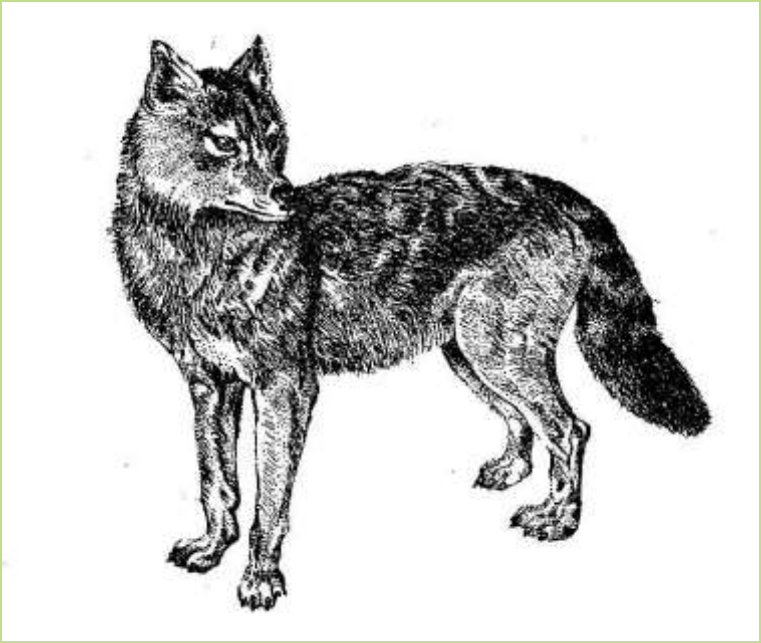

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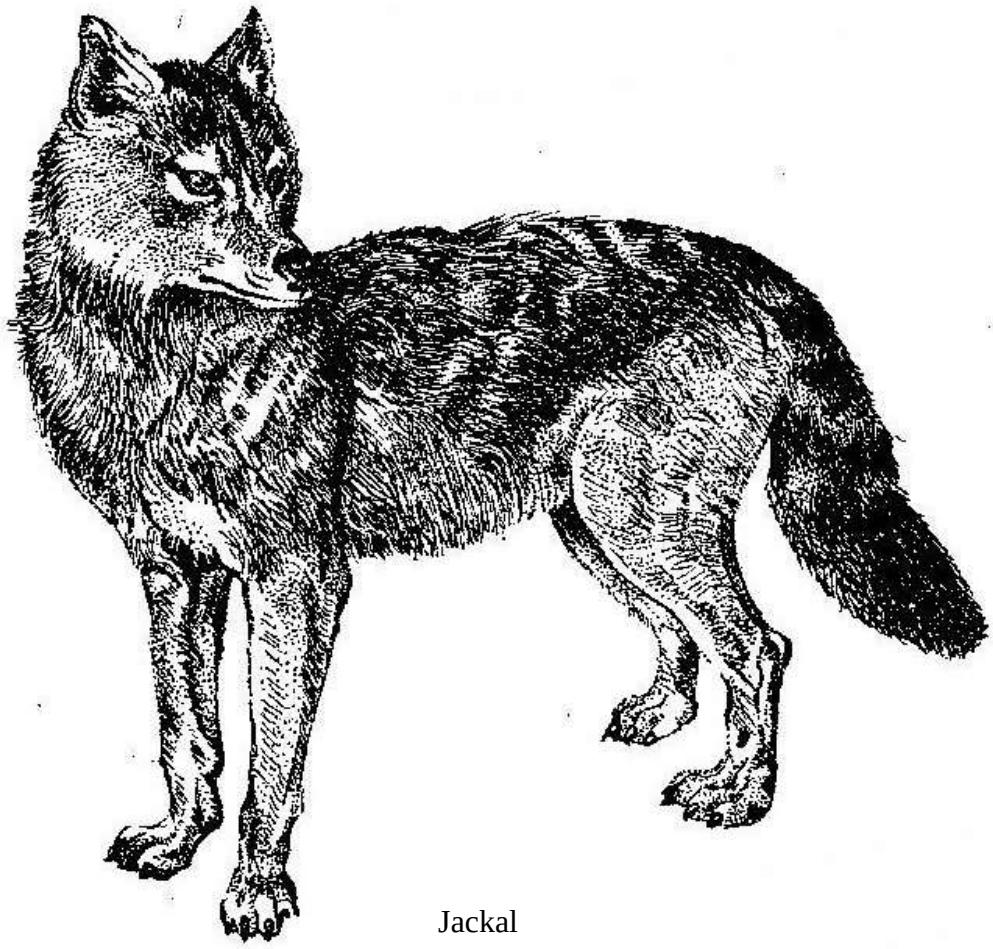

Jackal

Scripted in 2000, this paper was an input into the efforts to adopt and operationalise a natural resource accounting (NRA) approach in the planning process. Discussions on NRA were initiated in the Planning Commission during the preparation of the eighth five year plan (1990-91).

Sketch of the Jackal on the cover and above is by Pratibha Pande.

The primary task before the people of India, in the 21st century, could very well be to disempower the government. However, this is also a slogan of the liberalised economies. The US President, in one of his 'State of the Nation' addresses talked about the era of large governments being over. A former British Prime Minister promised to 'roll back the carpet of socialism and hand back the government to the people'. But the critical question is – who inherits the power. And the two main contenders are community institutions and corporate houses.

In the current process of liberalisation, the 'market' is seen to be a major instrument of democracy. The parliamentary system, through which the people of India voted for governments and which, in turn, supervised the bureaucracy, is no longer considered to be adequately democratic. The bureaucracy is said to be out of control and the system full of corruption and patronage. Besides, it represents the archaic form of 'representative democracy' where people vote once in five years and thereafter lose their right to further participate in governance. However, decisions through the market are seen as a part of 'participatory democracy' for, using the markets, the people of India vote every day through their purse and, like a referendum, steer the economy and much else along the lines they want.

To allow the market to make decisions is fraught with many dangers, especially for the environment. There are the general problems of 'market democracy', that it does not ensure an equal distribution of votes and some have most of the votes and most have only some. Its efficacy is determined by how well options are reflected in financial terms. It assumes that public interest and human welfare can all be measured in financial (or at best economic) terms. It replaces insidious political propaganda, that shapes the electoral process, with even more insidious marketing propaganda, controlled by corporations without even a pretence of democracy. It

empowers business corporations at the cost of the community. It promotes economic growth at the cost of both equity and environmental sustainability. Many examples of this are becoming obvious in the current Indian environmental scenario.

At a general level, there are two types of environmental concerns. The first are the concerns relating to the conservation of the productive capacities of the environment, so that the human race (and other races) can have a continued access to nature and natural resources. The second are the concerns relating to the conservation of the assimilative capacity of nature, so that human health and well being (and the health and well being of other living things) are not compromised. Also, in so far as the assimilative process of nature is disrupted, there is a concomitant degradation in its productive capacity.

The issues related to the productive function of nature are often called the "green issues" and those related to the assimilative function the "brown issues". The former include issues related to the conservation of forests, grasslands, deserts, coastal and marine areas, wetlands and other ecosystems, and to the conservation of water, soil, and biodiversity. The latter include air, water, noise and land pollution and chemical and nuclear hazards, among others.

In societies and economies based on the principles of equity and sustainability, rather than on market forces, the important concern is to use nature and natural resources sustainably and in a manner such that the costs and benefits are equitably shared between all sections of the society. The fact that this might not result in maximising the financial and economic returns of such use, is not the critical concern. The important questions in such a society are, who is using what (and whose) natural resource, how sustainably, how equitably, and to what purpose? Answers to these questions give a good

understanding to the nature of the society (and economy) in terms of its class characteristics and the nature and levels of exploitation and oppression.

Societies and economies that are moving towards a market-based economy have a different set of concerns and focus on another set of questions. Their main concern is to maximise the financial and economic returns from the use of nature and natural resources, irrespective of who benefits from these returns and how they affect the sustainability of the environmental processes.

Of course, prima facie, there are mechanisms in the market-based system that purport to ensure sustainability and equity. The process of conducting environmental impact assessments of projects and activities, and of undertaking natural resource accounting, are the two principal ones. However, the manner in which these mechanisms operate do not inspire much confidence.

Natural Resource Accounting[1]

For the last decade or so there has been a serious effort by various agencies within and outside India to introduce a system of natural resource accounting. Ostensibly, this is projected as an effort to bring the cost of nature and natural resources into the national accounting system and, thereby, reflect the depletion of, or addition to, the 'natural capital' in monetary terms.

Essentially, in the currently practised systems, the market is allowed to determine the monetary value attached to elements of nature. The market value is determined either directly or indirectly. For example, a direct evaluation would involve, very simply, what the market is willing to pay for the

[1] This section draws heavily from Singh et al 1999

various uses (including conservation) of a resource. So, for example, market based decisions are determined by the relative financial returns from the conservation of a forest area for recreation purposes versus the returns that logging of the trees there would get. At a more indirect level, decisions can be based on, for example, the financial returns to be got from the timber in a forest as compared to the water conserved by it. At even a more indirect level, decisions on land use can be determined by the differential in the 'willingness to pay' for a house located in a forested neighbourhood compared to an identical house in a non forested neighbourhood. A summary of the major systems of natural resource accounting is given below.

The need for economic valuation is seen to arise either because the market prices are not available or that they are inappropriate (i.e. they do not reflect the costs and benefits of using environmental resources). Such failures to completely or adequately reflect the opportunity cost are conventionally classified as arising from two sources:

1) Market Failures : Due to market imperfections, e.g. monopolies, or due to missing / incomplete markets (e.g. a market to pollute the atmosphere, which in turn arises due the lack of well-defined property rights). Another important omission in the context of environmental resources is the lack of future markets. The existence of Pareto Optimality, (a particularly desirable outcome in neo-classical economics) requires that a market exist for all goods and services at all times including in the future.

2) Government Failures : Due to the imposition of taxes and subsidies (both explicit and implicit) which may distort relative prices and therefore lead to misallocation of resources. A failure to take corrective action in the presence of market failures may also be classified as a government failure.

Without the need to document specific cases, it suffices to say that market prices need adjustment. Such non-market prices may be termed accounting / shadow prices. This need to adjust market prices is a relatively non-controversial issue, the difficulties arise in choosing a specific methodology and, of course, in selecting the prices.

While the price of many resources need adjustment, the case of biological and flow resources is unique due to one or more of the following reasons:

1) non-substitutability (e.g. the atmosphere)
2) irreversibility (e.g. extinction of a species)
3) uncertainties as ecological processes are imperfectly/ inadequately understood
4) provision of critical life-support functions
5) the threat of potentially catastrophic changes (e.g. global warming)
6) relationship between economic systems and the environment is unclear in many instances
7) open access nature of the resource (e.g. the oceans)
8) option and existence value of such resources

Before discussing specific approaches to economic valuation a short summary of the various kinds of value, which together make up total value, is given below.

1) USE VALUE : made up of Direct Use Value involving provision of goods and services for direct consumption and production activities, and usually exchanged in the market, and Indirect Use Value involving provision of functional services.

2) OPTION VALUE : value which is not related to present use but where a potential use may exist in the future.

3) EXISTENCE VALUE : the intrinsic value of a resource

Two ways of classifying the various methods for economic valuation are presented below .

	Conventional market	Implicit market	Constructed market
Based on actual behaviour	Effect on market Effect on Helath Defensive Cost Preventive Cost	Travel Cost Wage Differences Property Values Proxy Marketed Goods	Artificial Market
Based on potential behaviour	Replacement Cost Shadow Project		Contingent Valuation Other

DIRECT APPROACHES (techniques that elicit preferences, directly by asking respondents to state them)	INDIRECT APPROACHES (techniques that obtain preferences from actual observed market-based information)
a) Experiments b) Questionnaires (Surveys)- contingent ranking and contingent valuation	a)Surrogate Market i) Hedonic price and wage techniques ii) Travel cost approach b) Other Approaches i) Dose -response techniques ii) Replacement cost

ACCOUNTING FOR THE DEPLETION OF NATURAL RESOURCES (RESOURCE STOCKS) - NATURAL RESOURCE ACCOUNTING

METHOD	SHORT DESCRIPTION	ADVANTAGES	DISADVANTAGES	SUITABILITY
Present Value Method	The value of an asset is the discounted sum of the stream of income that the asset will generate	theoretically sound	information intensive, needs future costs, prices, production levels and discount rates. Most of the future markets are missing. Even otherwise the method is expensive and time-consuming	
Land Value Method	Land (Nature) values ought to reflect the value of natural resource contained.	No need to calculate income streams, comparison of land values suffices.	Land markets are not competitive	
Net Price Method	Calculate changes in physical resources and multiply	Simple and easy to calculate and inexpensive	Based only on current prices	

	them by the net price			
Replacement Cost	Calculate the cost of using another alternative resource to provide the same service /good		An Inadequate method since replacement may be impossible.	May be used where the earlier methods cannot be used
User Cost Methods	That total receipts from sale of mineral stocks consist of two components user cost and true income. The former should not be included in GDP.			

ENVIRONMENTAL ACCOUNTING (ACCOUNTING FOR THE DEGRADATION OF THE ENVIRONMENT)

METHOD	SHORT DESCRIPTION	ADVANTAGES	DISADVANTAGES	SUITABILITY
contingent valuation	The method involves asking respondents to reveal : a) WTP : willingness to pay for the provision of a good/service or to avoid a damage b) WTA : willingness to accept to forgo a change or tolerate it Relies on interviews personal or telephonic	theoretically sound and appealing	expensive and needs trained manpower, great care needs to be taken while sampling and in formulating questions to avoid misrepresentation. There is a danger of strategic answering.	A controversial method. Many argue that answers are unreliable and that replies are not borne out by actual behaviour.
Travel cost method	Value of an asset is determined / derived from the		data intensive, theoretical basis is questionable, econometricall	popular for recreational sites.

	expenditure incurred on travelling to the site		y difficult to handle due to multiple site-visits and site characteristics. ,	
Wage cost method	implicitly values characteristics such as morbidity and risk of mortality in labour market		labour markets are not perfect and in particular lack mobility	
Hedonic pricing	estimate implicit price by looking at real markets in which characteristics are traded such as noise and peace in the housing market		data intensive and often the assumption of competitive market is difficult to justify	

METHOD	SHORT DESCRIPTION	ADVANTAGES	DISADVANTAGES	SUITABILITY
Abatement/ replacement /preventive/ maintenanc / restoration costs or defensive expenditure	These are variations on the theme of keeping the natural environment intact. Two broad categories can be made : a) cost of avoiding damage b) cost of restoring the environment	abatement costs are simple to estimate		There can be large difference between abatement and replaceme nt costs, the latter is usually much greater and can be a very high multiple of the former.
Dose - response relationships	Relationship between pollution (dose) and damage (response) is established and then valued at market prices.	Simple exercise where physical effects are well documented .	Can be expensive where relationships are complex and difficult to unravel	

Apart from the disadvantages mentioned above, such market based systems have various other problems. Some of these are described below.

Classification of Nature: The first problem relates to classification of nature into that which has economic value or, as economists sometimes describe it, has alternate uses, and that which has no economic value for has no alternate use. The belief that some elements of nature have no alternate use and therefore no economic or financial value seems misplaced. Perhaps, if one takes a very narrow definition of "value" and "use", then one could argue this. However, it is well established that each individual living organism represents a unique element of biodiversity and, if nothing else, forms a part of the web of nature and is, therefore, critical for maintaining the balance of nature. Therefore, it is difficult to imagine even a single plant or creature that has no use.

Attaching Value: Even more difficult is the method by which economic and financial value is attached to elements of nature. Unfortunately, economics as a science can only put a replacement value to those goods and services, which are inputs into, or outputs of, an economic process. Much of nature, critical as it is to human survival, is not necessarily an input or an output of an economic process. Therefore, for economists, it is either invaluable or valueless. As economics cannot handle the notion of invaluable, it tends to consider much of nature as valueless.

As an example, how can economics ascribe a realistic financial or economic value to the last surviving pair of a species of a bird, which currently might have no known economic function? Given the present methodology, such a pair would ordinarily be considered without economic value. Yet, this very species might, if it survives, become of very great economic value in the future. Nevertheless, as there is no way

of predicting with any certainty whether this would happen or not, ascribing value becomes an impossible task.

The North-South Divide: Though the difficulties in ascribing economic value to elements of nature are common all over the world, their implications are far greater for countries of the South. Whereas in countries of the North most people have enough surpluses after meeting their immediate basic needs, to be willing to pay for recreation and long term needs like environmental conservation, this is not so in countries of the South. Therefore, if the economic value of the environment was to be determined through market forces, as is envisaged in the prevailing methodologies, it is unlikely that in countries like India the poor people would be in a position to choose long term needs over their immediate ones. Market forces would, consequently, make it difficult to conserve and protect anything.

Also, given the vast differences in the buying power of different segments of society in countries of the South, and between the North and the South, it is difficult to ensure socially just utilisation of natural resources. This is especially so if decisions were to be made solely or primarily on an economic basis.

Undervaluing Nature: There is also a tendency of governments, dominated by market imperatives, to systematically undervalue the contributions of natural ecosystems to human welfare in general. For example, a forest can be contrasted with a human made industry. Whereas the human made industry requires inputs of capital, energy, raw materials, maintenance, replacement, and a labour force to make it productive, the forest, as an industry, produces goods and services critical to humanity without requiring any of these. It generates its own energy, produces its own raw materials, maintains and replaces itself, and goes on for eternity without needing any human input. However, the

economic value attributed to forests never reflects this miracle of productivity and renewability.

Alternate Methods: The task, therefore, is to develop a methodology which is appropriate for India, which is workable given the socio-economic conditions in India and which is in consonance with the principles of equity and sustainable development.

The term sustainable development is mostly used in the context of natural resources and is understood to imply that the extraction of such resources must be sustainable in the sense of renewability. In other words, sustainability or renewability has come to mean that if a particular resources is being used or extracted, the rate of use or extraction must not exceed the rate at which the resource can renew or regenerate itself. However, such an understanding does not adequately take into consideration concerns about biodiversity conservation.

Many species that are not being specifically used or extracted can get adversely affected by the use or extraction of other species. Whereas the renewability of the primary (target) species may be safeguarded under 'sustainable use patterns', mostly the secondary (non-target) species are not even considered. For example, the sustainable use of timber usually means that the amount of timber extracted from a forest does not exceed, in that time frame, the capacity of the forest to grow timber. Therefore, only the increment and not the capital is extracted. However, there would be many species of plants, insects, birds, reptiles and mammals that are dependent on the species of trees being extracted. There is rarely, if ever, an assessment to see whether the extraction is at a rate where their populations do not get depleted or adversely affected. Similarly with the sustainable use of grasslands, or rivers and oceans.

Of course, it can be argued that if other species in the ecosystem are being adversely affected then, sooner or later,

this will have an adverse impact on the target species and their renewability will be threatened. Therefore, in so far as their renewability is being safeguarded, all the species linked to them are also being safeguarded. However, the adverse impacts of the depletion of a particular species on another can take many years, sometimes even centuries, to manifest itself and, in any case, is not always obvious and is even now poorly understood. Therefore, if biodiversity has to be protected, just ensuring the sustainable use of the target species is not enough.

Even where the populations of other (non-target) species are not depleted, there can still be a change in the populations and in the ecological processes. Such a change might itself be undesirable, especially as adequate representative populations and areas need to be maintained as genetic reference points. Therefore, there must be some areas that are entirely or substantially free from human use and disturbance. Proper sustainability must, then, include these concerns and considerations.

Keeping all this in mind, any methodology for natural resource accounting which is to be in consonance with the notion of development must:

- Promote economic growth that is
- environmentally sustainable and
- equitable.

Judging from this standpoint, the current (market based) methodologies fail miserably.

For one, 'development' as defined above accepts sustainability as an absolute value, as it does equity. In fact, it constraints economic growth by prescribing sustainability and equity. However, current, 'market based' NRA methodologies do not accept any absolute values. Therefore, if the unsustainable use of a resource has greater market value than its sustainable use, then current NRA methodologies will prescribe

unsustainable use as rational. By not accepting sustainability as an absolute value and, in fact, by discounting future value, current NRA methodologies actually militate against development in the real sense.

Similarly, current NRA methodologies have no absolute value for equity. In fact, market valuation will ordinarily militate against equity for the capacity of the poor to pay for resources would ordinarily be much less than that of the rich. Therefore, the current methodologies would invariably favour the rich and where there was competition between the poor and the rich for a resource, invariably prescribe that the rational thing is to give it to those who can pay more. An interesting example of this was a World Bank internal note that was leaked some years back. In this, a World bank economist had recommended that as the income levels of people in third world countries was very low it made economic sense to shift all polluting and hazardous industrial units to the third world. In the 'third world' it would be cheaper to pollute than to control pollution and certainly much cheaper to compensate injuries and deaths caused by hazardous effluents.

Artificial measures to introduce sustainability values in terms of option values and equity values in terms of government controls also do not work for, as these values are arbitrarily ascribed, they reflect the political power of the environment and the poor, which is usually not very much. What, then, is the solution.

The best way out seems to be to adopt a dual approach of both budgeting and accounting. This means that natural resources (and nature) are accounted for and decided upon on the basis of a system which first budgets, in physical terms, and then allocates the surplus on the basis of economic value. The elements of this approach are described below.

First, a natural resource, say water, needs to be budgeted in physical terms and allocations made to meet the basic ecological and social requirements. This means that, in a river, the minimum flows required for maintaining the ecological balance of the river and consequently its ability to cleanse itself and support life, must be assured. It must be assured that the river is not only able to perform all its ecological functions and renewably supply clean and wholesome water for human uses, but also that its biodiversity profile is not adversely affected. This would meet the absolute value of sustainability in the larger sense of including biodiversity conservation.

Once this is done, then the surplus water must next be allocated for meeting the basic needs of the human populations dependent on the river. This includes their drinking water requirements and other basic needs. Therefore, once sustainability is assured, then the next absolute value, that of equity, must be met. After water has been physically budgeted for these two requirements, the surplus, If any, can then be subjected to market forces and its use determined by the paying capacity of the various aspirants and by the economic benefits of the various uses. In such a model, where there is industrial demand for water over and above the surpluses available, there the industrial sector must pay for enhancing lean season flows by, for example, regenerating catchments, in order to produce larger surpluses. There is also, then, an economic incentive for investing in water saving technology, as the real cost of water is being charged.

A similar approach can be applied to other types of ecosystems and resources. Take, for example, forests. Here, also, the area required to maintain the biodiversity and ecological functions of forests must first be physically demarcated and budgeted. Once this is done then the areas required to meet the basic social needs, like firewood, must be physically

demarcated. Once this is done, then the surplus can be made available to the highest bidder.

It must, however, be remembered that environmental resources are location sensitive in the sense that apart from ensuring overall availability it must also be ensured that they are available at the right place. So, for example, the ecological functions of forests would not be served if the total area of forests required all occurred in one part of the country while the rest of the country became devoid of forests. Similarly, for a river it is not enough that the total water flow required occurred in one part of the river while other parts became bone dry. Therefore, apart from calculating the area and resources needed totally, there also has to be an assessment of the distribution of these areas and resources. This is also important from the equity angle.

Environmental Impact Assessment

An mechanism that is in common use to determine the environmental impact of projects and activities is the carrying out of an environmental impact assessment (EIA). Though an EIA has been conducted for selected government projects since 1979, it became legally mandatory only in 1994 and was made applicable to a variety of projects, including private sector projects.

Theoretically, an EIA, based on an environmental impact statement, is required prior to the initiation of any development activity. Based on such an EIA, the Ministry of Environment and Forests, Government of India or the State Government issues an environmental clearance for projects found to be acceptable and, where relevant, prescribes certain conditions.

The EIA process, as it is found in India, has various problems. Some of these are described below.

Appropriateness of Environmental Impact Assessments:

There is a general paucity of data, especially credible independent data, on environmental aspects relevant to the assessment of projects. There are Botanical and Zoological Surveys in India, and a Ministry of Environment and Forests along with state departments of environment and forests. However, despite this, detailed information on terrestrial and aquatic ecosystems for almost all of the potential impact areas of projects are not available in advance of the project being proposed. Therefore, much of the data required are collected after the project has been proposed and the environmental impact assessment initiated. This results in at least the following problems:

- *As the environmental studies are usually initiated very late in the day, there is a tendency to hurry them along so that the environmental clearance and the consequent completion of the project are not delayed. Considering that data have often to be collected from scratch, this results in the use of unscientific methodologies and a resultant inadequate assessment.*
- *These studies are done at the cost of the project proponents. This results in a tendency to try and do them as cheaply as possible, thereby cutting corners and compromising on quality.*
- *The project proponents are interested in getting their project cleared as soon as possible and with the least costs. Consequently, there is pressure on project consultants to produce a report that either shows no adverse environmental impacts or suggests very cheap (and usually ineffective) methods of mitigating these impacts. The problem is exacerbated by the fact that the Ministry of Environment and Forests (MoEF) and its Environmental Appraisal Committee) EAC have little ability to independently verify these reports and the data they*

contain. They can, at best, check up superficially on a few aspects or refer the matter back to the same consultants to review the data provided. This also results in delays in the assessment process that, in turn, makes the MoEF susceptible to criticism and to pressure for early clearances.

Unfortunately, there is no system by which the financing of environmental studies can be done by an independent institution like the Planning Commission and debited on a fixed percentage basis to project cost, thereby freeing the project consultants from pressures by the project authorities.

Lack of Retrospective Assessments: Apart from the fact that for all the projects designed and initiated before 1978, none of the environmental impacts were assessed, there has also not been any retrospective assessment since they were constructed. Though it might no longer be possible to fully assess many of the adverse impacts, especially those on terrestrial and aquatic biodiversity, many of the other impacts could be assessed even today. However, no effort has been made towards this end.

The lack of such assessments makes the task of assessing the overall impacts of future projects on the environment very difficult. It is also a wasted opportunity to learn from past experience. Consequently, even today, many of the impacts assumed and the mitigative measures planned have little experiential basis.

Political and Administrative Pressures: The process of environmental impact assessment has been subjected to political and administrative pressures almost from the start. Pressure is brought upon the professional project consultants to prepare Environmental Impact Statements (EISs) in a manner such that the project is cleared. Pressure is brought upon the EAC to recommend the clearance or rejection of projects. Also,

the MoEF or the Government of India rejects recommendations of the EAC, without assigning any reasons.

The Ability to Enforce and Monitor Conditions: As most projects get conditional clearance, it is essential to monitor that their environmental impacts are within the anticipated limits, that the preventive and mitigative measures proposed by them or stipulated by the MoEF are being carried out properly and in time, and that they are having the anticipated affects. However, the experience in India is that this very rarely gets done.

Though the process has been going on for the last 21 years, it has gained new significance since the opening up of the economy and the participation of the private sector, domestic and multinational, in setting up large projects, especially energy projects.

Even in the past, the EIA process had, as we have seen, many shortcomings. However, it was the only available instrument by which the environmental and direct social impacts (the latter being considered a part of this process) could at least be identified. Though for most parameters there were no proper standards available and, consequently, decisions were made on an arbitrary and often case by case basis, there was some effort at assessing the financial cost of preventing or minimising environmental and social costs. However, it only looked at a few of the environmental and social costs and also did not calculate the cost of the residual environmental and social impacts, i.e., those that could not be prevented or minimised. Though there were many problems, the process had some credibility for the projects being undertaken were allegedly in public interest and were being undertaken by the government. Therefore, even if some of the environmental or social costs were not recognised and the cost of their prevention or mitigation not built into the project

costs, the resultant financial savings accrued to the nation. It could also be argued that these projects were being developed by the nation for the nation. Besides, though inter-departmental and inter-sectoral interests did play a part in determining what externalities were internalised and what were not, the wrong decisions were often made by well meaning, though misguided, bureaucrats, technocrats and politicians who were often acting out of what they saw as the best national interest.

With the advent of the private sector, often multinational, into the area of power generation and other infrastructure, the situation changed. The savings were now private, adding to the profits of corporations and individuals, and the costs were public. Most development projects and all conventional energy projects take a toll of the environment. Much of the damage done is neither preventable nor can it be mitigated. Despite this, as long as the project is seen to have huge social benefits, there is a trade-off where a certain amount of environmental costs are accepted for the sake of the larger good. However, when the benefits start primarily going to corporations and individuals, then the justification for the environmental destruction disappears.

Also, where the benefits were to the society at large, there was a tendency to overlook the inequities because it was felt that, over time, these will get eliminated. However, with the privatisation of these projects, it becomes all the more important to look at the equity aspects.

A recent study [Singh et al 2000] has examined the 'larger good' that the generation of electricity serves in this country, in terms of equity or a 'class benefit analysis'. The findings are summarised below.

The Power Sector[2]

The statistics on power consumption in the country distinguish between different categories of users. Various estimates of the electricity used by each of these categories exist. The latest statistics of the [PC 1999] indicate the following patterns of use.

Category	*Consumption (Mkwh)*	*% of total consumption*
Domestic	*57553*	*18.4*
Commercial	*15182*	*5.0*
Agriculture/irrigation	*93687*	*30.0*
Industry	*105207*	*33.6*
Railways	*6660*	*2.1*
Outside the respective states	*3642*	*1.2*
Others	*30754*	*9.2*
Total	*312685*	*99.5*

The first distinction that could be made for the purpose of a class benefit analysis is that of urban versus rural, including the industrial in the urban, as it only marginally benefits the very poor. Among the rural, a further distinction can be made between agricultural and domestic uses, and within domestic uses, the class that uses it in the rural areas.

We can disregard the other categories as being irrelevant or insignificant and focus on domestic, agriculture/irrigation and industry. These three together account for 82% of the power consumed.

In assessing the profiles of the consumers, the industrial consumption can be clubbed with the urban consumption, being used primarily by the organised sector. According to the Planning Commission [GOI 1990] "Within the industry sector,

[2] This section draws heavily from Singh et al 2000

only six industries viz. Iron and steel, aluminium, cement, paper, fertilisers and textiles consume about 43% of the total electricity consumption in the industry sector."

The domestic sector needs to be further sub-divided into the urban domestic and the rural domestic sectors.

Though comprehensive figures indicating the break-up of consumption between urban and rural domestic sectors was not available, the figures available indicated that by March, 1997, over 80% of the villages (491465 out of a total of 587288 villages) in the country had been electrified [PC 1999]. However, this "achievement is to be viewed with the existing definition which declares 'a village as electrified if electricity is used for any purpose within the revenue boundary of that village'. Thus, even in all these electrified villages, power connection may or may not be available on demand. A large number of hamlets and harijan bastis adjoining the villages are yet to be electrified" [PC 1999].

According to Reddy [1999] " India's population according to the 1991 census was 846 million. The rural population was 74.34 percent or 623 million which at 5.5 persons per household corresponds to 114 million households. 69 per cent of these households, ie, 78.6 million households, were un-electrified."

In another study done in the Bankura district in West Bengal [Banerji et al. 1999], a stratified sample of 163 households revealed that none of the households below the poverty line used electricity as a source of non-cooking energy. The use of electricity as non-cooking energy rose sharply with the rise in the economic class of the households, doubling between the above poverty and the middle-income households, and nearly tripling for the high income households.

In none of the studies was electricity recorded as a cooking fuel for rural areas. Banerji et al go on to observe that "Non-cooking energy accounts for a small proportion of the

household energy use in Bankura. Non-cooking energy is predominantly for lighting. In electrified house-holds some electricity consumption is also for fans and higher income households also have other appliances like television sets etc.….Even electrified households have kerosene consumption for lighting. This is because the rural electricity supply is unreliable and there are many hours during the day when there are supply interruptions."

According to the [PC 1999], in 1996-97 there were 86.53 million consumers of electricity. Though these would include industries and commercial enterprises, even if we consider all of them as households then of the 173 million households in India only about half the households would be electrified. It does not need a separate study to determine that these would necessarily be the better off households.

It would, therefore, not be unreasonable to conclude that, even in the rural areas, the bulk of the domestic supply of electricity goes to the well to do families. This is partly due to the fact that, due to its unreliability, electricity in rural areas is primarily used for devices like fans and televisions, which cannot run otherwise. The poor do not own these. On the other hand, the capital cost of getting electric connection for lighting is too high for most rural families. According to Reddy [1999] " …the operating costs of traditional devices (e g, kerosene lamps) are a sort of upper bound for the costs of an alternate technology. From this point of view, it appears that the problem arises more with the capital costs of new technological options than with their operating costs."

A similar view is found in an action plan prepared by the Planning Commission [GOI 1990]. This plan states that " Rural electrification in the coming years will gradually, to some extent, replace kerosene as a fuel for lighting but the heavy initial investment required for electrification makes it difficult to achieve more rapid rural electrification… consequently

kerosene may very well continue to be the common man's fuel for domestic lighting for years to come.".

As far as the use of electricity for agriculture/ irrigation goes, Reddy [1999] says " Actually, subsidies granted in the name of the poor often end up going to the better off. For example, free electricity to rural areas goes primarily to farmers rich enough to own an electric pump for pumping irrigation water."

The Planning Commission [GOI 1990] also appears to concur and says " The emphasis has been mainly for rural electrification for energising agricultural pumpsets. In any case, owing to the high initial costs, it may be difficult for the low income section of the population to take advantage of the programme …".

Again, it is self evident that the land-less and the marginal farmers would not be the owners of electric pumps and, consequently, the benefits of rural electric supply would not flow to them.

The matter is exacerbated by the high rates of subsidy attached to the power sector, primarily for domestic and agricultural power. According to the Planning Commission, the subsidies to the agricultural and domestic sector in 1997-98 were a whopping Rs. 22,216 crores.[PC 1999]. The losses by the state electricity boards (without subsidy) were Rs. 10,684 crores. These subsidies and losses also come mainly out of the pocket of the common man and woman in India, but the benefits, as we have seen, go mainly to the rich in the urban and rural areas.

Added to this are the very high transmission losses in India. According to the latest figures available, the transmission losses in 1995-96 were 22.3% of the generation. It is also estimated that a significant proportion of these is losses due to theft. Considering the poorer half of the country has

little or no access to electricity, a large proportion of these thefts must also be by the better off 50%.

As we have seen, much of the electricity produced goes into the grid and is then primarily used (or stolen) by the well to do populations in urban or rural areas.

Conclusions

Market economies all over the World have recognised that environmental concerns cannot be adequately addressed through market mechanisms. Therefore, in the more developed market economies there are strict laws and standards, backed by effective enforcement and public participation, to ensure that the environment is not degraded. In newly emerging market economies, like India, the trend is in the opposite direction. It could be argued that, as the Indian market matures it would also be subjected to the controls and restrictions that apply to the western markets. However, it is clear that India and its environment cannot afford that grace period. Already our forest cover has shrunk to a third of the minimum prescribed in the forest policy. Government's estimates show that in the two years between 1995 and 1997, we lost a net of a half a million hectares of forests. Droughts and floods, mostly ecologically caused or aggravated, are becoming a common feature in large parts of India. Soils are getting eroded and degraded and water and air pollution levels are increasing in most parts of the country at an alarming rate.

At the same time, opulence and waste, especially in our urban centres, is also rapidly growing. We are having record production and sale of luxury cars, even if there is no air for them to release their exhaust into. Luxury hotels are doing booming business and the market is flooded with all sorts of imported and domestic consumer goods. The water, other raw materials and energy all this requires and the waste and

garbage it produces is taking an increasingly heavy toll of our environment. And even as the natural systems are beginning to collapse, the impacts of such a collapse are first being felt by the poor and the marginalised. Forests must be destroyed, the air and land in remote urban areas polluted and tribals and other rural poor displaced, so that electricity can be produced to meet the 'peaking' demand of the urban rich. And, despite being rich, if they are not willing to pay for even the basic financial cost of generating electricity, then the society must subsidise them. If air pollution become so bad in a city that it penetrates even the air-conditioned abodes of the rich and powerful, then introduction of new cars is not regulated, but old public transport vehicles are banned. The poor must walk so that the rich can buy their third car with impunity.

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