Environment Policy 2007

(Draft)

Government of Kerala

Department of Environment

Contents

1. Preamble

The "Environment" comprises all entities, living and non-living, natural or manmade, external to oneself, and their interrelationships, which provide value, now or perhaps in the future, to humankind. Environmental concerns relate to their degradation through actions of humans. We the human species and all our activities are also an integral part of the dynamic environment. Our biological survival is totally dependent upon the stability of our surroundings which is nothing but a complex set of processes in dynamic equilibrium. Hence automatically all our developmental activities if they are to be beneficial and sustainable must be anchored on the environmental and ecological precepts. On the other hand, if our interventions are destabilizing and disturbing the dynamic equilibrium, we as a species will fail and will vanish. Currently our developmental activities are becoming more and more environmentally disruptive. With each step in our current development we are creating a more and more fragile top-heavy system sensitive to all shocks including those triggered by us. Simultaneously we are also irreparably undermining our ecological foundations, i.e., the processes that sustain the primary productivity through green plants which is at the base of our biological energy source. It is the stability of the environmental processes that has been sustaining the availability of food, water and a healthy environment we have been accustomed to so far.

Kerala provides a geographical and ecologically circumscribed but complex mosaic of land where the development-environment link is getting neglected and disrupted. Due to the inherent nature of geography, climatic conditions and ecological characteristics, the environmental systems are very fragile in here. The biophysical system of the State could be considered among the richest in the whole world. It has all the three maximally productive and biodiversity wise richest ecosystems in the world namely the tropical rainforest, the coastal, freshwater and brackish water wetlands, and the coastal marine coral reefs. All thee three systems are compressed within a width of 50km. The tropical humid climate of the State, high rainfall spread over more than six months, biogeographic position, long history of biological as well as human civilizational continuity without major upheavals are all our assets.

There has been a rapid increase in the exploitation pressure on the environment and on the natural resources of Kerala over the years. The alarming consequences of this are becoming increasingly evident. Hence care has to be taken to see that the environment does not deteriorate. For the sake of the present as well as future generations measures have to be taken to see that the carrying capacity of the system is not exceeded. In this context, we need to recognize the limits imposed by ecological systems on our current economic activities and hence we should give a new thrust towards conservation along with sustainable development.
The Constitution of India has laid down in its Directive Principles of State Policy the following duties for the State and the Citizen. Article 48 states that "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". Article 51A *inter alia*, states that "It shall be the duty of every citizen of India (g) to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures." Commitment to a clean environment is mandated in Constitution in Articles 48 A and 51 A (g), strengthened by judicial interpretation of Article 21.

At the national level, policies for environmental management are contained in National Forest Policy, 1988; National Conservation Strategy and Policy Statement on Environment and

Development, 1992; Policy Statement on Abatement of Pollution,1992; National Agriculture Policy, 2000; National Population Policy, 2000; National Water Policy, 2002 and National Environment Policy, 2006. State government is in the process of framing policies related to forests, water and agriculture. Even though all these policies forward strategies and action plans for sustainable development in their respective fields, a comprehensive policy dealing with environment is so far lacking. The Environment Policy has been motivated by the above considerations and is intended to mainstream environmental concerns in all development activities.

This document provides a framework within which simultaneously conservation and development activities can be achieved with a view to maximize the quality of life for every one in the levels in the State, optimizing the ecological load on the natural systems as well as building up the State's economy can be achieved while minimizing environmental degradation. The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods from the fact of conservation, than from degradation of the resource. The policy also makes *everybody in Kerala realize that environment is everybody's concern as well as everybody's business – indeed, everybody's life itself. Further, it enables everybody to act consistently and collaboratively with everybody else to protect and enrich the environment for everybody's benefit.*

2. Environmental Scenario of Kerala

Kerala State, with a total area 38,863 km^2, harbours a population of more than 30 million. The State is characterized by its long coastline. There is the intricate system of backwaters along the coast. Tropical moist forests occur on the Western Ghats. The terrain is highly undulating. The climate is tropical monsoon. All these aspects make the State a unique geographical and environmental entity. The people have a high level of literacy and are generally conscious of health care practices, nutritional requirements and hygienic practices which have resulted in high life expectancy, low population growth and low infant mortality rate. Many environmental problems of this state are the result of its high density of human habitation and the consequent pressure on the scarce land and other natural resources. The undesirable consequences of many developmental measures carried out without proper environmental considerations have left its indubitable impact on the environment in Kerala, specifically in the following ways:

1.1 On the Western Ghats by way of degrading forests and shrinking biodiversity base leading to serious disruption of the ecology that supports the pristine faunal and floral life and in turn causing alarming fall in water availability in the rivers and other wetland systems, and other impacts like land slides, heavy sedimentation of reservoirs etc. Remedial and conservation efforts in this area must be accorded the highest priority in Kerala.

1.2 Almost complete loss of mangrove ecosystems, except in a few areas in the northern districts. The mangroves are facing increasing threats especially from new industrial and infrastructure development projects including tourism and housing. The impact of this on the fishing sector is recognized but inadequately addressed and is a classical example of the need for integrating the sectoral planning process. This area must be given high priority on the basis of improving fish availability and increasing the productivity of our wetlands and backwater systems so as to ensure better livelihood to our fisher folk.

1.3 Our coast is a sad state of affairs. Coastal erosion, urban pollution, lack of basic infrastructure for fisher families, like toilets and sewage systems, high density of population in our coast, and the pressure from various stakes, especially tourism have made our coast a hotspot. A serious intervention to remediate, without affecting the habitats and livelihoods of fisher folk need to be developed. A plan to improve the marine aquatic wealth with a focus on conservation needs to be done.

1.4 Sand and clay mining from the rivers, river banks and paddy lands has not only caused unaccounted ecological losses, but has caused many human lives to be lost. Attempts to regulate it through the district administration and police have not been able to curb this menace. But it must be recognized that sand mining is directly related to the construction industry. Kerala's construction boom may have its economic spin-offs but could destroy our only water and food resources irreversibly. Hence, this also needs to be effectively regulated. Limiting construction based on a real needs assessment has to be done, and priceless resource such as sand regulated and allocated to the needy areas only (rationing). We are losing our hills and rocks at a fast pace and this also needs to be immediately curtailed.

1.5 Fresh water and marine fauna is fast getting depleted due to habitat loss as well as over exploitation. The growing export industry is also a cause for the depletion. The need to conserve and replenish the habitats, as well as a focused activity to render their habitats viable and free from human influence such as pollution, reclamation, and construction also needs to be undertaken. As a source of livelihood and as an export commodity, a serious conservation and management strategy is needed, in association with the fisheries department and other impacting sectors.

1.6 Conversion of paddy lands for cash crops, construction and other development activities etc has made us a food deficient state, with more than 5 lakh ha of paddy reclaimed in 30 years since 1971. This trend is increasing, and it also has its impact on water availability, as paddy lands were also water-conserving lands, replenishing the ground water. Land fragmentation, conversion to homesteads, increasing cost of cultivation, etc have also contributed to farmers stopping to cultivate paddy lands. Highest priority must be given to revive paddy land farming together with the agriculture department and other allied departments.

1.7 Deterioration of the health of all our rivers, due to pollution from chemicals used in the plantations, effluent and sewage/solid waste from industries and municipalities etc, sand mining and over-exploitation by industries. A revival and remediation programme for the rivers on a river basin basis involving the local self governments, self help groups, self help groups, schools and colleges etc has to be taken on a high priority. Appropriate acts and laws may also be needed to protect the river systems and maintain its good health. Action programmes also need to be undertaken to stop and remediate the pollution affecting ground water, surface water sources such as ponds, lakes and wells, which are the single most available water source for the majority of the population. Here it is important to bring in an integration of various agencies/departments.

1.8 Water has become one of the most abused resources in Kerala, and there are growing conflicts in sharing – inter-state and intra-state. But Kerala is expected to have surplus water available, due to its good rainfall. Still, our rivers have become almost seasonal. Our water bodies have become polluted in spite of hygienic personal practices. Our community sense of conservation is at an abysmal low, and that has made clean water availability a huge crisis. Pollution from Industrial and municipal sources, exploitation by industries and other commercial activities are leading to conflicts as well as depletion.

1.9 One of the reasons for the agrarian crisis and farmer suicides is the loss of productivity of our farmlands. This can be attributed to loss of soil health, lack of conservation of water and making it available in the farms when needed, unavailability of good quality seeds, and

other organic inputs, and intensive modern agriculture practices such a fertilizer and pesticide application etc. One of the immediate needs to stop suicides is to ensure food security at the household level, which has been affected due to the intensive shift to cash crops, especially in homesteads. An agro-ecosystem approach for farm based planning in a micro-watershed must be given highest priority, as it would make far reaching changes to the lives, health and income of the farmers.

1.10 Pesticides and other agro-chemicals have been used for crop protection in the plantations, agricultural gardens and paddy lands of the State. Today, all analysis of pesticide residues in the state shows that there is contamination of all our food and water. The latest incidence of contamination of soft drinks and bottled water is also indicative of our contamination of our water. Nitrate levels in water have been increasing causing concerns.

1.11 Municipal Solid Waste continues to be an unsolvable issue all across the state. All the Panchayaths, Municipalities and Corporations face the issue of not being able to manage the MSW that is being dumped out of homes and establishments. Top priority needs to be given to get the people to act towards reducing their discards, phasing out the use of disposable plastics, such as covers, cups and plates and setup decentralized mechanisms for recovering the biodegradable and non-biodegradable discards in a segregated manner. Organic recycling of biodegradable discards must be taken up at the household as well as ward levels. A long-term Zero Waste approach must be devised for a permanent solution to the waste issue.

2.12 Plastics, especially the disposable ones like plastic covers, cups, plates etc, used and dumped into public places have caused a health disaster, like Chikunguniya and Dengue. Kerala is waiting for a worse disaster without doing anything. A special and intensive focus must be given to phase out the use of disposable plastics from our society. We must also take a look at the Materials Use in our society to see what all materials used are safe and healthy and what is not, what all materials are used and disposed off, and not handled properly. Such modern mechanisms as Extended Producer Responsibility, Eco-friendly packaging law, Materials Use Policy etc that will make manufacturers responsible for the materials and packaging they make and sell needs to be explored.

2.13 Industrial Pollution**,** especially in the industrial estates and industries in Ernakulam (Eloor-Edayar) , Palakkad (Plachimada, Kanjikuzhy) etc have made life miserable in these areas. Some of these pollutants found in the environment – soil, river and air have entered the food chain and some of the worst toxins have been found in food and human blood. Clean production processes must be supported through research and extension from the environment department. While remediation is needed in such areas, the state must also formulate policies for the remediation of the distressed people. The Industrial policy of the State should promote only non-polluting and non-exploitative industries. Industries that exploit the natural resources without any process of replenishing the same such as Cola factories, minerals and petro-chemical based industries, and chemical industries should not be encouraged in the state. Instead, factories that use replenishable natural resources, especially in the small and medium scale sector to help more employment generation must be the focus. The growing problem of electronic-waste, produced from IT and electronic industries must also be addressed. Even with the intervention of the Supreme Court, Kerala has not been able to stop the problem of hazardous waste. This shows that a concerted effort along with community groups and local participation is needed.

2.14 Urbanisation is at its growing trend and has impacted the urban landscapes and living environment, making it more and more un-inhabitable. This is now spreading into rural landscapes as well. The increase in surfaced area is causing flooding and water logging as well as no recharge of the ground water. Rapid urbanization is also causing loss of sand from rivers and paddy lands. Now this industry has turned to rock sand destroying the already mauled hills and rocks that are also water sources.

2.15 And most importantly, the health of the Keralite is deteriorating, if one is to interpret the statistics that show recurring contagious diseases, alarmingly increasing life-style diseases, increasing rates of diseases affecting the growing child, especially related to mental growth and learning disabilities, increasing rate of cancers of almost all types. Much of the reasons for this are that overall – physically, socially and culturally Kerala is going through a crisis, and is moving away from what we can call a prosperous and healthy society. Much of the causes for the deteriorating health lie in the environment and how we have caused its deterioration. A change in the way we think and live, within the limits and goodness of our environment is what we need to learn (or be taught) in the years to come.

3. Environmental Initiatives

3.1 The State Government has been pursuing to implement several regulatory and promotional measures for environmental protection and conservation through the Departments of Environment, Science and Technology, Health and Family Welfare, Forests and Wild Life, Factories and Boilers, Industries, Mining and Geology, Groundwater, etc. An integrated strategy in the implementation of environmental protection and regulatory measures will have to be evolved by the Environment Department.

The regulatory measures introduced by the Government from time to time are implemented through various Government Departments and agencies based on Acts/Rules/Notifications. Some of these are indicated below.

- The Wildlife (Protection) Act, 1972 as amended in 1983, 1986 and 1991, 1992, 1993, 1995, 1998, 2002, 2003
- The Water (prevention and Control of Pollution) Act, 1984 as amended in 1998
- The Water (Prevention and Control of Pollution) Cess Act, 1977 amended in 1991, 2003
- The Forest (Conservation) Act, 1980 as amended in 1988, 1992 and 2003.
- The air (prevention and Control Pollution) Act, 1981 as amended in 1987
- The Environment (Protection) Act, 1986
- The Environment (Protection) Rules 1986 as amended in 1991, 98, 99, 2001, 2003 & 2004
- The Hazardous Waste (Management and Handling) Rules, 1989, 96, 97, 99, 2000, 2001, 2003
- The Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
- The Coastal Regulation Zone Notification 1991, amended in 1998, 1999, 2001, 2002, 2003
- The Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms and Genetically Engineered Organisms or Cells Rules 1989
- The Environmental Impact Assessment, 1994, Amendments 1997, 2000, 2001, 2002, 2004
- The Chemical Accidents (Emergency Planning, Preparedness & Response) Rules 1996
- The Environmental Public Hearing Notification, 1997
- The Biomedical Waste (Management & Handling) Rules 1998, 2000, 2003
- The Recycled Plastics (Manufacture & Usage) Rules 1999, amended in 2003
- The Environment (Setting for Industrial Projects) Rules 1999
- The Noise Pollution (Regulation & Control) Rules 2000, amended in 2002
- The Municipal Solid Wastes (Management & Handling) Rules 2000
- The Biological Diversity Act 2002 and the Biological Diversity Rules 2004
- Kerala River Bank Protection and Sand Mining Regulation Act (2001)

- The Motor Vehicles Act, 1938, as amended in 1988
- The Public Liability Insurance Act 1991
- The Public Liability Insurance Rules, 1991, amended in 1992 & 1993

3.2 Kerala is one of the first States in India to constitute a State Pollution Control Board for monitoring and regulating measures for the abatement of pollution. The Government has also taken initiatives for the conservation and management of its forest and wildlife resources through the Department of Forests and Wildlife.

3.3 In order to strengthen the R&D efforts required in the field of environment, the Government has established Kerala State Council for Science, Technology and Environment and a number of autonomous R&D centres such as the Centre for Earth Science Studies (CESS), the Tropical Botanic Garden & Research Institute (TBGRI), the Kerala Forest Research Institute (KFRI), the Centre for Water Resources Development and Management (CWRDM), the Rajiv Gandhi Centre for Biotechnology (RGCB), National Transportation Planning and Research Centre (NATPAC) and Agency for Non-conventional Energy and Rural Technology (ANERT). These scientific institutions were meant for focused research on various aspects for the benefit of the State and society at large. The State's Science and Technology Policy was revised in 2002 to ensure that science and technology inputs become an essential part of its decision making process with regard to environmental issues. Further, university departments, colleges, research centers and few NGOs also pursue R&D on environment-related matters.

3.4 In order to facilitate the implementation of environmental protection regulation and management measures, the Government constituted Environmental Protection Programme Planning Committee (EPPPC) and an Environment Protection Task Force (EPTF). The Environment Protection Task Force has provisions for facilitating expert consultations with regard to critical environmental issues.

3.5 Great emphasis is to be given for consultations with the non-governmental organizations working in the environmental field on all important issues on environment. Considerable effort is being taken through various public as well as non-governmental institutions for creating environmental awareness among the public. As a result of these efforts, the State has already achieved the distinction of being a highly environmentally conscious State.

3.6 To address the water-related environmental issues and to sustainably manage our water resources with the primary objective of ensuring availability of safe drinking water, Government of Kerala has brought out a State Water Policy.

3.7 As per the provisions under the Biological Diversity Act 2002 & Biological Diversity Rules 2004, the State Government has established the Kerala State Biodiversity Board during 2005 in order to take measures for documentation, conservation and sustainable utilization of the state's rich biodiversity. The Kerala State Biodiversity Board will facilitate the formation of Biodiversity Management Committees (BMCs) in all the local bodies. The BMCs will prepare People's Biodiversity Registers and biodiversity management plans and regulate collection of biological resources for commercial purposes.

3.8 The decentralized development system established through the three-tier Panchayat institutions is a most effective vehicle to address the issue of conservation of the environment at the grass-root level through the active participation of the citizens. The decentralized

planning process has raised consciousness about environmental issues in local development planning. A few Panchayats have attempted to set up biodiversity gardens and bird sanctuaries. A major effort is underway to prepare watershed-based master plans at the block level, which will lead to a long-term perspective plan towards sustainable and equity oriented development. There is a need for environmental empowerment of Panchayaths.

3.9 The achievements of these environmental management initiatives, though modest, are by no means insignificant. However, it will be necessary to adopt several other measures in future including coordination of various activities to protect our environment and to conserve our natural resources so as to make sustainable development a reality. There is a need for environmental empowerment of Panchayats.

4. Objectives

The principal objectives of this policy are listed below. These objectives are related to the current environmental challenges of Kerala and, therefore, are likely to evolve over time.

4.1 Ensure conservation of resources

To ensure conservation of natural resources, including species, ecosystem and genetic wealth of the State.

4.2 Ensure equitable access and sustainable use of resources

To ensure equitable access to environmental resources to all the sections of the society, particularly the poor, whose survival depends on the availability of natural resources, and to ensure sustainable and equitable use of environmental resources for meeting their basic needs of present as well as future generations.

4.3 Efficiency in environmental resource use

To ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output, to minimize adverse environmental impacts.

4.4 Mitigation and restoration activities

To frame mitigate the damage already caused to the environment and the ecosystems by suitable restoration/ameliorative measures, and to prevent and control further deterioration of land, biomass, water and air which constitute our basic life-support systems.

4.5 Integration of Environmental Concerns in Economic and Social Development

Ensure that development projects are correctly translated and implemented so as to minimize their adverse environmental consequences and to integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.

4.6 Environmental Governance

To apply the principles of good governance (transparency, rationality, accountability, reduction in time and costs, participation, and regulatory independence) to the management and regulation of use of environmental resources.

4.7 Enhancement of Resources for Environmental Conservation

To ensure higher resource flows, comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through mutually beneficial multi-stakeholder partnerships between local communities, public agencies, the academic and research community, investors, and multilateral and bilateral development partners.

5. Instruments and Agencies for Action

5.1. Instruments for Action

To achieve the above objectives, the instruments for action will include the following:

- Carry out environmental impact assessment of all development projects right from the planning stage and integrate them with their cost-benefit considerations. Appropriate

costs for environmental safeguards and eco-regeneration would continue to form an integral part of the projects.

- Data/information should available in the public domain.
- Ensure that all projects/activities in ecologically sensitive/fragile areas require compulsory prior environmental clearance;
- Formulate appropriate legally binding environmental safeguards and protection measures in policies, planning, site selection, choice of technology and implementation of schemes in areas such as agriculture, water resource development, animal husbandry, fisheries, industries, mining and quarrying, mineral extraction and processing, energy, forestry, tourism, transportation and human settlements;
- Encourage research, development and adoption of environmentally compatible technologies, and promote the application of modern tools of science and technology for conservation and restoration and in supply of natural resources;
- Identify and notify environmentally sensitive areas;

- Elicit participation of people in programmes for integrating their environmental concerns in planning and implementation of developmental projects; such participation should be done after informed consent;
- Implement ecomark and eco-labelling schemes for popularization of ecofriendly products and encourage eco-friendly projects.
- Create environmental awareness in the society in tune with the goals of sustainability of the eco-systems as well as human development;
- Moderate the demand on resources by taking measures to reduce wasteful consumption, recycle waste materials and natural resources, conserve energy, reduce the use of natural resources in industrial products through measures like substitution for river sand, wood etc.
- Frame policies and provide incentives to people to adopt life styles consistent with ecological sustainability.
- Develop appropriate organizational structures and a pool of professional manpower for environmental management;
- Creation and strengthening of the requisite enforcement machinery and effectively implement all laws and regulations for environmental protection.

5.2 Agencies for Action

The agencies for action involved in meeting the objectives of the policy would be the following:

5.2.1. The primary agency for action to protect and enrich the environment is the common man in Kerala. Our aim is that every household takes upon itself the duty and responsibility to do everything that will:

i. *Increase* its own and its neighbours' awareness of the goals of sustainability of eco-systems as well as human development;
ii. *Moderate* demands on resources by reducing wasteful consumption, and recycle waste materials and natural resources in all productive activities through measures like substitution of scarce materials that are difficult to replace as means of production as well as consumption, conserve energy, and maximize production of bio-mass for recycling;
iii. *Safeguard* water, both in quantity and quality, by reducing run-off, harvesting rain water where it falls, recycling, and gradation of quality of supply according to end use;
iv. *Act collaboratively* with neighbours and other agencies for establishment of biogas plants, vermi-compost units, kitchen gardens, integrating animal husbandry into agricultural pursuits, such that cost is reduced, benefit maximized, and the environment protected and enriched.

v. Government will re-define and reform the working of various Departments charged with responsibilities in these areas, and bring them closer to owning responsibility to the people, and ensuring transparency in their transactions, by placing them under the local self governments.
vi. Government will also constantly review the laws and regulations relating to, or having impact on ecological concerns, and revise them so that they become more dynamically the enablement for desirable ecological practices.
vii. Government will also *ensure the enforcement* of existing laws and regulations and enact new legislation as may be required from time to time, to encourage eco-friendly practices, and to penalize ecologically hurtful actions.

5.2.2 The policy is to strengthen Panchayats to the maximum extent, and gradually to pass on to them the control and governance of those things that matter most to the people. Accordingly, in keeping with the empowerment that has already been achieved, the following will be the tasks for which the Panchayats shall be the agencies for action.

5.2.2.1. Grama Panchayats

Compared to all-India, our grama panchayats are large, with about 20,000 people in each, and spreading over arbitrarily delineated territory. Therefore, it is necessary to organize at ward level and at even more primary collectivities, people's organisations under the Panchayat umbrella. Such groupings will be based on micro-watersheds, so that they are clearly defined from an ecologically meaningful viewpoint. All programs for soil conservation and for preventing soil degradation, monitoring of soil fertility, encouragement of cropping systems in accordance with land capability classification, and other works in relation to agricultural lands will devolve on Village Panchayats. They will arrange these works according to the identified micro-watersheds, and entrust the works to the multi-tiered people's organisations, to be formed as mentioned above.

5.2.2.2. Block & District Panchayats

i. These panchayats will be primarily responsible for conducting training classes, bringing about attitudinal, and competence change to enable the people to be conscious of ecological imperatives, while seeking economic maximization goals.
ii. They will co-ordinate and encourage programs like bio-gas plants, mini- and micro hydel projects, wind energy farms, solar energy conservation, and maximization of renewable sources of energy, and fuel wood species.
iii. They will pioneer and encourage the production and spread of fodder planting material, and the cultivation of these species by farmers so that self-sufficiency in fodder needs is approached/reached.
iv. They will supplement, complete, and extend efforts undertaken by village panchayats and grass roots organisations so that benefit will be maximized.
v. They will ensure that public demand and profit-driven business in scarce materials is harmonized with eco-specific requirements.
vi. Panchayats may run eco-friendly enterprises on public land, or land made available to them by the community, or acquired, for cultivating and selling fodder species, fuel wood, vegetables, and other items of consumption, as well as protective vegetation like cover plants, hedges, wind breaks, medicinal trees, etc.
vii. District and Block Panchayats may link and form 'associations of associations' at the village panchayat and smaller levels, engaged in ecological conservation and enrichment activities, and businesses based on non-invasive land use, so that economies of scale where possible, and stronger bargaining for advantage are secured.

5.2.2.3. Departments and agencies of Government.

i. Government hope to end the pernicious colonial view that Departments of Government are the proprietors and Chief Executive Officers of public property and assets belonging to the people. The Departments, and their echelons at various levels, shall be only instrumentalities, whose services will always be available to the Panchayati Raj institutions and people's organisations.

ii. Environmental policy *foregrounds* people, and their participatory involvement. Departments of Government at all levels shall revise the rules and procedures so that the people's organisations receive the full cooperation of the Departments. Departmental officers and experts shall serve as consultants and technical experts in advising panchayati raj institutions on how best to achieve the ecological objects together with economic growth.

6. Strategies for Action

6.1. Fresh water resources

6.1.1. Rivers, reservoirs, ground water and rain water

i. Basin-wise assessment of total quantity fresh water available in the state and equating it with the demand for industry, agriculture, house hold utilization, services such as hospitals, hotels, recreation centres, ecosystems etc.
ii. Continuous monitoring of demand and supply of fresh water and regulation of water utilization for completion of hydrological cycles.
iii. Remedial measures will be undertaken where there appears to be shortfall of water in completing the hydrological cycle
iv. Protection of all fresh water resources from inundations, pollution of any kind, and diversions.
v. Heavy utilization with out an impact assessment study will be prohibited.
vi. Rain data will be taken based on sub basins and rain water harvesting will be made mandatory.
vii. Assessment of effluent loading capacity of each receiving water body before sanctioning new projects.
viii. Maximum quantity of fresh water which an industry, institution and establishment individual or institution can utilize without prior sanction from the government will be fixed.
ix. Water conservation, recycling and optimal use of surface and ground water, and rainwater harvesting will be brought under the local administration with clear guidelines.
x. New standards will be fixed for discharge of treated effluents based on ecotoxicological studies.
xi. New standards have to be fixed for discharge of treated effluents to fresh water resources taking in to consideration of the long term effects.
xii. A state level water literacy mission to educate the public in appropriate utilization and conservation of water.

6.1.2 Drinking Water

i. Assessment of per capita drinking water requirement of the state at regional level and demarcation of their supply from the supply for other domestic purposes and irrigation.
ii. Provide clean drinking water to all the people.
iii. Promotion of community based/village based drinking water supply projects.
iv. Community based monitoring and water testing facilities in every local body.

6.1.3 Irrigation

i. Environment impact assessment for all the irrigation projects.

ii. Encouragement to small-scale irrigation projects which have only a minimum impact on the environment.
iii. Encourage traditional systems of water management like pond irrigation and the promotion of alternate irrigation systems such as the harvesting of run off rain water.
iv. Adoption of measures for increasing water use efficiency, conservation and recycling.
v. Designing and implementing of irrigation projects which are environmentally sustainable based on the experience from and the evaluation of earlier projects.
vi. Provision of drainage as an integral component of irrigation projects so as to prevent water logging.
vii. Formulation of guidelines for storm water management.
viii. Adoption of command area development approach for irrigation projects to ensure optimal utilization.
ix. Development of irrigation systems incorporating local water resources utilization, water conservation recycling and optimum methods of irrigation and crop management.
x. Ensuring farmers 'participation in irrigation management' by the formation of farmers association and the development of group farming systems that are conducive to the preservation of the environment.
xi. Continued evaluation and monitoring of all irrigation projects for their societal benefit and environmental impacts; if any.

6.2. Forest and wildlife including fisheries

i. Survey, mapping and demarcation of all natural forest land as defined in 202/95 supreme court judgment;

ii. Conservation and restoration of with special thrust to conservation of biodiversity;

iii. Preservation of sacred groves with the biodiversity therein, without tampering with cultural integrity;

iv. Conservation of existing mangroves and restoration wherever possible, through enacting appropriate legislative measures;

v. Restoration of degraded forests with people's participation wherever possible;

vi. Increasing the tree cover in the State through afforestation and social forestry programmes, especially on denuded and degraded lands with participation of communities under the leadership of local self governments;

vii. Increasing the productivity of production forestry/agroforestry by adopting modern technologies, and encourage efficient utilization of forest produce;

viii. Encourage and enable local production of forest produce to meet the requirements of medicinal plants, timber, fire-wood, fodder and green manure;

ix. Assist forest tribes to collect Non Wood Timber Produce (NWFP) in a sustainable manner and to carry on life-style in a manner that does not harm the environment; exclusive right of forest tribes to access and sustainably harvest (NWFP) will continue;

x. Forests should not be the exclusive source for wood-based industries; they should find resources from outside forest areas;

xi. Participatory Forest Management policy will be implemented in the forest fringe areas;

xii. Establishing corridors by restoring lost patches through appropriate measures;

xiii. Promoting direct relationship between forest-based industry and farmers to raise the required raw materials, provided this does not result in diversion of prime agricultural lands and displacement of small and marginal farmers;

xiv. Tourism activities within the forest areas will be under the strict control and supervision of forest department;

xv. Preventing the entry of Invasive Alien Species into natural ecosystems;

xvi. Increasing the population of riverine endemic species through appropriate ranching programmes and research;

xvii. Preventing over exploitation of indigenous ornamental fishes and preventing collection of fish species in the RET category;

xvii. Establishing fish sanctuaries in water bodies rich in RET species;

xviii. Encouraging and supporting R&D programmes on conservation, restoration and sustainable utilization of forest resources:

a. Causes of degradation of natural forests and depletion of wildlife population, and corrective measures;

b. Extensive research and development in forestry for better regeneration and improved productivity;

c. Development of scientific methods for the efficient, sustainable and eco-friendly utilization of forest produce and dissemination of the knowledge generated through extension activities;

d. Reproductive strategies and regeneration pattern of flora and fauna and causes of extinction and endangerment of flora and fauna.

e. Management of natural forests to provide materials and enable services without environmental degradation

f. Restoration of degraded forests in a phased manner

g. Improving the productivity of man made forests

h. Control high-impact eco-tourism to ensure that the inflow of tourists does not damage the eco-system.

6.3 Wetland ecosystem

Wetlands play a vital role in ensuring water to Keralites, besides offering an array of ecological services. The Sasthamkotta, Vembanad and Ashtamudi lakes have been recognized as Ramsar sites or wetlands of international importance for conservation and sustainable management. Government accords the highest priority to the conservation and managemen of wetlands and proposes the following for the same:

i. No developmental works and reclamation will permitted in wetland areas.

iii. Enact stringent legislation for the conservation of wetlands.

iv. While developing water bodies as a means of communication (National Waterway), the greatest caution will be exercised in order to prevent the pollution of the waters by discharge of oils and wastes from the vessels that operate on them.

v. The public and local bodies should be made aware of the environmental hazards that may happen due to wetland reclamation. Studies to assess the environmental impacts shall be made compulsory before any substantial reclamation is done for development purposes.

6.4. Agriculture land systems

Kerala's agriculture has to develop through the judicious utilization of the scarce resources of land, water, rural manpower and technology, with focus on increased production and productivity in a planned manner. To achieve this goal with the least damage to the environment, the action plan for the sector should include the following:

6.4.1. For all types of farmers

i. Strengthening of soil conservation and soil enrichment programmes for preventing soil degradation

ii. Periodic monitoring of soil fertility to maintain and improve its productivity;

iii. Encouragement of crops based on land capability classification and cropping patterns suitable for productivity conservation;

iv. Promotion of organic farming with an emphasis on recycling of organic wastes; frame an organic farming policy for the state;

v. Revival of traditional varieties of crops and establishment of gene/seed banks for their conservation;

vi. Adoption of integrated nutrient and pest management systems and promotion of the use of bio-fertilizers, organic compost and bio-pesticides;

vii. Conservation of paddy land and prevent its use for other crops;

viii. Ensure that the use of agrochemicals will be in a judicious manner and phase out chemical pesticides over time;

ix. Practice Integrated Pest Management wherever possible;

x. Evolving efficient and cost-effective methods of water conservation and use;

xi. Promotion of traditional practices of mixed cultivation in homesteads.

xii. Provide support for storage, incentives for marketing and price stability by promoting local markets and discourage involvement of middlemen;

xiii. Encourage cultivation of crops with lower demands on water and energy inputs;

6.4.2. For paddy farmers

Paddy farmers face a multiplicity of problems many of which may be ameliorated by ecological measures, viz.,

i. Regulation of water regimes, restoration of traditional irrigation structures like contour tanks, drainage channels at suitable contours, conservation of water in tanks with combined irrigation and social use (e.g., 'temple tanks');

ii. Cultivation of legume crops along field bunds so that the bunds are strengthened and the farmer gets an additional income yielding crop;

iii. Combine fodder cultivation in rice fallows and other available lands, so that animal husbandry can be successfully integrated;

iv. Conserve straw, as was the traditional practice;
v. Wherever possible, combine pisciculture with paddy, integrating duck or poultry farming.

6.4.3. For homestead farmers

Homestead farmers are holders of small plots of land, generally below 0.25 ha, in area, in which is located the living house of the family, and around which the members of the family raise a miscellany of crops including tubers, legumes, fruits, flowers, and tree-crops, combined with various types of animal husbandry, the produce generally being consumed, or sold at distress prices to all sorts of middle-men, and the entire exercise not returning enough income to enable the family to live a reasonable life style, or accord to its children equality of opportunities for development, and therefore compelling the family to engage itself simultaneously in other occupations in the secondary and tertiary sectors as well. These constitute about 70% of our farm families. They are both perpetrators of the most heinous environmental degradation as well as its worst sufferers. They have also to meet competition from non-agricultural land use, like urban housing, roads, etc. These holdings cut across (non-existent) rural-urban administrative delineations of jurisdiction. Therefore, the following are proposed in the policy:

6.4.3.1. The holders of Homestead Farms require special empowerment in order to protect their holdings from economic threats like fragmentation and alienation, as well as ecological degradation by wrong usage by the owners themselves, and consequential uncontrolled actions by neighbours and public agencies.

6.4.3.2. Government and the Panchayats will accord high priority to organize neighbourhood associations of such farmers, and enable them to undertake works for the ecological protection of their properties; illustratively, the following are examples:

a. Plan together measures for conservation of soil and moisture for maximum benefit;

b. Moderate alternative land use (e.g., construction, expansion of houses), so that extended land use does not interfere with beneficial enjoyment of neighbours' properties, or with natural water flows, soil regimes, or crop sequences.

c. Undertake works of common benefit like retention walls, bunds, moisture conservation pits, and combinatorial land use like fodder cultivation and animal husbandry husbandry, production of high value vegetation like orchids, vanilla, etc., and processing, marketing and maximizing value addition by local collectivities;

d. Organize collective consideration of proposals of alternative land use including urban and housing development, so that informed consent may be accorded or denied.

e. *Caution against introduction of GM and exotic planting materials*: Widespread and indiscriminate adoption of untested exotic planting material, however mightily advertised, is fraught with irreversible damage. Government, Panchayats and Farmers will be constantly educated about the need for extreme caution before being tempted to fall into the traps laid for them by commercial agencies of multinational agricultural business monopolies. Panchayats may set up laboratories and testing procedures before licensing the spread of such materials.

6.4.4. Caution against Genetically Modified Organisms

Widespread and indiscriminate adoption of untested exotic planting material, however mightily advertised, is fraught with irreversible damage. Government, Panchayats and Farmers will be constantly educated about the need for extreme caution before being tempted to fall into the traps laid for them by commercial agencies of multinational agricultural business monopolies.

Genetically modified organisms (GMOs) farmed must be a product of indigenous genes and introduction in field must be done only after scientific appraisal as to its long-term impacts.

More laboratories will be set up in association with research institutions for finding out genetic contamination of species through the usage of GMOs.

6.5. Mining and quarrying

To mitigate and minimize the environmental hazards due to mining and quarrying the steps taken will be the following:

i. Environmental Impact Assessment (EIA) by competent agencies prior to the allocation of sites for mining and quarrying activities;

ii. Strict implementation of regulations for mining and quarrying to ensure minimal disturbance to the environment;

iii. Restoration of the mined and abandoned areas by those responsible to their damage.

iv. Implementation of environment management plans approved by the appropriate authorities like the Pollution Control Board concurrently with the ongoing mining operations to ensure adequate ecological restoration of the affected areas;

v. Discouraging selective mining of high-grade ores leading to local accumulation of low-grade ores, causing environmental degradation.

vi. Upgradation and beneficiation of minerals at source to the extent possible in order to ensure the utilization of low grade minerals and to reduce the cost of transportation/processing and utilization;

vii. Prevent mining and quarrying of hills;

viii. Regulation and restriction of river sand mining in all rivers, rivulets and clay mining in paddy fields based on scientific studies;

ix. Identification and promotion of new construction methods to avoid pressure on natural resources such as river sand.

x. Environmentally safe disposal of the bye-products and wastes of all mining operations.

6.6. Coastal and marine resources

For sustainable management of the coastal and marine eco-system and fisheries, both fresh water and marine, in the State, the following are the points for action:

i. Preparation of a database on inland and marine fishery resources, including maximum sustainable yield available for harvest in the water bodies;

ii. Coastal and riverbank erosion to be dealt with preferably by biological methods;

iii. Eco-friendly aquaculture activities to meet the gap between demand, production and supply;

iv. Regulate total fishing efforts for avoiding overfishing;

v. Protection of aquatic habitats from pollution, reclamation, infestation from weeds, dredging, over-exploitation and unscientific methods of fishing;

vi Control of trawling in the territorial waters of Kerala during the monsoon season and frequent analysis of resources to record the stock available for exploitation;

vii. Regulation of mesh size in trawl net and fixed engine for conserving the juvenile fish and shellfish; adopt measures to reduce by-catch;

viii. Regulation of fishing at the entrance of river mouths.

ix. Establishment of a Fishery Resource Management Cell for monitoring optimum fishery utilization and to function as a clearinghouse for development programmes with special reference to conservation and natural utilization of the precious living resources of the State.

6.7. Biodiversity outside forest areas

Rich biodiversity occur outside the protected forest areas, and action for conservation of biodiversity to be related to:

i. Intensification of surveys for complete documentation of biodiversity, including microbes;

ii. Electronic data base inventory of biological resources in different parts of the State through People's Biodiversity Register at Panchayath, municipality and corporation levels;

iii. Conservation of biodiversity through a network of protected areas including biosphere reserves, national parks, sanctuaries, gene conservation centres, wetlands, mangroves, sacred groves, and such other natural habitats of biodiversity;

iv. Protection and sustainable use of plant and animal genetic resources through appropriate laws and practices;

v. Protection and conservation of domesticated species/varieties of plants and animals in order to conserve indigenous genetic diversity;

vi. Maintenance of corridors between national parks, sanctuaries, forests and other protected areas for ensuring the natural movement of animals;

vii. Documenting and conserving traditional skills and knowledge related to biodiversity;

viii. Conserving threatened and endangered plants and animal species through application of modern techniques of tissue culture, biotechnology and cloning;

ix. Discouragement of monoculture;

x. Strict regulations regarding the introduction of aggressive and exotic species of flora and fauna in unsuitable areas without sufficient experimentation;

xi. Control of invasive species already affecting the land and water ecosystem;

xii. Promote community biodiversity centres in local bodies.

xiii. Strengthening biodiversity board.

xiv. Control over exploitation of biodiversity for commercial purposes.

xv. Popularise the need for biodiversity conservation.

xvi. Include biodiversity as a subject in curriculum at school and college levels.

6. 8. Animal Husbandry

For the maintenance of a healthy and productive animal population, the environment related activities would be:

i. Improvements in the genetic variability of the indigenous breeds;

ii. Control of cattle population in the forest fringes so as to conserve the fodder resources and to avoid spread of diseases;

iii. Monitoring the extent of depletion of wild flora and fauna and the adoption of steps for the protection of wildlife and wildlife resources on a sustainable basis;

iv. Restoration and protection of the existing grazing lands along with the promotion of stall feeding and rotational grazing;

v. Monitoring of migrating birds for pathogens and taking appropriate measures to check entry of pathogens.

vi. Taking measures to increase the production of fodder and grass to bridge the gap between supply and demand;

vii. Scientific siting and waste management should be mandatory for all the animal farms.

viii. Integration with farming systems to sustainably maximize farmers' benefits,

ix. Encouragement of communitarian action by neighbourhood groups so that cattle trespass, over-grazing of common lands, etc., are prevented, and economies of scale achieved by processing gobar gas, compost manures, vermi-compost, fodder production, etc.

x. Enabling of existing Milk Producers' Co-operative Societies to maximize value addition at site, and to ensure that the maximum advantage is derived by the members.

xi. Recycling of household waste foods and agricultural residues by silage making and other means, for use as fodder.

xii. Integration of non-conventional animal husbandry like rabbit-rearing, and farming of bird species like turkey, guinea fowl, etc., for maximum benefit to the farmers;

xiii. Constant research and extension to ensure improvement of genetic variability;

xiv. Enforcement of quality control by communitarian action, and by Panchayats.

6.9. Human settlements of Built Environment

It is imperative that reasonably comfortable housing be provided to all people in the State in clean, hygienic and healthy surroundings, and to encourage green building technology by using energy efficient design, lay out and construction materials. Steps to be taken for the achievement of this goal are the following:

i. Adoption of environment-friendly techniques and materials in housing in the State and for the betterment of slums.

ii. Promoting low cost building systems using indigenous and energy-efficient building materials in construction and the improvement of existing building stock;

iii. Promotion of strategies for the decentralization of urbanization through the establishment of satellite cities and townships with the necessary infrastructure facilities and job opportunities.

iv. Documentation of details of buildings, places and monuments of cultural heritage value and the adoption of measures including strict regulation on tourists/pilgrims for the protection and preservation of the former.

v. Adoption of deterrent measures to discourage unsustainable growth of human settlements and polluting industries in ecologically vulnerable areas such as hilly regions and coastal stretches;

vi. Ensuring the quality of water supply and provision of adequate sanitary facilities in all cities and towns, commercial centres, industrial establishments and rural residential areas;

vii. Programmes for the scientific and cost-effective management and disposal of sewage, garbage and domestic wastes;

viii. Encouragement of planting shade, fruit-bearing and ornamental trees by the roadside, in market places and commercial centres, school compounds, hospitals, offices, places of worship and other public places;

ix. Establishment of parks and gardens in urban and rural public places for public use and for the promotion of environmental awareness;

x. Providing incentives for and recognition of the raising of gardens in homes, schools, hospitals, offices and other institutions;

xi. Promotion of cultivation of medicinal plants in home gardens and private farmlands;

xii. Promotion of homestead farming and maintenance;

xiii. Restriction of pavement of open yards preventing infiltration of water;

xiv. Prevention of environmental degradation and resulting health problems, communicable and non-communicable diseases etc. by educating the people on personal hygiene, sanitation and the use of pure drinking water;

xv. Prevent spreading of communicable diseases by creating awareness on individual community hygiene;

xvi. Insistence on the concerned local authorities in villages, towns and cities for the speedy removal and disposal of all accumulating rubbish, waste and garbage, and for keeping the surroundings of human dwellings and places of human activities, as clean and neat as possible;

xvii. Promoting use of local products like khadi and handlooms and encourage products using local resources;

xviii. Preparation of Environmental Impact Assessment and Environmental Management Plan for development of new townships, industrial units/clusters, settlement colonies, major highway projects, commercial complexes, hotel complexes, hospitals, office complexes etc.

6.10. Tourism

Kerala has a very high potential for tourism. To ensure sustainable growth of tourism in the State without causing irreparable damage to its natural environment, the programme of action should include the following:

i. Promotion of tourism on the basis of a careful assessment of the target areas with regard to their carrying capacity, and availability of support facilities such as transport, fuel, water and sanitation;

ii. Regulating tourism in protected areas like forests and in ecologically sensitive areas such as grass lands;

iii. Development of eco-tourism sustainably. In all potential areas it shall be in harmony with the environmental conditions and should not affect the life styles or the cultural heritage of the local people;

iv. Responsible tourism will be encouraged in all the tourist destinations.

6.11. Transportation

For the development of an environmentally compatible transportation system, the following steps need to be taken:

i. Improvement in the existing transport system based on scientific studies so as to provide efficient and safe transportation and to reduce consumption of fuel, traffic congestion and environmental pollution;

ii. Development of inland water transport infrastructure which is more energy saving and cost efficient on commercial basis;

iii. Promote the use of bicycles and vehicles using LPG.

iv. Incentive for water transportation using the backwaters, canals and river systems;

v. Encouraging, wherever possible, water, rail and pipeline transportation in place of road transport;

vi. Enforcement of smoke emission standards for containing pollution from vehicular exhausts at the manufacturer and user levels;

vii. Phased introduction of renewable energy and non-polluting transport systems, especially Compressed Natural Gas (CNG) for vehicles;

viii. Promote the use of cycles and enforce user friendly pedestrians and cycle tracks;

ix. Strict enforcement of updated traffic laws/rules for the safety of users;

x. Develop user friendly pedestrian paths wherever possible;

xi. Develop transportation infrastructure including roads which does not adversely affect the environment during construction or operation.

xii. Strict rules and regulations for environmental safety in the transport of dangerous and hazardous materials;

xiii. Enforcement of regulations in the case of overhead wires, construction of arches, fixing of advertisement hoardings etc across and in the proximity of roads;

xiv. Restrictions for the construction of roads through ecologically sensitive areas.

6.12. Industrial development

The location and technology used in industries in the State should be conductive to the least possible damage to the environment. For this the points for action are the following:

i. Provision of incentives to environment friendly technologies involving recycling and reuse of wastes and the conservation of natural resources;

ii. Insistence on the installation of effluent and emission treatment plants in the industrial units and mining;

iii. Operation of the ‘polluter pays’ principle will be strictly adhere to and punitive measures fore exceeding permitted standards by introducing effluent tax, resource tax for industry and implementation of standards based on resource consumption and production capacity;

iv. Demarcation of industrial areas in each locality/region and designation of specific areas for certain industries in the State;

v. Strictly ensuring the setting up and running of industries as per environmental guidelines;

vi. Industrial sites/zones for compatible industries so that, effluent treatment could be common, reducing costs and enhancing effectiveness. Wastes from one could be used as raw material for another and thus the net pollution load could be minimized;

vii. Enforcement of pollution control norms by Pollution Control Board in various types of industrial units, depending upon their process/technologies and pollution potential, particular attention being paid to highly polluting industries;

viii. Strict implementation of the treatment required for industrial effluents and solid waste disposal/management.

ix. Regular monitoring of the quality of the industrial effluents, solid and gaseous emissions, and prompt action with regard to complaints by the local people;

x. Incentives and recognition to industries for effective pollution control and reduction of wastes;

xi. Establishing of green belts in the vicinity of/around industrial establishments;

xii. Formulation of regulations and enforcement of norms in respect to auto emission. Encouragement for the use of environmentally benign automobiles/motor vehicles up-gradation of emission standards for automobiles in urban areas initially and in phases over the whole State.

xiii. Common effluent storing/treatment facilities in industrial estates;

xiv. Preparing on-site emergency plans for hazardous industries and off-site emergency plans for districts in which hazardous units are located;

xv. Setting up of environmental cells in industries for implementing environmental management plans and for compliance with the requisite environmental laws;

xvi. Incorporation of the costs for environmental safeguards as an integral component of the total project cost;

xvii. Dissemination of information to the local public and workers on hazardous substances and measures to ensure safety of workers and people.

xviii. Promote zero industrial waste generation technology;

6. 13. Energy

There are many environmental hazards related to energy generation and hence for promoting efficient and moderate energy use without waste, some measures are proposed. The popularization of environmentally benign energy systems is also called for.

i. Environment impact assessment should be mandatory as a prior condition for investment decisions and site selection for power generation projects;

ii. Adoption of clean technologies for energy production including utilization of wastes for power generation.

iii. Energy conservation in all sectors including households, agriculture, industry and transportation;

iv. Energy conservation education and awareness activities.

v. Incentives to encourage energy conservation and punitive measures (including proper pricing for energy) for proper energy use cutting down waste.

vi. Popularise the use of non-conventional and renewable energy sources and incentives for their use;

vii. Incentives for raising of bio-fuel plants in wastelands/degraded areas;

viii. Promotion of efficient wood-burning chulahs;

ix. Regular monitoring of the environmental impact of energy generation projects through well defined parameters and adoption of measures for the mitigation of environmental degradation;

x. Promotion of small scale hydroelectric projects (micro, mini and small);

xi. Increasing biomass availability to meet essential requirements of biomass based energy generation;

xii. Regulation of trade and unscientific disposal of hazardous wastes;

xiii. Development of technologies for enhancing the productivity and efficiency of use of all biomass resources (both terrestrial and marine) for energy generation.

6.14. Air and Noise Pollution

For prevention and control of air pollution and noise pollution, the thrust shall be on the following:

i. Encourage use of clean fuels and clean technologies, energy efficient devices and air and noise pollution control systems;

ii. Adoption of source specific and zone-wise air quality standards and set time bound plans to achieve the quality standards;

iii. Locating developmental projects appropriately to minimize the adverse impact of noise on people and environment during construction and operation;

iv. Strict enforcement of emission control measures in industrial and transport sectors;

v. Incentives for environmentally benign substitutes, technologies and energy conservation;

vi. Establishment of green belts with appropriate plant species for mitigating pollution;

vii. Promoting appropriate technologies to reduce emission of carbon dioxide and greenhouse gases;

viii. Reduction /avoiding use of ozone depleting substances;

ix. Strict control over the use of incinerators for solid waste treatment other than biomedical waste;

x. Promote recycling of plastic.

7. Policy Implementation Structures and Linkages

For the effective implementation of the aims and objectives of the environmental policy, it is essential that the existing institutional arrangements and legislative measures must be strengthened and adequate enforcement mechanisms should be provided. Coordination between the various implementing agencies, promotion of research and development

programmes, creation of public awareness and training of required personnel in the field of environment, as well as mobilization of the necessary financial resources are some of the extremely important measures proposed for achieving this objectives.

7.1 Strengthening of Institutions and Legislation

The lacunae in the existing institutional arrangements will be identified and rectified. Better coordination and networking among the various departments and institutions dealing with environment will be ensured. Until 2006, the matters concerning environmental policy, protection, awareness creation research and development were being implemented through different departments without effective co-ordination. The Pollution Control Board under the Department of Health and Family Welfare, enforced the laws and regulatory measures for pollution control and also for promoting measures for the abatement of pollution. Pollution studies and research were also undertaken by the department of Science, Technology and Environment as also various local bodies under the Department of Local Administration. Other departments like the Motor Vehicles Department, Directorate of Factories and Boilers under the Department of Labour also were involved in pollution control activities. Now a Department of Environment has been created to coordinate environmental issues dealt with by different authorities/departments and to focus on regulation and promotion activities relating to the environment. WOMEN CISSA

7.2 State Environment Department

The coordination of the activities of different departments, authorities and local bodies in the State relating to environment, and the implementation of the Environment Policy of the State, will be undertaken by the Environment Department. The department will focus on promotional aspects for the protection and conservation of the environment with the help of the concerned government departments, research institutes, regulatory bodies, local bodies and reputed non-governmental organizations, researchers and academicians.

7.3. State and District Advisory Councils

The State Level Environment Advisory Council with officials of various departments and governmental bodies, as well as experts and representatives of reputed non-governmental organisations working in the field of environment, advises Government on the issues of policy and implementation. This body, headed by the Minister for Environment, is also assisted by inputs from the District Level Environmental Advisory Councils to be headed by the respective District Panchayat Presidents and consisting of official and non-official members focusing on district and local level problems relating to the environment.

8. Environmental Audit Statement

The annual environmental auditing and the submission of audited environmental statements by the concerned industries to the State Pollution Control Board are to be enforced. This will provide an opportunity to the industries board for evaluating and modifying their activities with reference to environmental management, and enable the Pollution Control Board to assess the environmental safeguards established by the industries.

9. State of the Environment Report

The implementation of development programmes has its impact on the quality, quantity and productivity of the environmental resources. This calls for a system of resource accounting along with other exercises such as cost benefit analysis of the development projects. The State has developed a strong science and technology base in various natural resources management sectors including biodiversity, forestry, earth sciences, water, technology, transportation, biotechnology etc. This capability will be used to assess periodically the status of natural

resources. The Centre for Earth Science Studies with its multi-disciplinary capabilities in different R&D Centres could be used to coordinate the activities and compile the status of natural resource availability and utilization every five years. Based on this, the State Environment Department will finalize a regional carrying capacity evaluation with the support of R&D Centres of the State.

Based on the regional carrying capacity evaluation, the Government can prepare a five year natural resources budget to reflect the availability of resources like land, forests, water, minerals, etc. and the extent of utilization of such resources every year. This can be used while preparing the Five Year Plan of the State, thus ensuring conservation with sustainable development, while allocating natural resources from the available sources for various developmental purposes.

10. Promoting Environmental Education, Training and Awareness

In view of the importance of environmental conservation, 'Environmental Sciences' will be recognized as a board subject of instruction and as part of the general education both at the school and University levels.

- Syllabi and the contents of the text books will be revised in a phased manner to include subjects relating to environment. This will be done from primary school level to University Level.
- Special training programmes will be arranged for the benefit of teachers imparting instruction in various aspects of Environmental Sciences.
- Non-formal education being as important as formal education in the dissemination of the knowledge on environmental issues, the village level NGO and literacy centres will be made use of in order to promote public awareness and involvement in environmental activities, In addition, non-governmental organizations involved in environmental awareness, science popularization, social welfare etc., will be encouraged to conduct environmental awareness campaigns.
- Women have a pivotal role in environmental conservation programmes at the grassroots level. Their environmental conservation activities will be promoted through women's organizations with the support of local bodies. In addition, women will also be promoted to take up conservation programmes which will be income generating, self-financing and sustainable on a long-term basis.
- The required educational resource materials will be developed. Various institutions, NGOs, writers and publishers involved in the field of environment will be encouraged to publish literature on different aspects of environmental conservation, protection, preservation and pollution control.
- Updating the knowledge of the professionals, bureaucrats and other officials involved in project planning and implementations regarding techniques to mitigate environmental problems, are essential. In-service training on environmental appraisal, impact assessment environmental management planning etc., to the officials from the various departments/local bodies will be arranged.
- Officials from the Departments using and regulating the use of natural resources and implementing development projects will be encouraged to undergo such training.
- State-level ecological literacy programme in each Panchayath will be launched.
- Awareness creation and capacity building programmes will be designed and implemented for the elected people’s representatives.

11. R&D and promotion of technologies

The development of appropriate technologies suitable to the local socio economic and environmental conditions is essential for the successful implementation of all environmental conservation programmes. For this, R&D efforts will be strengthened.

- Special efforts will be made to promote R&D on cleaner technologies and their demonstration and promotion. New projects will also be initiated which make use of both conventional and modern high-tech methodologies like remote sensing, biotechnology and genetic engineering.
- A centralized Environmental Data Bank will be created for the use of environmental assessment, natural resource accounting, pollution abatement etc., with the help of R&D centres in the field of environment studies.
- The local bodies in the State will be assisted in the preparation of watershed master plans for development planning with science and technology inputs.

12. Rehabilitation of affected people in the projects

- While implementing projects in various sectors, conscious efforts will be made to avoid displacement of local people. Where unavoidable, comprehensive measures will be taken on priority basis to ensure their rehabilitation by providing suitable facilities;
- While rehabilitating, care will be taken to ensure that they are provided with means of livelihood better off as a result of their rehabilitation.

13. Role of Non-Governmental organizations

The active participation of the people at the grass root level is to be ensured for the successful implementation of an environmental conservation strategy. This will be done by the local bodies with the participation of residential associations and non-governmental organizations (NGO's) at the District, Block and Panchayath levels.

At the district level, Environmental Information Centres will be set up with the cooperation of NGOs and local District Panchayat to generate knowledge regarding different systems of environmental management practices**.** This information can be disseminated and put into practice through NGO's. Different media and methods will be used to disseminate environment-based information.

14. General Strategies

i. The Environment Department shall co-ordinate the activities of different departments/local bodies/institutions relating to the environment.

ii. The department shall recommend the State's views and suggestions for projects that need Central Government clearance.

iii. Efforts shall be made to minimize waste generation; appropriate ecofriendly methodologies shall be adopted for waste management.

iv. Ecotourism shall be encouraged and necessary administrative / legislative measures shall be taken to keep the natural ecosystem of tourist places undisturbed.

v. Sustainable agricultural patterns shall be encouraged and research projects pertaining to this aspect shall be given priority.

vi. The department shall take appropriate action to prepare an inventory of heritage resources of Kerala (both natural and cultural).

vii. Agro-forestry shall be encouraged with assistance from the Department of Forests and local bodies, and shall be implemented through people's participation at local levels.

viii. Bench mark data on biodiversity will be collected based on People's Biodiversity Registers prepared in each local body.

ix. Relevance of renewable energy resources (non-conventional) shall be emphasized and research projects based on this shall be encouraged.

x. The ill effects of sand mining shall be publicized widely among the people. People shall be made aware of the available alternate construction materials and eco-friendly construction models and methods.

xi. Reclamation of the wetlands should be prohibited.

xii. Land filling and tree planting shall be made compulsory in the mined areas.

xiii. Quarrying shall be regulated by adopting strict compliance of pollution control mechanisms.

xiv. For the effective implementation of the policy, a comprehensive legislation will be made.

xv. An environment fund shall be raised separately by introducing "Polluter pays principle / fines" and the amount shall be used for environmental protection purposes.

xvi. Use of pesticides and chemical fertilizers will be regulated and phased out.

xvii. Phasing out pesticides

15. Conclusion

- The Indian constitution is one of the first in the world to recognize the importance of environmental conservation. The Constitution directs the "State to take measures to protect and improve the environment and to safeguard the environmental quality". It also makes it a fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife.
- As the Constitution provides the framework for creating a welfare state, it is necessary that the finite natural resources of the country be optimally utilized without adversely affecting either the health of the people or the environment. This is the essence of the term sustainable development. We must make conservation – oriented developmental choices to avert pressure on natural resources and life-support systems.
- The initiatives highlighted in the preceding paragraphs are expected to resolve the conflicts that often arise between the environmental concerns and developmenta pursuits that have a direct bearing on the very fabric of our society and life styles.