



APPENDIX

Appendix 1

ABBREVIATIONS

ASI	Annual Survey of Industries	NO ₂	Nitrogen dioxide
BSI	Botanical Survey of India	NO ₃	Nitrate
CEA	Central Electricity Authority	NSFP	National Social Forestry Project
CFC	Chloro-Floro-Carbons	ODP	Ozone Depletion Potential
CO	Carbon Monoxide	PM	Particulate matter
CH ₄	Methane	ppm	Parts per million
Cl	Chlorine	ppbv	Part per billion by volume
CPCB	Central Pollution Control Board	ppmv/year	Parts per million by volume per year
Cu.m	Cubic Metre	Pb	Lead
Fe	Iron	ppmv	Part per million by volume
GWP	Global Warming Potential	pptv	Part per trillion by volume
GOI	Government of India	Rs.	Rupees
H ₂ S	Hydrogen sulphide	RSC	Residual Sodium Carbonate
ha	Hectares	SAR	Sodium absorption ratio
HC	Hydro Carbons	SFP	Social Forestry Project
IQ	Institutional Qualified	SO ₂	Sulphur dioxide
Kms	Kilometers	SO ₄	Sulphate
M.C.M.	Million cubic metre	SP	Sodium Percentage
Mg	Magnesium	SPM	Solid Particulate Matter
Mha	Million hectares	SWS	Sub-Water Shed
MOEF	Ministry of Environment and Forests	RSPM	Residual Suspended Particulate Matter
MW	Megawatts	Sq. Kms.	Square Kilometers
NA	Not Available	TDS	Total Dissolved Solids
Neg.	Negligible	TERI	The Energy Resources Institute
NH ₃	Ammonia	WB	World Bank
NIQ	Non-Institutional Qualified	ZSI	Zoological Survey of India
NO _x	Oxides of Nitrogen	BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand	TSP	Total Suspended Particulate

Concepts and Definitions of the Terms Used

Area under miscellaneous tree crops, groves, etc.:

All culturable land which is not included under 'net area sown' but is put to some other agricultural use, such as land under casuarina trees, thatching grasses, bamboo bushes, and other groves for fuel, etc.

Barren and unculturable land:

Land which cannot be brought under cultivation unless at high cost, irrespective of whether such land is in isolated blocks or within cultivated holdings.

Critical:

A taxon is critical when it is facing an extremely high probability of extinction in the wild in immediate future.

Crown cover:

The canopy formed by the crowns of all the trees in a forest or in an uneven aged forest by the crowns of all trees in a specified crowns class.

Culturable waste:

Land available for cultivation but not taken up for cultivation or abandoned after a few years for one reason or the other. Such lands may be either fallow or covered with shrubs and jungles not put to any use. These may be assessed or unassessed and may lie in isolated blocks or within cultivated during the year and the last five or more consecutive years in succession, will be included in this category.

Current fallow:

Cultivable area kept fallow during the current agricultural year. Any seedling

area in the current agricultural year not cropped in the same year is also treated as current fallow.

Demersal:

Refers to fish that live on or adjacent to the sea bottom.

Dense Forest:

Forests whose crown density is 40 percent or above.

Endangered:

Species in danger of extinction and whose survival is unlikely if the casual factors continue operating. Included are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Expectation of Life at Birth:

The Expectation of life at birth is defined as the average number of years expected to be lived at the time of birth if current mortality trends were to continue.

Extinct:

Species that are no longer known to exist in the wild after repeated searches of the type in localities and other known or likely places.

Flush system latrine:

The type of latrine which is connected to an under ground sewerage system, from which human excreta and wastes are flushed out by water.

Forest:

Includes all actually forested area on the lands so classed or administered as

forests under any legal enactment dealing with forests, whether state-owned or private.

Gross area irrigated:

An irrigated plot growing crop in more than one season, is counted as many times as it is cropped to arrive at gross area irrigated. In case of mixed crops, the area under component crops as reported by household is taken into account.

Habitat:

An area and not a particular location is called habitat. The site or environment which a plant or animal lives, such as forest.

Household:

A household is a group of persons who commonly live together and would take their meal from common kitchen unless the exigencies of work prevented any of them from doing so. There may be a household of persons related by blood or a household of unrelated persons or having a mix of both. Examples of unrelated households are boarding houses, messes, hostels, residential hotels, rescue homes, jails, ashrams, etc. These are called “Institutional Households”.

Infant Mortality Rate:

Infant mortality rate is defined as the number of deaths under one year of age to thousand live births in a year.

Insufficiently Known:

A taxon is insufficiently known when an evaluation has been made but the available data are inadequate to assign a category.

Irrigation:

A device of purposely providing land with water other than rain water by artificial means.

Land put to non-agricultural uses:

Includes all land occupied by buildings, paths, etc. or under water (e.g. tank, canals, etc.) and land put to uses other than agricultural production.

Neretic :

The part of the pelagic environment that extends from the nearshore zone out to depth of about 200 m; the water overlying the continental shelf related to shallow water on the margin of the sea, generally that overlying the continental shelf.

Net area irrigated:

The total of all the areas irrigated from different sources, counting each area irrigated only once even though it was irrigated more than once in the same year.

Net area sown:

Area sown with crops and orchards, counting the area sown more than once in the same year, only once.

The above definition was elaborated as follows:

The net area sown was defined as the difference between the total geographical area of all plots of land of the holding and the sum of the areas of land under

- (1) forest, (2) barren & uncultivable wastes, (3) put to non-agricultural uses, (4) culturable wastes, (5) permanent pastures & other grazing land, (6) miscellaneous tree crops excluding orchards and (7) all type of fallow lands.

Open Forest:

Forest whose crown density is more than 10 percent but less than 40 percent.

Other fallow:

All lands which are taken up for cultivation in the past, but are temporarily out of cultivation for a period of not less than one year and not more than five years including the

current agricultural year are classified under 'other fallow'.

Pastures and grazing land:

Include all grazing lands irrespective of whether they are permanent pastures and meadows or not. Grazing lands within forest area shall be included under this category.

pH:

The logarithm to the base 10 of the reciprocal of Hydrogen ion concentration.

Rare:

The species with small world populations that are not at present endangered or vulnerable but are at risk. These species are usually localised within restricted geographic areas or habitats or are thinly scattered over a more extensive range.

Room:

Covered space enclosed by walls on all sides reaching from the floor to the roof and having a door way. The rooms have been further classified as NBO rooms (specification for a room as recommended by the National Buildings Organisation) and other rooms. An NBO room is defined as a room having a floor space of at least four square metres and height of at least two metres from the floor to the ceiling.

Service latrine:

The types of latrine which are attended by the scavenging services of the Municipalities or Corporations.

Slum:

A slum is defined as an areal unit having twenty five or more kachcha structures mostly of temporary nature, or fifty or more households residing mostly in kachcha structures, huddled together, or inhabited persons with practically no private latrine and inadequate public latrine and water facilities.

Species:

A group of individual specimens having close resemblance but differing from others and belonging to the same genus.

Tap:

Source through which the drinking water is distributed through pipes laid out by corporations, municipalities or other local authorities like metropolitan or town development authorities or housing estates or similar agencies. But drinking water distributed through pipes by the house owner by pumping out from unprotected wells, tanks or springs should not be regarded as tap.

Type of dwelling:

Dwellings, have been classified under three categories, namely, chawl/bustee, independent house and flat.

(a) Chawl/Bustee:

A collection of poorly built katcha or semi-pucca huts or tenements.

(b) Independent house:

A separate structure with a room or rooms and having all its accessories and a separate entrance to it. In other words, if the dwelling unit and the entire structure of the building are physically coterminous, it should be considered an independent house.

(c) Flat:

All housing arrangements other than chawl/bustee and independent house are to be taken as flats. Flat thus includes any self-contained dwelling unit with a room or rooms provided with normal housing facilities like water supply, bath and latrine used exclusively by the family residing there or jointly with other families. It also includes detached room or rooms with or without other housing facilities.

Type of structure:

The structures have been classified into three categories, namely pucca, semi-

pucca and kachcha on the basis of the materials used for construction.

(a) Pucca Structure:

A structure whose walls and roof at least are made of pucca materials.

(b) Kachcha Structure:

A structure which has walls and roof made of non-pucca materials.

(c) Semi-Pucca Structure:

A structure which has either the walls or the roof, but not both, made of pucca materials. Walls/roof made partially of pucca materials will be regarded as kachcha walls/roof. Materials such as oven-burnt bricks, stone, stone-blocks, cement, concrete, jack-board (cement plastered reed), tiles and timber are pucca materials. Corrugated iron or asbestos sheets used in the construction of roof will also be treated as pucca materials.

Urban:

The criteria adopted for treating the urban for 1991 census is:

All statutory towns, i.e., all places with a municipality, corporation, cantonment board or notified town area committee, etc.

(a) All places which satisfied the following criteria:

- (i) A minimum population of 5000;

- (ii) At least 75% of the male working population engaged in non-agricultural pursuits; and
- (iii) A density of population of atleast 400 per sq. km. Mile (1000 per sq. mile).

Urban Agglomeration:

- (i) A city or a town with a continuous outgrowth, the outgrowth being outside the statutory limits but falling within the boundaries of the adjoining villages ; or
- (ii) Two or more adjoining towns with their outgrowths, if any, as in (i) above ; or
- (iii) A city and one or more adjoining towns with or without outgrowths all of which form a continuous spread.

Vulnerable:

The species believed likely to move into the endangered category in the near future if the casual factors continue operating. Included are species of which most or all the populations are decreasing because of overexploitation, extensive destruction of habitat or other environmental disturbance; species with populations that have been seriously depleted and whose ultimate security is not yet assured; and species with populations that are still abundant but are under threat from serious adverse factors throughout their range.

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Appendix 4

METHODS OF MEASUREMENT OF AIR POLLUTION

Methods of measurement of air pollution followed by the Central Pollution Control Board are as follows:

A. Sulphur dioxide (SO₂)

The SO₂ is absorbed from air in a solution of potassium tetrachloromercurate (TCM). The resultant complex is made to react with pararosaniline and formaldehyde to form the coloured pararosaniline methylsulphonic acid, the absorbance of this solution is measured by means of a suitable spectrophotometer at 560 nm.

B. Nitrogen dioxide (NO₂)

The NO₂ in ambient air is collected by bubbling it through a solution of sodium hydroxide and sodium arsenate. The resultant nitrite ion concentration is colorimetrically determined by reacting it with sulfanilamide and N- (1-naphthyl)-ethylene diamine dihydrochloride, the absorbance is then measured at 540 nm.

C. Suspended Particulate Matter (SPM)

SPM is measured gravimetrically high volume sampling with whatman filter paper is used at average flow rate being not less than 1.1 cubic meter per minute.

Source: Ambient Air Quality – Status and Statistics, 1997, Central Pollution Control Board, Delhi

Appendix 5

Methods of Determination of Water Quality Parameters

Parameter	Recommended Method
1. Temperature	Thermometric method
2. pH	Electrometric method
3. TSS	Nephelometric method
4. Velocity of Flow	1) Current method 2) Float method 3) Chemical method
5. Dissolved Oxygen	Iodometric method
6. Biochemical Oxygen Demand	Dilution method
7. Total Kjeldahl Nitrogen	a) Digestion b) Distillation 1) Titration method (>5mg/l) 2) Nesslerization method (<5mg/l)
8. Nitrogen, nitrate + nitrite	Amalgamated Cadmium Reduction method for reduction of nitrate to nitrite by diazotisation method
9. Total Coliform (MPN)	Multiple Tube Dilution technique
10. Fecal Coliform (MPN)	Multiple Tube Dilution technique
11. Conductivity	Conductometric method
12. Chloride*	1) Argentometric method 2) Mercurimetric method
13. Hardness	EDTA Titrimetric method
14. Calcium	EDTA Titrimetric method
15. Magnesium	By difference of 13 & 14
16. Alkalinity	1) Electrometric method 2) Visual titration method

Parameter	Recommended Method
17. Sulphate**	Turbidimetric method
18. Sodium	Flame photometric method
19. Chemical Oxygen Demand	Dichromate reflux method
20. Total Dissolved Solids	
&	Gravimetric method
21. Fixed Dissolved Solids	
22. Phosphate	Molybdate method (Colorimetry)
23. Boron	Curcumine method (Colorimetry)
24. Free Ammonia	

Source: Water Quality - Status & Statistics (1996 & 1997)
Central Pollution Control Board

Argentometric method has been given first preference but if the colour of the sample interferes with the chromate end point then mercurimetric method should be used. Usually sulphate concentration is low in surface waters & hence gravimetric method may not be accurate as turbidimetric method, therefore, turbidimetric method is suggested.

Note: Wherever more than one methods are given, they are in order of preference.

A NOTE ON POVERTY ESTIMATION

The official estimates of the poverty line are based on calorie norm of 2400 per capita per day for rural areas and 2100 per capita per day for urban areas. The poverty line for the base year 1973-74 has been taken as the per capita expenditure level of which these calorie norms have been met, on an average, for the country as a whole, as per the National Sample Survey (NSS) household consumption expenditure survey for the corresponding year.

In order to arrive at the estimates of the number of poor, Planning Commission has been making adjustments in the NSS data on distribution of households by consumption expenditure levels. Such an adjustment has been felt to be necessary because the aggregate private household consumption expenditure as estimated from the NSS data is different from the aggregate private expenditure estimated in the National Accounts Statistics (NAS). Based on this methodology estimates of poverty have been made at national and state levels for the years 1972-73, 1977-78, 1983-84 and 1987-88.

In September 1989 in order to look into the methodology for estimation of poverty at National and State level and also to go into the question of redefining the poverty line, if necessary, the

Planning Commission constituted an Expert Group on Estimation of Proportion and Number of Poor under the Chairmanship of Prof. D. K. Lakadwala. The Expert Group submitted its report in July, 1993.

The Expert Group has recommended (i) for giving up adjustment of the NSS data on the basis of the estimates of Private Consumption given in the NAS (ii) State specific poverty lines as against an All-India poverty line for rural and urban areas and (iii) use of the State Specific cost of living indices for up-dating the poverty line separately for rural and urban areas.

The full Planning Commission under the Chairmanship of the Prime Minister has decided to accept the Expert Group methodology for estimating poverty. However, whereas the Expert Group had recommended taking a simple average of the weighted commodity indices of “Consumer Price Index for Industrial Workers” and Consumer Price Index for Urban Non-Manual Employees” for estimating and updating urban poverty line, in a slight simplification of this method, the Planning Commission has decided to use only the “Consumer Price Index for Industrial Workers” for estimating and up-dating the urban poverty line.

Environment Legislation, Acts, Rules, Notifications and Amendments

In the Constitution of India it is clearly stated that it is the duty of the state to **'protect and improve the environment and to safeguard the forests and wildlife of the country'**. It imposes a duty on every citizen **'to protect and improve the natural environment including forests, lakes rivers and wildlife'**. Reference to the environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985.

The constitutional provisions are backed by a number of laws – acts, rules and notifications. The Environment Protection Act of 1986(EPA) came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws came into existence as the problems began arising e.g. Handling and Management of Hazardous Waste Rules in 1989.

Following is a list of the environmental legislations that have come into effect:

- **General**
- **Forest and wildlife**
- **Water**
- **Air**

General

1986 – The Environment (Protection) Act authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.

1986 – The Environment (Protection) Rules lays down procedures for setting standards of emission or discharge of environmental pollutants.

1989 – Hazardous waste (Management and Handling) Rules objective is to control generation, collection, treatment, import, storage and handling of hazardous waste.

1989 – The Manufacture, Storage and Import of Hazardous Chemical Rules defines the terms used in this context, and sets up an Authority to inspect, once a year, the industrial activity connected with hazardous chemicals and isolated storage facilities.

1989 – The Manufacture, Use, Import, Export and Storage of hazardous Micro-organisms/ Genetically Engineered Organisms or Cells Rules were introduced with a view to protect the environment, nature and health, in connection with the application of gene technology and micro organisms.

1991 – The Public Liability Insurance Act and Rules and Amendment, 1992 was drawn up to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident while handling any hazardous substance.

1995 – National environmental Tribunal Act has been created to award compensation for damages to persons, property and the environment arising from any activity involving hazardous substances.

1997 – The National Environment Appellate Authority Act has been created to hear appeals with respect to restrictions of areas in which classes of industries etc are carried out or prescribed subject to certain safeguards under the EPA (Environment Protection Act).

1998 – Biomedical waste (Management and Handling) Rules is a legal binding on the health care institutions to streamline the process of proper handling of hospital waste such as segregation, disposal, collection and treatment.

Forest and wildlife

1927 – Indian Forest Act and Amendment 1984 is one of the many surviving colonial statutes. It was enacted to 'consolidate the law related to forest, the transit of forest produce and the duty leviable on timber and other forest produce.

1972 – Wildlife Protection Act, Rules 1973 and Amendment 1991 provides for the protection of birds and

animals and for all matters that are connected to it whether it be their habitat or the waterhole or the forest that sustain them.

1980 – The Forest (Conservation) Act and Rules 1981 provides for the protection of and the conservation of the forests.

Water

1882 – The Easement Act allows private rights to use a resource i.e. groundwater, by viewing it as an attachment to the land. It also states that all surface water belongs to the state and is a state property.

1897– Indian Fisheries Act establishes two sets of penal offences whereby the government can sue any person who uses dynamite or other explosive substance in any way (whether coastal or inland) with intent to catch or destroy any fish or poisons fish in order to kill.

1956 – The River Boards Act enables the states to enroll the Central Government in setting up an Advisory River Board to resolve issues in inter state cooperation.

1970 – Merchant Shipping Act aims to deal with waste arising from ships along the coastal areas within a specified radius.

1974 – The Water (Prevention and Control of Pollution) Act establishes an institutional structure for preventing and abating water pollution. It establishes standards for water quality and effluent. Polluting industries must seek permission to discharge waste

into effluent bodies. The Pollution Control Board (CPCB) was constituted under this act.

1977 – The Water (Prevention and Control of Pollution) Cess Act provides for the levy and collection of cess or a fees on water consuming industries and local authorities.

1978 – The Water (Prevention and Control of Pollution) Cess Rules contains the standard definitions and indicate the kind of and location of meters that every consumer of water is required to affix.

1991 – Coastal Regulation Zone Notification puts regulations on various activities, including construction, are regulated. It gives some protection to the backwaters and estuaries.

Air

1948 – Factories Act and Amendment in 1987 was the first to express concern for the working environment of the workers. The

amendment of 1987 has sharpened its environmental focus and expanded its application to hazardous processes.

1981 – Air (Prevention and Control of Pollution) Act provides for the control and abatement of air pollution. It entrusts the power of enforcing this act to the Central Pollution Control Board.

1982 – Air (Prevention and Control of Pollution) Rules defines the procedures of the meetings of the Boards and the powers entrusted on them.

1982 – Atomic Energy Act deals with the radioactive waste.

1987 – Air (Prevention and Control of Pollution) Amendment Act empowers the central and state pollution boards to meet with grave emergencies of air pollution.

1988 – Motor Vehicles Act states that all hazardous waste is to be properly packaged, labeled and transported.

Source: <http://edugreen.teri.res.in/explore/laws.htm>