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Biodiversity and Indian National Law: A Conceptual Framework

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Abstract

Concern over the rapid erosion of biodiversity has necessitated a review of national and international provisions relating to its conservation. Among the vital provisions are legal measures and, to this end, the Ministry of Environment and Forests of the Government of India requested a report on the legal structure relating to various aspects of biodiversity conservation and use in India. A report entitled *Legal Provisions Relating to Biodiversity in India* was prepared and circulated in June 1992. The report attempted to:

- construct a conceptual framework within which to review existing legislation and its adequacy to biodiversity conservation; a framework which, although to India, could well be applied to any other national situation;
- review government acts and regulations concerning the protection of, access to and use of biodiversity and its components in India; and
- give broad recommendations towards filling gaps in legal coverage of various aspects of biodiversity conservation.

The present paper builds upon the above report, relates the findings to the Convention on Biological Diversity, and points to further work which would be needed if the national legal structure is to be in line with the Convention.

1. Biodiversity and the Law

1.1 The Conceptual Approach

For the purposes of this paper, we have categorised biodiversity components into five parts: wild fauna, wild flora, domesticated fauna (livestock), domesticated flora (crops and other cultivated plants), and genetic materials (seeds, eggs, germplasm, semen, etc.). Unless otherwise specified, biodiversity components in this paper refer to both living species and also genetic material such as cells and germplasm. Legislation relating to each of these components has been assessed in terms of the parameters described below.

- a) **Identification**—The process of locating, and thereafter establishing the identity, distribution, occurrence, status, and value of biodiversity components. This is relevant to both wild and domesticated fauna and flora.

- b) **In Situ Protection**—Efforts at protecting and conserving biodiversity, including the habitats within which biodiversity survive and evolve. This applies especially to wild fauna and flora, but also to domesticated fauna and flora at the sites of their use, in so far as these may need to be protected from disease, displacement by new varieties, and destruction due to human activities.
- c) **Ex Situ Conservation**—Attempts at preserving living species or genetic material in gene banks, zoological parks, botanical garden, and sites other than their natural or field habitats.

Relevant to all biodiversity components are:

- d) **Access and Extraction**—Controls on the kind and amount of access to fauna and flora in the wild, to *ex situ* collections, and to genetic material; also the modes of extraction of these components, relevant especially to *in situ* species materials. This overlaps with intellectual property rights (IPRs).
- e) **Use**—Utilising biodiversity for subsistence, commercial, scientific, or other purposes. Also extended to the notion of benefits from such use, and the restriction and sharing of these benefits.
- f) **Trade**—Activities relating to barter, sale, import, export, and other forms of exchange of biodiversity components.
- g) **Breeding, Cultivation and Multiplication**—Artificial or induced measures for regenerating flora and fauna populations in captive or closed conditions. Relevant to both wild and domesticated fauna and flora. Overlaps to a certain extent with *ex situ* conservation.
- h) **Introduction, Augmentation and Reintroduction**—Measures to deliberately stock an ecosystem or area with species which did not previously exist there (introduction), or where they have declined or need to be increased in number (augmentation), or where they have died out (reintroduction); relevant to both wild and domesticated fauna and flora, and also to genetic material (e.g. seeds) used for this purpose.
- i) **Release**—Disposal of biodiversity components without the specific purpose of introducing, augmenting, or re-introducing them into the environment. This includes accidental release, and is relevant to all biodiversity components.
- j) **Movement**—Measures to transport, by human means, biodiversity components from one location to another, especially relevant in cases of transportation across ecosystems or bioregions, involving the possibility of accidental release of components. This does not include natural or voluntary movement of animals, or movement of seeds or other floral parts by natural means. Relevant to all biodiversity components.
- k) **IPRs**—Measures pertaining to the rights of the state, organisations, or individuals, over biological and biotechnological knowledge, including patents, royalties, copyrights, farmers' rights, breeders' rights, and others.

Within this framework, it is possible to assess relevant acts to see whether they cover one or more of these parameters and if so, how. It is, of course, necessary to decide which of these parameters need to be covered by law. For instance, it may be felt that the activity of identification (e.g. inventorying) need not be given legal status; similarly, countries may feel that IPR on biodiversity components is not desirable. The framework does not imply that all the parameters must at all times be covered by law, but merely provides a convenient mark against which to measure the legal coverage of biodiversity conservation.

It is within this framework, therefore, that we have attempted to assess India's legislative structure.

1.2 Scope of the Study

The assessment on which the following section relies on is a general overview, and is not intended to be comprehensive. The following limitations should be born in mind:

- it examines only central government laws directly relevant to biodiversity, and a great deal of state legislation which may be of relevance was identified, but is not listed here;
- international agreements to which India is a party, and which specify certain obligations with regard to biodiversity protection and use, were identified, but not included in the assessment (these include the Convention on Wetlands of International Importance especially as Waterfowl Habitat [Ramsar Convention], the Convention on International Trade in Endangered Species of Fauna and Flora [CITES], the Convention on the Conservation of Migratory Species of Wild Animals [Bonn Convention], and the International Undertaking on Plant Genetic Resources of the Food and Agriculture Organization);
- certain laws which may be of indirect relevance, such as the Land Acquisition Act of 1894, were not examined;
- the voluminous rules which, over the last century or so, were promulgated under various acts were not reviewed; and
- the study did not attempt to comment on the implementation of the acts discussed, except at a cursory level.

A more comprehensive study filling these gaps was recommended, and is currently underway at the Centre for Environmental Law of the World Wide Fund For Nature (India). We submit, however, that the following may be used as a broad framework within which other countries can also assess the legal coverage given to biodiversity conservation.

2. Essential Laws Relevant to Biodiversity: An Overview

In the course of this study, over 40 acts promulgated by the Government of India, and other relevant material, were reviewed. These are available upon request. The assessment includes acts promulgated both before and after Independence in 1947, and which are still in force today. For reasons of convenience, and since there is considerable overlap, we discuss biodiversity components under three headings: wild fauna and flora, domesticated fauna and flora, and genetic materials.

Table 1 provides a brief overview of the legal status of biodiversity components in India, listed according to the parameters mentioned above. Table 2 gives a detailed statement of specific laws, and their major provisions relevant to biodiversity, which have been enacted by the Government of India.

2.1 Wild Fauna and Flora

By far the largest number of the laws reviewed related to wildlife and wild habitats. These are discussed below, as relevant to each of the 11 aspects of biodiversity (see also Table 1 and Section 1.1 above).

- a) Identification—There appears to be no legal provision stipulating the identification of wild species of fauna and flora. Nevertheless, agencies like the Zoological Survey of India, the Botanical Survey of India, state Forest Departments, universities and many independent organisations and individuals are involved in such identification.

- b) **In Situ Protection**—Several acts are relevant to the protection of species *in situ*, either through stipulating restrictions or prohibitions in hunting, cutting, etc. of notified species, or through providing protection to their habitats. The former, species protection, is provided for in the Wild Life (Protection) Act of 1972 and its 1991 amendments, with legal protection being given to all species listed in Schedules I to IV. The latter, habitat protection, is directly stipulated in the Indian Forest Act of 1927, the Wild Life (Protection) Act of 1972, the Forest (Conservation) Act of 1980, the Territorial Waters, Continental Shelf, Exclusive Economic Zone, and Other Maritime Zones Act of 1976, and the Environment (Protection) Act of 1986. *In situ* protection is also indirectly provided for in the Fisheries Act of 1894, the Water (Prevention and Control of Pollution) Act of 1974, the Air (Prevention and Control of Pollution) Act of 1981, and the Prevention of Damage to Public Property Act of 1984, in so far as these regulate damage to, or destruction of, natural habitats, though not explicitly with the purpose of protecting biodiversity.
- c) **Ex Situ Protection**—Very few acts relate to *ex situ* protection of wild species. The Wild Life (Protection) Act of 1972 provides some controls over the keeping of animals in captivity, while its 1991 amendments contain provisions regarding the management of zoos and the possession and cultivation of notified plant species. Agencies like the Botanical Survey of India, and wildlife sections of state Forest Departments, are making attempts at *ex situ* protection of wild fauna and flora, though without any legal mandate. Botanical gardens seem to have no national legal status.
- d) **Access and Extraction**—With the exception of the legal rights vested in individuals, communities, and governments, by virtue of their ownership of property, there seem to be few central acts governing access to, and modes of extraction of, wild fauna and flora. The few acts which regulate extraction, and methods of extraction, of wild flora and

Table 1: Legal Coverage of Various Aspects of Biodiversity in India

	Wild Fauna	Wild Flora	Domestic Fauna	Domestic Flora	Genetic Materials
a) Identification	N	N	N	N	N
b) Protection <i>In Situ</i>	W	W	N	N	N
c) Protection <i>Ex Situ</i>	W	P	N	N	N
d) Access/Extraction	P	P	N	N	N
e) Use	W	P	W	N	N
f) Trade	W	W	P	W	P
g) Breeding/Cultivation/ Multiplication	W	P	P	P	P
h) Introduction/Augmentation/ Re-introduction	P	P	P	P	P
i) Release	N	N	N	N	P
j) Movement	W	P	P	P	P
k) Intellectual property rights	N	N	N	N	N
N = Not covered P = Partially covered W = Well covered					

Table 2: Major Relevant Provisions of Central Acts Relating to Biodiversity

(Figures and letters refer to the paragraphs in the respective acts).

1.	Agricultural and Processed Food Products Export Development Authority Act, 1985/1986. <ul style="list-style-type: none"> Promotion and regulation of export of agricultural products specified in schedules; includes medicinal plants.
2.	Agricultural Produce (Grading and Marking) Act, 1937. <ul style="list-style-type: none"> Fixing grade designations to indicate quality of specified agricultural produce (3a, 3b). Prohibition or restriction on trade in wrongly marked/graded produce (3g). Extension of such provisions to any other article (including non-agricultural articles) (6).
3.	Cardamom Act, 1965. <ul style="list-style-type: none"> Provisions as in Rubber Act (see below); includes seeds. Provision for prohibiting/restricting export/import of cardamom (21). Applicable to <i>Elettaria cardamomum maton</i>, but extendible to other plant notified by Cardamom Board (3).
4.	Coconut Development Board Act, 1979. <i>As in Rubber Act, Tea Act, Cardamom Act, etc.</i>
5.	Customs Act, 1962. <ul style="list-style-type: none"> Regulation or prohibition of import and export of specified articles (21). Regulation of import-export specifically for: <ul style="list-style-type: none"> (a) the protection of human, animal or plant life or health (11t); and (b) the conservation of exhaustible natural resources (11m). Regulation of transportation and storage of notified items (11j, 11k, 11l, 11m).
6.	Destructive Insects and Pests Act, 1914. <ul style="list-style-type: none"> Prohibition or regulation of import of any articles which may cause infection to any plant (3.1). Prohibition or regulation of movement, between states within India, of articles likely to cause infection to any plant (4a). <p>Note: "articles" includes insects and plants.</p>
7.	Environment (Protection) Act, 1986. <ul style="list-style-type: none"> General measures to protect environment (3.1). Restriction of industrial and other processes/activities in specified areas (3.2v). (Read with Rule 5 of Environment (Protection) Rules, 1986). Prevention and control of hazardous substances, including their manufacture, use, release, and movement (3.2, 7, 8).
8.	Fisheries Act, 1897. <ul style="list-style-type: none"> Prohibition on use of explosives for fishing (4.1). Prohibition on use of poisons for fishing (5). Regulation on fishing in private waters, with consent of owner/right-holder (6.2, 6.3). Prohibition of all fishing in specified waters for maximum 2 years (6.4).
9.	Forest Act, 1927. <ul style="list-style-type: none"> Setting up and managing reserved forests (Chapter II). Setting up and managing village forests (Chapter III). Setting up and managing protected forests (Chapter IV). Protection of non-government forests and lands (Chapter V). Control of movement of forest produce (Chapter VII). Control of grazing or trespass by cattle in forest land (Chapter X).

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10. Forest (Conservation) Act, 1980.	<ul style="list-style-type: none"> • Prohibiting or regulating non-forest use of forest lands (2).
11. Import and Export (Control) Act, 1947.	<ul style="list-style-type: none"> • Prohibition or restriction on imports and exports of specified items (3). • Regulations on transportation of specified items (4e).
12. Marine Products Export Development Authority, 1972.	<ul style="list-style-type: none"> • Establishment of an Authority for developing and controlling marine products (4, 9.1). • Developing and regulating off-shore and deep-sea fishing; taking measures for conservation; fixing standards for export; regulating exports (9.2a, 9.2c, 9.2f). • Prohibition/restriction on export and import of marine products (20.1).
13. Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981.	<ul style="list-style-type: none"> • Regulation of fishing in India's Exclusive Economic Zones by foreign vessels (3). • Permits only to be granted within definition of public interest, and for scientific research, experiments, etc. (5.3, 8).
14. National Dairy Development Board Act, 1987.	<ul style="list-style-type: none"> • Establishment of a Board which promotes dairy development and other agriculture based industries (4, 16.1a). • Financing and facilitating animal husbandry, agriculture, high yielding cattle (including import of semen), import-export of milch animals and bulls and general enhancement of cattle wealth (16.1).
15. National Oilseeds and Vegetable Oils Development Board, 1983.	<ul style="list-style-type: none"> • As in Rubber Act, etc. Special focus on providing farmers, esp. small farmers, benefits from development of oilseeds industry (9.2a). • Assistance for production and development of breeder's seeds, foundation seeds, and certified seeds of high quality, and for improved methods of cultivation
16. Prevention of Cruelty to Animals Act, 1960.	<ul style="list-style-type: none"> • Restrictions on cruel treatment of animals, including use, transportation, and trade (Chapter III, and Rules under Section 38). • Restrictions on use of animals for purposes of experimentation and performances (Chapter IV & V).
17. Rubber (Production and Marketing) Act, 1947.	<ul style="list-style-type: none"> • Establishment of Indian Rubber Board, with function of developing/encouraging improved rubber cultivation and marketing, advising or import/export (8.1, 8.2). • Restrictions on right of rubber planters - licence required to plant or replant, where to plant, etc. (17). <p>Notes: Applicable to 4 species of rubber initially, more if Board so notifies (Definitions).</p>
18. Seeds Act, 1966.	<ul style="list-style-type: none"> • Regulation on quality of seeds of notified food crops, cotton, and fodder to be sold for agricultural purposes (5, 6). • Restriction on export/import of notified seeds (17). • Exemption to persons selling/delivering, on own premises, seeds grown by them (24).
19. Spices Board Act, 1986.	<ul style="list-style-type: none"> • As in Rubber Act, etc., for cardamom; for other spices, restricted to export-import development and regulation.
20. Tea Act, 1953.	<ul style="list-style-type: none"> • As in Rubber Act, etc. Includes restrictions on export of tea seeds (17). Applicable to one species, <i>Camellia sinensis</i>, presumably to all its varieties.
21. Territorial Waters, Continental Shelf, Exclusive Economic Zone, and other Maritime Zones Act, 1976.	<ul style="list-style-type: none"> • Establishment of sovereign rights over waters and seabed within the continental shelf and exclusive economic zone (200 nautical miles from nearest appropriate point on Indian territory) (3.1, 5.1, 6.2, 7.4).

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<ul style="list-style-type: none"> • Sovereign right to explore, exploit, conserve and manage resources of continental shelf and Exclusive Economic Zones (6.3, 7.4). • Notification of any area within this zone for purposes of protection and resources and conservation of marine environment (6.5, 7.6).
<p>22. Tobacco Board Act, 1975. As in Rubber Act, Tea Act, Cardamom Act, etc.</p>
<p>23. Wildlife (Protection) Act, 1972 and Wildlife (Protection) Amendment Act, 1991.</p> <ul style="list-style-type: none"> • Restriction or prohibition on hunting of animals (Chapter III). • Protection of specified plants (Chapter IIIa). • Setting up and managing sanctuaries and national parks (Chapter IV). • Setting up of zoo authority, control of zoos, and captive breeding (Chapter IVa). • Control of trade and commerce in wild animals, animal articles and trophies (Chapter V & Chapter Va).

fauna include the Indian Forest Act of 1927 and the Wild Life (Protection) Act of 1972 for terrestrial biodiversity, and the Fisheries Act of 1894 and the Territorial Waters, Continental Shelf, Exclusive Economic Zone, and Other Maritime Zones Act of 1976 for aquatic biodiversity.

- e) **Use**—There are not many acts which regulate the way in which biodiversity components are to be used, though there are several on the use of the products or extracts of these components (e.g. medicines). The Wild Life (Protection) Act of 1972 specifies restrictions on the use of wild animals, and its 1991 amendments have extended this to notified plants and to wild animals in captivity (specifically zoos). The Prevention of Cruelty to Animals Act of 1960 extends protection against misuse of animals in captivity or under human use, including those being used for performances or for experimentation.
- f) **Trade**—Within India barter sale, and other forms of exchange of notified wild animals and plants and their parts or derivatives, are regulated by the Wild Life (Protection) Act of 1972. Import and export of specified biodiversity components are controlled by the Destructive Insects and Pests Act of 1914, the Import and Exports (Control) Act of 1947, the Customs Act of 1962, and the Marine Products Export Development Authority Act of 1972. In addition, the new Import and Export Policy announced by the Government of India in 1990 banned the export of all birds for a period of three years. Indications are that this ban will be extended beyond this period. On the other hand, a 1993 notification has taken some other biodiversity components off the list of items for export, including cultivated orchids, parts and derivatives of wild plants.
- g) **Breeding, Cultivation and Multiplication**—Control mechanisms for captive breeding of wild animals and cultivation of specified wild flora are provided for in the 1991 amendments to the Wild Life (Protection) Act of 1972. As mentioned above, there seems to be no central law which governs botanical gardens in general, such as the Wild Life (Protection) Act of 1972 that governs zoological parks.
- h) **Introduction, Augmentation and Reintroduction**—There appears to be no central act governing the introduction, augmentation, or reintroduction of wild animals and plants. The only one which may be relevant, to some extent, is the Destructive Insects and Pests Act of 1914, which regulates or prohibits activities that could lead to an introduction or spread of pests from one area to another, or from another country into India.
- i) **Release**—There appears to be no central act covering this aspect.
- j) **Movement**—Control over the mode and means of transportation of specified biodiversity components is provided for in all the acts relevant to trade. In addition, the

Prevention of Cruelty to Animals Act of 1960, and its subsequent rules, regulate conditions of transportation of animals.

- k) IPRs—Protection of knowledge, innovations and other forms of intellectual property relating to biodiversity is not covered under any central law. The Patents Act of 1970 leaves out of its purview life forms, “on the grounds of law, morality, and health”.

2.2 Domesticated Fauna and Flora

Compared to wild fauna and flora, there are relatively few laws concerning domesticated biodiversity. These are discussed below, as relevant to each of the 11 aspects of biodiversity.

- a) **Identification**—There appears to be no central law stipulating the identification (and associated activities) of domesticated fauna and flora. Agencies like the National Bureau of Plant Genetic Resources (NBPGR), the National Bureau of Fish Genetic Resources, and the National Bureau of Animal Genetic Resources, are conducting identification exercises, but these do not seem to have any legal mandate.
- b) **In Situ Protection**—Conservation of crops and livestock at the sites of their use, or conversely, sanctions against their destruction or replacement at these sites or elsewhere, is not covered by any central law. In the context of the severe *in situ* decline of crop and livestock diversity in India, this is a very serious legal omission.
- c) **Ex situ Protection**—There seems to be no act governing the protection of domesticated biodiversity in *ex situ* conditions, though agencies like the NBPGR, and agricultural universities, are maintaining such stocks. The New Policy on Seed Development of 1988 provides for the compulsory supply of imported plant cuttings and samplings by the importers to the genebanks of the NBPGR.
- d) **Access and Extraction**—With the exception of the legal rights vested in individuals, communities and governments, by virtue of their ownership of property, there seem to be no central act governing access to, and modes of extraction of, domesticated fauna and flora.
- e) **Use**—As in the case of wild biodiversity, the use of domesticated flora and fauna is governed by very few acts, though there may be several on the use of the products or extracts of these species (e.g. medicines). The Prevention of Cruelty to Animals Act of 1960 extends to domesticated animals.
- f) **Trade**—The largest number of laws relevant to domesticated biodiversity relate to its barter, sale, import, export, or other forms of exchange. Provisions for controlling trade within India are contained in the Agricultural Produce (Grading and Marking) Act of 1937, and in several laws relating to individual species or classes of crops such as the Rubber (Production and Marketing) Act of 1947, the Tea Act of 1953, the Cardamom Act of 1965, the Tobacco Board Act of 1975, the Coconut Development Board Act of 1979, the National Oilseeds and Vegetable Oils Development Board Act of 1983, and the Spices Board Act of 1986. These acts also govern the import and export of these crops. In addition, import-export of domesticated plants is regulated by the Destructive Insects and Pests Act of 1914 (especially under the Plants, Fruits, and Seeds Regulation of Import into India Order of 1984) and the Agricultural and Processed Food Products Export Development Authority Act of 1985-86. The latter includes within its purview medicinal plants. The Special Licensing Procedures, and the Import Policy for Registered Exporters of the Export and Import Policy also govern the import of living plants. International trade in some kinds of livestock is covered by the National Dairy Development Board Act of 1987. In addition, import-export of specified kinds of both

plants and animals can potentially be controlled by the Import and Exports (Control) Act of 1947, and the Customs Act of 1962.

- g) **Breeding, Cultivation and Multiplication**—There appears to be no central act covering the breeding of domesticated animals, except to some extent the National Dairy Development Board Act of 1987, which has general clauses on promoting animal husbandry and facilitating the "enhancement of cattle wealth". Cultivation of domesticated plants in general is not covered by any central act, but the growing of tea, cardamom and other spices, coconut, tobacco, oil-yielding plants, and certain other crops is encouraged or regulated by the specific acts mentioned above under (f).
- h) **Introduction, Augmentation and Reintroduction**—Generally the same acts as those that govern breeding and cultivation also deal with the introduction, augmentation, and reintroduction of domesticated animals and plants.
- i) **Release**—There appears to be no central law relating to this aspect.
- j) **Movement**—Transportation of plants within India, specifically those which might carry pests with them, is regulated by the Destructive Insects and Pests Act of 1914. There appears to be no act regulating other domesticated plants. The Prevention of Cruelty to Animals Act of 1960 and its subsequent rules specify conditions for the transportation of animals. The international movement of domesticated species is regulated by the various acts related to import and export, mentioned under (f) above.
- k) **IPRs**—Protection of knowledge and innovation in the fields of agricultural and animal husbandry, generally known as intellectual property rights, farmers' rights, or breeders' rights, is not covered by any central law. The Patents Act of 1970 does not permit the patenting of substances in the fields of agriculture, horticulture, and curing and enhancing human, animal, or plant life.

2.3 Genetic Materials

With the exception of seeds, genetic materials seem to be least covered by laws in India. The acts relevant to various aspects of such materials are discussed below.

- a) **Identification**—This does not appear to be stipulated in any central act. Agencies like the National Bureau of Plant Genetic Resources, the National Bureau of Fish Genetic Resources, and the NBPGR, are conducting identification exercises, but these do not seem to have any legal mandate.
- b) **In Situ Protection**—*In situ* protection seems relevant mainly to seeds, since other genetic materials are best preserved in the living organisms which are their source. In the case of seeds, such protection would be done at the level of the individual farmer or farming communities. However, there appears to be no act providing protection to even this restricted class of materials; neither the Seeds Act of 1966, nor the New Policy on Seed Development of 1988 deal with this aspect.
- c) **Ex Situ Protection**—Supply of a portion of imported seeds and other plant material by the importer to the NBPGR for accession to its gene bank has been made obligatory under the New Policy on Seed Development of 1988. There appears, however, to be no laws relevant to *ex situ* protection of genetic materials. The agencies named under "Identification" are conducting *ex situ* operations without any legal mandate.
- d) **Access and Extraction**—There seems to be no law governing this aspect, except in so far as genetic materials which may be under private, corporate, or government ownership, and therefore given the status of property, are covered by property laws. There appears to be no law, for instance, which guarantees or restricts access to the country's genebanks.

- e) **Use**—It may be possible to apply the Environment (Protection) Act of 1986 to control the use of those genetic materials which can be classified as hazardous. Otherwise, there appears to be no law governing this aspect.
- f) **Trade**—Sale and other exchange of seeds of notified crops, including their export and import, is governed by the Seeds Act of 1966, while all imports of seeds and plant materials are regulated by the Plants, Fruits and Seeds (Regulation of Import into India) Order of 1984, made under the Destructive Insects and Pests Act of 1914. The New Policy on Seed Development of 1988 also stipulates restrictions on the import of plant materials. The Agricultural Produce (Grading and Marking) Act of 1937 can be used to regulate internal trade of seeds (and possibly other genetic material under a general clause of extension), which are considered below standard. Import-export of seeds of certain specified crops, like tea and cardamom, are governed by the specific laws mentioned above. The National Dairy Development Board Act of 1987 provides for the import of livestock semen, but there is no other act regulating trade in animal genetic material. It may be possible to extend the scope of both the Import and Export (Control) Act of 1947, and the Customs Act of 1962, to include such materials, but, as far as we could ascertain, this has not yet been done.
- g) **Breeding, Cultivation and Multiplication**—The National Oilseeds and Vegetable Oils Development Board Act of 1983 has provisions for assisting in the production and development of oilseeds. Such a provision is also made in the acts regulating the cultivation of, and trade, in tea, rubber, and cardamom, named above. Apart from these, there seems to be no other act encouraging or regulating the multiplication of genetic materials. The agencies mentioned above are engaged in this task, but not under any legal mandate.
- h) **Introduction, Augmentation and Reintroduction**—Introduction of genetic materials of exotic varieties of plants into India is partially covered by the Seeds Act of 1966, and the Plants, Fruits, and Seeds (Regulation of Import into India) Order of 1984, made under the Destructive Insects and Pests Act of 1914. The National Dairy Development Board Act of 1987 provides for the introduction of semen of exotic livestock species into India. There seems to be no comprehensive act governing the introduction of genetic material, including the introduction of hazardous genetically altered materials, though rules have recently been framed to deal with this aspect (see below).
- i) **Release**—In 1991 rules were enacted under the Environment (Protection) Act of 1986, to regulate the release of genetically altered materials into the environment. Other genetic materials are however not covered by this or other laws.
- j) **Movement**—The various laws mentioned above, regulating internal and external trade in genetic materials, particularly seeds, also have general stipulations concerning the transportation of any goods under purview. Otherwise there is no act concerning this aspect.
- k) **IPRs**—There is no act protecting genetic material.

3. Major Loopholes in Legislation Concerning Biodiversity and Suggestions for Future Directions

The above survey of central acts relevant to biodiversity has revealed certain areas of special concern. There seem to be serious omissions in the legal coverage provided to the following categories and aspects of biodiversity.

- a) **Identification** is not provided for by any law. Since this is a prerequisite for protection, the laws relevant to *in situ* protection should perhaps be amended to include this aspect for all biodiversity components. This is especially urgent in the case of crops and livestock, since updated inventories of their diversity do not exist.
- b) ***In situ* protection** is not extended by any law to domesticated flora and fauna, nor to seeds. It is well-established that "evolution" of crop and livestock varieties takes place "in the field" as much as in laboratory conditions, and that the protection of these varieties in areas of cultivation or animal husbandry is a vital part of biodiversity conservation. In addition, protection against loss of such diversity in the field is crucial if farmers are to gain from it, since their access to *ex situ* collections is restricted. Hence, a legal structure which could safeguard against *in situ* erosion of domesticated flora and fauna is essential.
- c) ***Ex Situ* Protection**—Though a number of agencies are maintaining *ex situ* collections of different species and varieties, no direct and explicit provisions apply to such collections, except in the case of wild animals. There is perhaps also a need to give legal backing to the principle that *ex situ* conservation measures should never replace *in situ* measures.
- d) **Use**—The possibility of misusing genetic material, especially materials where genetic alterations have been made through modern biotechnological procedures, is a real threat. The issue of biosafety is currently being discussed even at the level of the Convention on Biological Diversity (hereafter the Convention), and needs to be urgently re-examined within India. Although India has certain regulations that deal with field testing of genetically engineered organisms, legal stipulations on their use are necessary.
- e) **Introduction**—The introduction of exotic species into natural and agricultural ecosystems has often caused havoc in India and elsewhere, including the erosion of components of biodiversity. Legal restrictions and prohibitions on this are absent in the case of all biodiversity components, and are urgently required.
- f) **Release**—The repercussions of dumping, or unintentional release of biodiversity components, especially exotic species, can be disastrous. No law covers this aspect related to biodiversity except regulations for genetically altered materials, a gap which needs to be filled.
- g) **IPRs**—This is a difficult and contentious issue. At the global level, India and many other nations have had relatively free access to each others plant genetic resources, to intellectual property, and to biotechnology applications. This was diluted when the Food and Agriculture Organization accepted the compromise formulations of Farmers' Rights and Breeders' Rights. Within India, a legal structure ensuring free access should be created, and at the same time, provision of some form of incentives and rewards for those with traditional or new knowledge relating to biodiversity and biotechnology.

Filling the above mentioned major gaps, and other specific minor ones in the legal framework concerning biodiversity in India, is an urgent requirement.

4. Conclusion: The Convention on Biological Diversity and National Law

One question which has come up in our perusal of India's legal regime *vis-a-vis* the Convention is whether there should be one over-reaching law covering biodiversity as a whole. Given the complex nature of the issue of biodiversity conservation, a simple answer to this question is not possible. There are two of the major complexities.

First, combining both natural (wild) and domesticated biodiversity in the same law might prove complicated and cumbersome, though not impossible. The close link between the two, especially in the case of wild relatives of cultivated plants, may not be appropriately represented if there are two separate laws.

Second, since the conservation of biodiversity—as distinct from the conventionally defined category of wildlife—is a matter pertaining to virtually every human activity, a single act may become too bulky and ineffective. However, many of the links are so close that separate acts dealing with, say, conservation, technology transfer, and the safety of products derived from modern biotechnologies, may lack punch and even become mutually contradictory. It would be like dissecting development of agriculture, industry, and services and developing separate, and often conflicting, policies and legislation on each sector.

If a single, well-integrated law on biodiversity is not possible, there must be an attempt to have an overall biodiversity policy which can harmonise various relevant laws. This is a challenging task ahead for all countries, but will be absolutely necessary if the provisions of the Convention are to be made effective.
