



ADMINISTRATIVE REFORMS COMMISSION  
GOVERNMENT OF KERALA

EIGHTH REPORT

# Sustainable Development

## GOVERNANCE ISSUES

.....

Agriculture • Fisheries • Biodiversity • Forests  
Waste Management • Pollution • Health • Sanitation  
Energy • Industries • Infrastructure • Tourism  
Water • Climate Change • Disaster Management

.....

DECEMBER 2020

In Partnership With  
Kerala State Council for Science Technology and Environment (KSCSTE), Thiruvananthapuram



## Foreword

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Kerala adopted a model of development with stress on social development along with economic development. The strategy assisted Kerala in ensuring fairly good physical quality of life to the people and a model of economic development that is moderately sustainable. However, high density of population and resultant pressures on available scarce resources is on the increase threatening fragile ecology of the state. Kerala's investments in the social sector helped the state to manage/contain spread of infectious diseases including COVID 19 pandemic to some extent despite high density of population and high degree of national/international migration.

Sustainable Development is the outcome of the vision that development shall meet "needs of the present without compromising the ability of future generations to meet their own needs". Execution of this vision requires paradigm shift in the prevailing perception of development and adoption of processes of 'good governance' in administration. The report intends to study strengths and weaknesses of the present system of governance and submit recommendations to government on changes required in governance systems to realise the vision.

United Nations Organisation has defined major elements of good governance and its pivotal role in ensuring development that is sustainable. Based on these principles the report examines governance issues in sustainable development.

While the state moves forward in making the best use of opportunities, the threats it faces need to be considered. Unchecked exploitation of natural resources in the name of development becomes counterproductive in the long run, causes ecological degradation, triggers climate change and occurrence of natural disasters. These destabilize economies, resulting in further marginalisation and deprivation of already marginalised communities. Health impact of climate change will affect different populations disproportionately. Poor will suffer the most and among them children and elderly people will be the worst affected.

Climate change affects all living beings and destroys biodiversity. Indiscriminate use of chemical fertilizers, pesticides and insecticides damage the state's eco system and cause

irreversible negative effects on plants, animals – both aquatic and terrestrial, and human beings. Another emerging issue is Anti-Microbial Resistance (AMR) in pathogens found in animals through indiscriminate use of antibiotics in animal care, dairy and fisheries and resultant infection in human beings when they consume animal products. AMR renders antibiotics, mainstay in the management of bacterial infections, ineffective.

Hence, the need to stress on planned development with sustainability at its core.

Planning is based on scientific principles. But being scientific may lead to an attitude of infallibility and compromises on transparency. Transparency and involvement of people in the planning process is essential for ensuring sustainable development. Adoption of scientific principles for planning shall focus on the need for informing/making people aware of principles on which scientific conclusions are reached. For instance, people need to be aware of the reasons for declaring a region as ecologically sensitive and resultant restrictions. Transparency needs to be the guiding principle of good governance.

Development is for the benefit of present and future generations. Hence, governance systems need to be responsible and accountable. Responsible participation of people is also a precondition for success of sustainable development. Decentralisation of planning and implementation ensuring people's participation at all levels are necessary parameters in this endeavour. Gandhiji's words 'the best way to judge an administration is to examine how it affects the last and least of citizens' needs to be the guiding principle of development. Recommendations in this report aim at developing decentralised structure for developmental planning, where people's voices are welcome and given the importance it demands.

I present this report to government with request to adopt the recommendations for ensuring sustainable development of the state. I also take this opportunity to stress the necessity to fast forward steps for adaptation /mitigation of debilitating effects of climate change. Disaster management needs to be taken to a higher level of preparedness with participation of people, civil society organisations and LSGIs.



**V.S. Achuthanandan M.L.A.**

02.11.2020

Thiruvananthapuram

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## Abbreviations

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|          |   |
|----------|---|
| ABS      | Access and Benefit Sharing                                  |
| ADAK     | Agency for Development of Aquaculture Kerala                |
| AEs      | Assistant Engineers   |
| AEUs     | Agro-Ecological Units                                       |
| AMR      | Anti-Microbial Resistance                                   |
| ANERT    | Agency for New and Renewable Energy Research and Technology |
| ARC      | Administrative Reforms Commission                           |
| BMCs     | Biodiversity Management Committees                          |
| CADA     | Command Area Development Authority                          |
| CBSE     | Central Board of Secondary Education                        |
| CCAs     | Community Conserved Areas                                   |
| CCDU     | Communication and Capacity Development Unit                 |
| CDS      | Centre for Development Studies                              |
| CFRs     | Community Forest Rights                                     |
| CGWB     | Central Ground Water Board                                  |
| CIB & RC | Central Insecticides Board and Registration Committee       |
| CMFRI    | Central Marine Fisheries Research Institute                 |
| CVCA     | Critically Vulnerable Coastal Areas                         |
| CWC      | Central Water Commission                                    |
| DBCCs    | District Biodiversity Coordination Committees               |
| DBT      | Direct Benefit Transfer                                     |
| DDMA     | District Disaster Management Authorities                    |
| DISCOMs  | Distribution Companies                                      |
| DLAC     | District Level Authorised Committee                         |
| DMC      | Disaster Management Center                                  |
| DM Act   | Disaster Management Act                                     |
| DoECC    | Directorate of Environment and Climate Change               |
| DPC      | District Planning Committee                                 |
| EbA      | Ecosystem-based Adaptation                                  |
| EBT      | Electronic Benefit Transfer                                 |
| EoDB     | Ease of Doing business                                      |
| ECBC     | Energy Conservation Building Code                           |
| ESZ      | Ecologically Sensitive Zones                                |
| EHT      | Extra High Tension  |

|              |  |
|--------------|--|
| EPR.....     | Extended Producer Responsibility                         |
| ESZ .....    | Ecologically Sensitive Zones                             |
| FAO.....     | Food and Agricultural Organisation                       |
| FCO.....     | Fertiliser Control Order                                 |
| FDA.....     | Fisherfolk Development Agencies                          |
| FSPV .....   | Floating Solar Photovoltaic                              |
| GIAHS.....   | Globally Important Agricultural Heritage System          |
| GIFT .....   | Gulati Institute of Finance and Taxation                 |
| GoI.....     | Government of India                                      |
| GPS .....    | Global Positioning System                                |
| GSDP.....    | Green Skill Development Programme                        |
| HT .....     | High Tension   |
| IBM.....     | International Business Machines                          |
| IDRN .....   | India Disaster Resource Network                          |
| ICZMP .....  | Integrated Coastal Zone Management Plan                  |
| IEC .....    | Information Education Communication                      |
| IEM.....     | Industrial Entrepreneur Memorandum                       |
| IL .....     | Industrial License                                       |
| ILDm.....    | Institute of Land and Disaster Management                |
| IMP .....    | Integrated Management Plans                              |
| IRS .....    | Incident Response System                                 |
| IT .....     | Information Technology                                   |
| IWRM.....    | Integrated Water Resources Management                    |
| JFM .....    | Joint Forest Management                                  |
| KAU .....    | Kerala Agricultural University                           |
| KAVL.....    | Kerala Aqua Ventures International Limited               |
| KBSFS.....   | Kuttanad Below Sea-level Farming System                  |
| KCICM.....   | Kerala Centre for Integrated Coastal Management          |
| KCZMA.....   | Kerala Coastal Zone Management Authority                 |
| KFDRC .....  | Kerala Farmers' Debt Relief Commission                   |
| KI IDC.....  | Kerala Irrigation Infrastructure Development Corporation |
| KIIFB .....  | Kerala Infrastructure Investment Fund Board              |
| KILA.....    | Kerala Institute of Local Administration                 |
| KINFRA ..... | Kerala Industrial Infrastructure Development Corporation |
| KMBR.....    | Kerala Municipality Building Rules                       |

|              |   |
|--------------|---|
| KSDMA .....  | Kerala State Disaster Management Authority                        |
| KSERC .....  | Kerala Electricity Regulatory Commission                          |
| KSIDC .....  | Kerala State Industrial Development Corporation                   |
| KSIE .....   | Kerala State Industrial Enterprises Limited                       |
| KSITM .....  | Kerala State Information Technology Mission                       |
| KSPCB .....  | Kerala State Pollution Control Board                              |
| KSTP .....   | Kerala State Transport Project                                    |
| K-SWIFT..... | Kerala Single Window Interface for Fast and Transparent Clearance |
| LAPCC .....  | Local Level Action Plans on Climate Change                        |
| LLMC .....   | Local Level Monitoring Committee                                  |
| LSGIs.....   | Local Self-Government Institutions                                |
| MAM .....    | Mobile Application Mannu  |
| MGNREGA..... | Mahatma Gandhi National Rural Employment Guarantee Act            |
| MISSK.....   | Microlevel Information System on the Soils of Kerala              |
| MNREGS ..... | Mahatma Gandhi National Rural Employment Guarantee Scheme         |
| MoEF .....   | Ministry of Environment and Forests                               |
| MoEFCC.....  | Ministry of Environment, Forest and Climate Change                |
| MSMED.....   | Micro Small and Medium Enterprises Development                    |
| MVD .....    | Motor Vehicles Department   |
| NABARD ..... | National Bank for Agriculture and Rural Development               |
| NAFCC.....   | National Adaptation Fund for Climate Change                       |
| NBWL.....    | National Board for Wild Life                                      |
| NGOs.....    | Non Governmental Organisations                                    |
| NGT .....    | National Green Tribunal   |
| NHAI.....    | National Highways Authority of India                              |
| NIDM .....   | National Institute of Disaster Management                         |
| NIFAM.....   | National Institute of Fisheries Administration and Management     |
| NTFP.....    | Non-Timber Forest Products  |
| NRW .....    | Non-Revenue Water   |
| PAs.....     | Protected Areas   |
| PDNA.....    | Post Disaster Need Assessment                                     |
| PGCIL .....  | Power Grid Corporation of India Ltd                               |
| PHCs .....   | Primary Health Centres  |
| PPP .....    | Public-Private Partnership  |
| PRIs.....    | Panchayati Raj Institutions                                       |

|             |   |
|-------------|---|
| PWD.....    | Public Works Department   |
| R&D.....    | Research and Development  |
| RIDF.....   | Rural Infrastructure Development Fund                           |
| RRFs.....   | Resource Recovery Facility                                      |
| SAF.....    | Society for Assistance to Fisherwomen                           |
| SAPCC.....  | State Action Plan on Climate Change                             |
| SCERT.....  | State Council of Educational Research and Training              |
| SDGs.....   | Sustainable Development Goals                                   |
| SDMA.....   | State Disaster Management Authority                             |
| SDRF.....   | State Disaster Response Force                                   |
| SEAC.....   | State Environmental Appraisal Committee                         |
| SEIAA.....  | State Environmental Impact Assessment Authority                 |
| SEOC.....   | State Emergency Operations Cell                                 |
| SHGs.....   | Self Help Groups  |
| SIDCO.....  | Small Industries Development Corporation                        |
| SLC.....    | State Level Committee   |
| SoR.....    | Schedule of Rates   |
| SPO.....    | Solar Procurement Obligation                                    |
| SWAK.....   | State Wetland Authority Kerala                                  |
| TSG.....    | Technical Support Group   |
| ULBs.....   | Urban Local Bodies  |
| UN.....     | United Nations  |
| UNDP.....   | United Nations Development Programme                            |
| UNESCO..... | United Nations Educational Scientific and Cultural Organization |
| VDA.....    | Vembanad Development Authority                                  |
| WMC.....    | Watershed Management Committees                                 |

## Introduction

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The **Commission on Global Governance** in its report '**Our Global Neighborhood (1995)**' defines governance as "the sum of many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest".

Decline in the quality of public service, as observed by the 3rd Administrative Reforms Committee, leads to cynicism and distrust among the people on governance systems and sustainability of government programmes and policies. The 4th Administrative Reforms Commission (ARC) was set up by the government in 2016 with the former Chief Minister, Shri V.S. Achuthanandan, MLA as chairman, former Chief Secretaries Shri C.P. Nair and Smt. Neela Gangadharan as members and former Additional Chief Secretary Smt. Sheela Thomas as Member Secretary. The Commission has to recommend measures for improving efficiency and effectiveness of public service delivery and for evolving a governance system that is participatory, sustainable, amenable to changes and has people at the centre of public service delivery.

One of the areas identified for study by the Commission is 'Environment and Sustainable Development' and the report on 'Sustainable Development- Governance Issues' is the outcome of the study under this theme. Sustainable development is defined as "development that meets needs of the present without compromising the ability of future generations to meet their own needs" (UN World Commission on Environment and Development - "Brundtland report/ Our Common Future", 1987). Sustainable Development is crucial to the future of any nation, and requires partnerships between governments, private sector and civil society. Economic growth based on sustainability, inclusiveness, social development, environmental protection and eradication of poverty and hunger are identified as the goals of good governance by the United Nations. To make any development sustainable, it is necessary to ensure that all these aspects are balanced in the growth of the region. Advancement in any one of the areas as key to living a comfortable life, by compromising on others is not sustainable. Advancement in health or education with a modest growth in income, or failure to improve life expectancy, though the economy is strong, are examples of imbalanced growth.

Kerala is one of the states in India with a high density of population. The state has an area of 38863 Km<sup>2</sup> with 3.45 crore population (2019). Increase in population coupled with rapid urbanisation and consumerism has led to pollution of air, water, land, and challenges in waste management causing alarm and bringing to focus the need for conservation of biodiversity, protection of wetlands, prevention of environmental pollution and promotion of ecological balance to enable sustainable development. Effective implementation of policies for sustainable development is essential to balance the need for development and conservation of the environment. Hence, a holistic understanding of land management together with mainstreaming of environmental planning into the development process becomes important. Along with this, it is equally important to incorporate a good policy framework, build effective communication channels between various stakeholders, and strict enforcement of environmental regulations.

According to the discussion paper released by UNDP on 'Governance for Sustainable Development- Integrating Governance in the Post 2015 Development Framework, March 2014', (<https://www.undp.org>) the following are cited as areas requiring action in order to establish good governance.

- Enforcing effective, responsive, and accountable state institutions
- Ensuring openness and transparency- allowing public access to information
- Addressing corruption and curbing illicit financial flows
- Perfecting justice and the Rule of Law
- Enabling public participation in decision making
- Curbing violence and combating transnational organised crime

Sustainable Development Goals (SDGs), also known as Global Goals adopted by UN in 2015 are:

- No Poverty
- Zero Hunger
- Good Health and Well-being
- Quality Education
- Gender Equality
- Clean Water and Sanitation
- Affordable and Clean Energy
- Decent Work and Economic Growth



- Industry, Innovation and Infrastructure
- Reduced Inequality
- Sustainable Cities and Communities
- Responsible Consumption and Production
- Climate Action
- Life below Water
- Life on Land
- Peace and Justice Strong Institutions
- Partnerships to achieve the Goal

While developing SDGs, UN adopted a three-dimensional approach - social, economic and environmental, sectors vital for survival of the societies, economies and ecosystems. Some of the SDGs fall exclusively to a particular sector while some others overlap into more than one. SDG 17 is crucial for attainment of the other 16 SDGs.

Kerala is ranked first in the SDG Index Baseline Report 2018. The top rank for Kerala is attributed to its achievements in providing good health and quality education, reducing hunger and achieving gender equality. The state's commitment to the implementation of SDGs is evident from the status report 2018. (Status Report prepared is given as Annexure I)

### **Objectives**

Kerala has enacted stringent environmental legislations and has created institutions to monitor and enforce these legislations. Creation of a legal and administrative framework for environmental management alone does not solve problems of environmental degradation or provide ecological balance for sustainable development. Several factors contribute to the gap between theory and reality- insufficient resources, lack of effective coordination between various institutions etc. Strategies for implementing policies need to be ambitious, integrated, action-oriented and collaborative, and adapt to different levels of development. Range of enabling services and resources are required for successful implementation of most policies. Holistic approach to the concept of sustainable development by meshing development aspirations of the citizens with environmental consciousness is a felt need. Similarly, needs of the present and future generations are to be safeguarded. Through the study on "Sustainable Development-Governance Issues", ARC aims to understand the impact/implication of, rapid economic growth on environmental sustainability, developmental issues, challenges, opportunities, and constraints to growth, integration of programmes across key departments, constraints faced in implementation of environmental policies and laws, and recommend measures to address these issues.

## **Methodology**

A sustainably developing system needs to ensure that public officials are accountable for any action made in the name of the public or by using public resources. UNDP mentions strong rule of law as a prerequisite for good governance. Strong rule of law is definitely a starting point for making changes in an existing governance model. It is observed that laws and policies of the state, at times, have not kept pace with changes happening outside the governance system.

To understand issues in implementation, central and state government acts, rules, regulations, policies, orders, etc. are listed and a comparison of provisions is attempted to have clarity on contradictions, if any between the two. Study of existing legal frameworks is also required to identify gaps in policies that need to be addressed in order to ensure effective functioning of specific sectors and changes that need to be made to fulfill the SDGs.

Data were collected from concerned departments of the state regarding laws, policies and regulations by the state and central government, international treaties etc., to identify issues in the selected sectors.

For the study, environmentally important resources of the State are categorised into five groups.

- Agriculture, Fisheries, Biodiversity and Forests
- Waste Management, Pollution, Health and Sanitation
- Energy, Industries, Infrastructure and Tourism
- Water
- Climate Change and Disaster Management.

## **Climate change and disaster management**

Analysis of institutional mechanisms for implementation of policies, legislations, human resource issues within departments, relationship between implementing agencies, role of local government, Non Governmental Organisations (NGOs), other civil society groups etc. in each sector, and social aspects of development are included in the report. Chapters in the report are based on the above five topics. Subject wise panels/ groups of experts were constituted to assist the Commission at different stages of the study. Secondary data from reference books, conference proceedings, articles published in the referred journals, various reports/ government documents were used in the preparation of the report. Websites of state and central government departments and national and international organisations relating to sustainable development were reviewed periodically.

ARC held discussions with departments for independent assessment. Interactions with scientists, environmentalists, NGOs were conducted to elicit their views and ideas. Subject based questionnaires were prepared and sent to the departments and other stakeholders. Focus Group Discussions with local communities by ensuring participation of marginalised groups including tribal communities, fisher folk etc. were conducted. Workshops, seminars and discussions with key functionaries of the departments were held for identifying governance issues faced by them. Draft report was validated by the stakeholders at different stages of the study and by the Commission. Recommendations in the report are based on inputs from the studies, data from secondary sources and analysis by the Commission.

Following departments/ organisations of Government are included in the study:

- Agriculture and Allied Departments
- Environment Department
- Forest and Wildlife Department
- Health Services Department
- Land Revenue Department
- Local Self Government Department
- Mining and Geology Department
- Soil Conservation Department
- Town & Country Planning Department
- Water Resources Department
- Kerala State Pollution Control Board
- The Clean Kerala Company
- Suchitwa Mission
- Haritha Kerala Mission





# Agriculture, Fisheries, Biodiversity, Forests

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## CHAPTER 1

### 1.1. Agriculture

Presence of different agro-climate zones, physiographic features and weather conditions helped Kerala to facilitate agriculture and hence, the economy of the state was dominated by agriculture. Although the growth rate of agriculture has over the years fluctuated between highs and lows, agriculture still plays a major role in the economy of the state. Most common food crop of Kerala is rice (paddy), followed by coconut and tapioca. 96 percent of the country's production of pepper comes from Kerala. Kerala also produces cardamom, cinnamon, clove, turmeric, ginger, nutmeg etc., and recently vanilla. Centuries old overseas trade of spices shaped the political and cultural history of India. Other crops of the state include tea, coffee, cashew, pulses and areca nuts. Kerala's share in natural rubber production of the country is around 79 percent.

Traditional farming in Kerala is based on mixed rotational systems combining agriculture involving diverse varieties of crops, fish and livestock, etc. The age-old Pokkali cultivation in some coastal districts and Kaipad farming in Kannur district are unique to Kerala, and are traditional world acclaimed integrated farming practices developed by the farmers in tune with the climatic rhythm of land. Advent of modern farming with emphasis on uniformity and monocultures has destroyed farming diversity on the assumption that diversity goes against productivity, although several studies show that diversity can increase productivity at total system level than monocultures.

Kerala faces challenges in maintaining the meager gross cropped area of 25,79,000 hectares (2017-18), for food production. Year on year there is 2 percent decline in gross cropped area. Agricultural economy has taken a turn from rice and tapioca to more remunerative crops like bananas and plantation crops. 62.8 percent of the total cultivated area is accounted for cash crops compared to 10.21 percent area used for food crops. Agriculture and changing trends in the sector continue to influence people of the state, and its economy. Hence, proper governance of the sector is to be ensured for sustainable development of the State.

Sustainability and resilience are different qualities but are complementary for agro-ecosystems. A resilient system may be preferred to a sustainable one as a resilient system of agriculture can meet food and development needs over short and long term, from local to global scales without destabilising the ecosystem. It concerns interactions of people and nature and will resist any

change that may adversely affect farmers, food production, food safety and environment. Adoption of a resilient system of agriculture, which is also sustainable, requires innovations amenable to adaptations.

The sector is governed by several acts/rules/policies/orders at national and state level (Annexure II). Implementation of these acts, rules, orders is carried out by various departments in Government. Department of Agriculture Development and Farmers' Welfare implement regulations on seeds, fertilisers and pesticides. Kerala Conservation of Paddy Land and Wetland Act, 2008 is implemented by the Agriculture and Revenue Departments and Kerala Land Utilisation Order, 1967 by the Revenue department. Kerala State Information Technology Mission (KSITM), autonomous agency of the Department of Information Technology is responsible for implementation of Information Technology Act. Departments of Animal Husbandry, Dairy Development, Co-operatives, Fisheries, Soil Survey and Soil Conservation and Biodiversity Board etc., are other departments/ agencies in the sector. The Kerala Farmers' Debt Relief Commission implements the KFDRC Act.

### **1.1.1 Department of Agriculture**

Department of Agriculture was established on May 27th, 1908 in the erstwhile princely state of Travancore and was restructured in 1987 to ensure holistic development of agriculture in the State. It was renamed as Department of Agriculture Development and Farmers Welfare.

Vision of the Department is to 'attain self sufficiency in food production through enhanced productivity of agricultural commodities so as to make agriculture a sustainable and viable vocation, providing livelihood support'.

Mission of the Department includes:

- Safeguarding the interest of farmers, ensuring food and nutritional security and supporting Kerala's agricultural economy
- Achieving targeted growth rate for the agricultural sector by successfully implementing various schemes
- Protecting farmers from risk through risk management cover and from unfair and deceptive business practices
- Setting up investments in agriculture
- Ensuring the safety of agricultural products by ensuring supply of quality agricultural inputs
- Conserving and protecting the state's agricultural and natural resources by promoting environmentally safe agricultural practices.

ARC has limited its recommendations to the following issues identified during its deliberations

### 1.1.2. Governance Issues

- i. As part of implementation of organic farming policy, Government of Kerala banned certain extremely toxic (red label) and highly toxic (yellow label) pesticides. Prescriptions of Agricultural Officers are mandated for purchase and use of some pesticides. Despite these measures to streamline and ensure responsible use of pesticides, illegal transportation of banned and restricted pesticides is often noticed, especially in the border districts of the states.
- ii. Absence of proper and effective mechanisms for disposal of banned/ date expired/ substandard pesticides seized by insecticide inspectors, and pesticides kept in analytical labs after conducting quality analysis is another issue.
- iii. Many new-generation and combination pesticides are available in the state with CIB & RC registration and are used widely by farmers without following directions on the label. Adverse effects of these chemicals on biodiversity are yet to be studied.
- iv. Household insecticides such as insect repellents, rodenticides, etc., are included in the purview of the Insecticides Act. But these are available freely in various forms - powder, granules, coils, incense sticks (agarbathi), aerosols, sprays, etc., and are sold in the open market without any valid license or safety measures and are even stored along with food articles.
- v. At present, as per Fertilizer Control Order (FCO) 1985, license is not required for manufacture of organic and biofertilizers. This favours production and availability of spurious organic manures and biofertilizers. Illegal movement of fertilisers, especially urea allocated for industrial use (plywood manufacturing) is also reported. For chemical pesticides, wholesale licenses are issued for more than 200 products based on registration by Central Insecticides Board and Registration Committee (CIB & RC). Unscientific and indiscriminate use of such pesticides causes serious health hazards and environmental issues, as these products often may not be recommended for use in the state by the Kerala Agricultural University (KAU) as the labels may claim. Farmers/agricultural workers engaged in handling pesticides or similar chemicals may not be aware of scientific practices, usage and precautions to be observed. This has wider ramifications like toxicity, pollution of land and water, other health hazards, wastage of money, etc. KAUs report (as part of a safe to eat programme under organic farming scheme) on pesticide residue analysis of various food products including fruits and vegetables confirms unscientific use of pesticides. Inspectors (Seed/ Fertilisers / Insecticides) authorised to enforce quality control acts and regulations are performing these duties in addition to the responsibilities of implementation and monitoring of more than 37 state schemes and nearly 15 central schemes, and schemes and projects of LSGIs. This leads to lack of effective coordination which in turn causes hurdles in enforcement of existing legal frameworks. Moreover, the present system is ineffective in providing adequate legal administrative support to field level officers.

- vi. Developmental interventions are made to enhance productivity. A classic example is the construction of 'Thanneermukkom Bund' for enhancement of rice cropping intensity in Kuttanad. Productivity increased by about 30 percent and enhanced returns to farmers, but eventually led to stagnation of water bodies, increased pollution resulting in ecological degradation, adverse impact on biodiversity etc. Adoption of such interventions needs to be taken up only after its impact on the ecosystem and sustainability are studied. Otherwise returns from the interventions will be short lived and turn out to be counterproductive in the long run, not only to biodiversity but to farming itself.
- vii. The Kerala Conservation of Paddy Land and Wetland Act, 2008 does not provide for reconsideration/ appeal of decisions of Local Level Monitoring Committee (LLMC) regarding reclamation or filling for construction of house. LLMC is the final authority to recommend to State Level Committee (SLC) or District Level Authorised Committee (DLAC) as the case may be, for reclamation of paddy land for public purpose or for construction of residential buildings by the owner of the paddy land. LLMC is not bound to convey its decision to the land holder/applicant which is against principles of natural justice. There is no clarity on the course of action if the application is rejected.

### **1.1.3 Recommendations**

- i. Paddy lands play a crucial role in providing flood cushioning especially in places like Kuttanad, by reducing the impact of flood waters during monsoon season. Increase in area under flood season cropping by dewatering of paddy lands has led to reduction in flood cushioning and resultant increase in the occurrence of floods. In the background of repetitive floods faced by the state it has become imperative that government implements a scheme to limit flood season cropping/return part of the reclaimed land to the rivers and lakes to accommodate and store water. The scheme needs to be implemented by taking the farmers into confidence and with their participation. Government needs to ensure, with the participation of farmers, that cropping patterns and cycles remain in tune with land use in diverse environmental regimes.
- ii. Government declared an Organic Farming Policy in 2010. As per strategy (22) of the policy, chemical fertilisers and pesticides are to be phased out from the farming sector. But the policy could not be implemented effectively in the absence of specific guidelines. ARC recommends that guidelines, with time frames for phased withdrawal of chemical fertilisers and detailed implementation plans need to be issued by government to ensure implementation of 'Organic farming Policy' - a positive step towards sustainable and resilient agriculture. Organic farming protocol for each crop needs to be made available to farmers.
- iii. Plant Health Clinics need to be set up in all Krishi Bhavan as an extension tool for providing services to the farmers at clinic and field level. PHCs need to be strengthened and evolved as



a total solution provider to ensure implementation of better plant health systems. Integrated Pest Management (IPM) in agriculture combines use of biological, cultural and chemical practices to control insects and other pests, promotes use of natural predators/parasites for pest control and use of only selective pesticides for back up when pests could not be controlled through natural means. Promoting IPM needs to be an important function of the PHCs in Krishi Bhavans. IPM can support the regulation of excessive use of pesticides. PHCs can also address, to a large extent, the human resource constraint experienced by Agriculture Department.

- iv. Intensive training programs for farmers need to be conducted on scientific methods of modern farming and on the importance of adhering to the guidelines for using chemical fertilisers, pesticides etc., and on adoption of sustainable agricultural practices. Krishi Bhavans need to conduct these training regularly, based on a schedule. Training for farmers shall be the mandated responsibility of agriculture officers. All agriculture officers shall be trained in conducting training programs for farmers.
- v. Farmers Data bank and e-payment facility need to include all allied departments such as Animal Husbandry, Dairy Development, Fisheries etc. Separate data bank for each department is not required. A comprehensive web portal as a subset of Kerala Government portal may ease workload of officers at the grass root level and give them time for promotional, enforcement and allied responsibilities.
- vi. Inspectors (Seed/Fertilisers/Insecticides) who are authorised to implement acts and regulations on quality control are performing these duties in addition to implementation and monitoring of more than 37 state schemes and nearly 15 central schemes, and schemes and projects of LSGIs. ARC recommends that Government shall review all state schemes and assess justification for continuing schemes started years back, on the basis of output and outcome of the schemes. Government needs to consider the possibility of merging schemes of similar nature. This exercise needs to begin immediately and in any case before preparations for the next annual plan
- vii. ARC recommends that government needs to consider setting up a separate quality control wing for effective execution of mandatory duties and responsibilities of Agriculture and allied departments. The wing shall coordinate all mandatory functions as per Acts/ Rules/ Orders and focus on certification, registration, licensing and quality assurance of agricultural inputs, ensure effective plant quarantine services for the import of planting material and movement of planting materials within the country and state, establish mechanism for standardisation of indigenously made organic manures and biofertilizers, establish mechanism for quality enforcement and monitoring system for regulating production, distribution, sale/ use of spurious organic products, prevent influx of organic bio pesticides marketed as pesticides without CIB & RC registration, etc.

- viii. Projects/schemes implemented by LSGIs need to be limited to development of common facilities for agricultural production and marketing. Individual beneficiary projects/schemes shall be limited to required minimum and ensured that beneficiaries are selected through a transparent process with the assistance of IT tools. Application of IT for various functions of the department, especially functions of repetitive nature will reduce workload of the departments to a great extent. All individual beneficiary-oriented schemes and projects shall be implemented only at the lowest tier of local bodies. This will relieve agricultural officers at higher levels (Assistant Directors, Deputy Directors and Joint Directors) of responsibilities at the lower tiers. They can then be entrusted with supervisory responsibilities of the lower tier and Block Panchayats and District Panchayats and of general state schemes or projects of the department.
- ix. District level Multi-Disciplinary Squad constituted by GO(MS)No. 1361/ 2011/AD, dated 23.05.2011 for preventing entry, transport and use of Endosulfan needs to be reconstituted to include illegal transportation of banned Plant Protection chemicals and spurious organic manures in its mandate.
- x. Government needs to evolve an effective mechanism to tackle the issue of accumulation of banned/ date expired/ substandard pesticides seized by insecticide inspectors, and pesticides kept in analytical labs after conducting quality analysis, with the assistance of Pollution Control board and manufactures. License for sale of pesticides shall be linked to the mechanism. Use of new generation pesticides shall be allowed in the state only after proper study on the impact on humans, animals and biodiversity at large. Amendments in the relevant enactments shall be made for the same.
- xi. All insecticides used for pest control shall be brought under section 13 of Insecticide Act to ensure safety. Bio pesticides and organic protectants shall also be brought under Insecticides Act to regulate use and ensure quality. Standards for these products need to be developed.
- xii. Effective use of land and water is fundamental to growth and sustainable development. Initiatives by LSGIs in watershed management have been widely experimented in Kerala since the 1990s. Major, Micro and Mini watersheds in Kerala were identified and watershed maps prepared by all panchayats and urban local bodies. ARC recommends that the state needs to move towards a watershed-based development process, especially in agriculture and allied activities without any further delay. For this the government needs to take immediate steps to restart watershed-based development, stalled by the year 2000. Prior to adoption of the process, mapping of all major, minor and micro watersheds in the state needs to be completed.
- xiii. Adoption of new/innovative interventions needs to be taken up only after its impact on the ecosystem and sustainability are studied. Otherwise returns from the interventions will be short lived and turn out to be counterproductive in the long run, not only to biodiversity but to farming itself.

- xiv. ARC recommends to government to study the measures that need to be taken to conserve more of the monsoon water in Kuttanad for the dry months to balance climate induced salinity intrusion in the area. Land use modeling also needs to be done for the area by the Land Use Board in consultation with the farmers and research institutions.
- xv. Collective or group farming on lease land (non cultivated fertile land available in public and private sector) under the effective leadership of LSGIs and with the assistance of allied departments viz. Agriculture, Animal Husbandry, Dairy Development and Fisheries, needs to be accelerated. Rules/orders required for implementation need to be issued by LSG department in consultation with implementing departments.
- xvi. Research and innovation on several aspects/sectors is required to address challenges of environmental pollution, sanitation issues, availability of potable water, decrease in the variety and number of fish, animal and plant diseases, issues by increasing population of rodents, increased cost of cultivation, decrease in net profit, non-availability of labour, indebtedness, political conflicts, etc. The issues are socio economic, environmental, socio political, etc. These challenges need to be specifically stated, categorised and prioritised. KAU, concerned departments of other universities and institutions such as CDS, GIFT, etc., may be requested to take up the challenges categorised above according to their area of interest and domain expertise. Government needs to incentivise these initiatives.
- xvii. Farmers of Kuttanad need to adopt other cropping patterns along with rice to assure an increase in income, reduce risk and ensure sustainable development of the ecologically fragile area. Land that is kept with water can be used for fish culture. As in the case of paddy procurement by Civil Supplies Corporation, fish reared by farmers may be procured by Matsyafed. Integrated Farm Models/Crop-Livestock diversity like duck-paddy, duck-paddy-fish, duck-pig-fish, etc., needs to be promoted.
- xviii. Detailed conceptual framework shall be developed for cage fish farming by experienced professionals who have demonstrated their expertise in such novel ventures to prove productivity of large area cage-culture systems in water rich backwaters of Kerala. These ventures can be combined with agro-tourism. Local governments can also benefit from these ventures through lease payments from registered venture producers. An example of a model of multiple fish feed blending units and fish seed production units has been demonstrated at the Kerala Agricultural University at Kumarakom. Central Marine Fisheries Research institute (CMFRI) has also funded cage farming projects in some islands around Kochi.
- xix. Interactions with agriculture and allied departments enjoins the Commission to reiterate the view that coordinated functioning of the departments of Agriculture, Animal Husbandry, Dairy Development and Soil Conservation, and participation of farmers are necessary to ensure adoption of sustainable and resilient agriculture practices. This can be achieved only through breaking the silos in which these departments function and ensuring joined up functioning. Minor and small irrigation projects need to be integrated with LSGIs and

Agriculture Departments. Joint planning, implementation and management of such projects shall be envisaged in future. Any intervention in the local productive sector needs to be in consultation/convergence with LSGIs.

- xx. Legislation related to river bank protection and sand mining regulation has to be revisited to identify and demarcate river banks and protect these areas from further encroachment. The role of Kadavu Committees needs to be redefined, enforcement of regulation and control mechanism strengthened to protect rivers in the state from pollution and excessive sand mining. Law on minor minerals and quarrying shall also be revisited to strengthen measures to regulate unlawful activities in this regard.
- xxi. Conservation of indigenous germplasm like Vechur cattle, Kasaragod dwarf cattle, Kuttanad ducks, Kuttanad buffalo, Tellicherry chicken etc., have been taken up by departments concerned. Similarly, indigenous technical knowledge in farming practices like bill branding in ducks, brooding of ducklings without supplementary heat, etc., need to be protected.
- xxii. Government needs to consider amending Kerala Conservation of Paddy land and Wetland Act, 2008 and include the provision that all future land transactions of paddy land, except by partition deeds shall be permitted only for whole land in contiguous survey and sub division numbers and not for any portion of the land. The new owner shall be eligible for getting permission for reclamation of land thus sold, for house construction. This will be a right step towards preventing fragmented sale of paddy land which results in creation of parcels of land uneconomical for paddy cultivation. ARC also recommends that the extent of land allowable for reclamation for house construction may be limited to 5 cents irrespective of location. Government may also consider if a declaration by the landowner will suffice legal requirements for conversion instead of permission from concerned authorities.
- xxiii. Government may also consider if a declaration/affidavit by the land owner will suffice legal requirements for conversion instead of permission from concerned authorities. This will ensure transparency in paddy land conversion and minimise corruption.
- xxiv. Kerala Conservation of Paddy Land and Wetland Act, 2008 shall include provision for reconsideration/ appeal on the decisions of Local Level Monitoring Committee (LLMC) for reclamation/filling up for construction of house. Recommendation of LLMC to the SLC or DLAC, as the case may be, is the final step. LLMC is not bound to convey its decision to the land holder/applicant and no time limit is prescribed for the process. ARC recommends that the Act shall provide for appeal/reconsideration of the decisions of the LLMC by DLAC/SLC to ensure transparency in the procedure of conversion of paddy fields for house construction.
- xxv. Before registering a paddy or wetland in the Data Bank, as stipulated in the Act, it needs to be ensured that such land has been/is a paddy land and/or reclaimed after the effective date 12.8.2008. ARC recommends that paddy lands reclaimed/filled up before 12.08.2008 need

to be exempted from inclusion in the Data Bank. Satellite pictures may be helpful in this process. Necessary amendments shall be made in the Act. This will help to avoid harassment of farmers and provide accurate data on the extent of paddy land as on 12.8.2008

## 1.2 Soil

Soil and vegetation are precious natural resources essential for sustenance of human and animal life and livelihood security. Conservation of soil and water is essential for sustainable agricultural production.

Department of Soil Survey and Soil Conservation is the nodal department for 'conservation and management of soil and water resources' in the state. The department 'provides scientific data base on soil and land resources for developing suitable soil and land management practices and implements projects for conserving and managing these natural resources vital for sustainable development and food security'. Soil and land resource inventory for each parcel of land carried out by the Department is based on soil survey methodologies and provides a scientific database for planning and executing developmental programmes at macro and micro level. All schemes taken up by the department are implemented in a participatory and democratic manner with active participation from the public. The department has been implementing soil and water conservation programmes on a watershed basis in the state since its inception in 1963. Stress is given for conservation activities aimed at 'reduction of soil erosion, in situ moisture conservation, protection of the sides of drains, improvement of infrastructure facilities for agricultural production, increasing ground water recharge and protection of natural resources for sustainable development'. Eco-restoration projects implemented by the Department are beneficial to the society.

The department has taken several steps for moving towards sustainable development. These include soil and water conservation activities undertaken under NABARD assisted RIDF schemes, protection of catchment area of reservoirs of water supply schemes, revival of traditional water bodies, stabilisation of landslide affected areas, etc. Soil and water conservation projects are implemented by adopting activities like stone pitched contours/graded bunds, moisture conservation pits, terracing, contours identifying farm specific problems and potential for increasing agricultural production.

Introduction of Graphical User Interface – 'Micro level Information System on the Soils of Kerala (MISSK)' provides information to stakeholders on all aspects of the soil as per plot/survey number. 'Mobile Application Mannu' (MAM) developed by the department helps guide farmers on crop wise fertilizer recommendation systems based on site specific soil nutrient status. 'State Soil Museum' at Parottukonam, Trivandrum, is a documentation and reference centre for the soils of Kerala and aims to provide an overview on the heterogeneous soils of the state.

### 1.2.1 Governance Issues

- i. Health of soil deteriorates due to many reasons. Soil analysis is done by different agencies in the State. Results of analysis from different agencies tend to differ leaving the farmer confused about the quality of soil of their land.
- ii. Watershed development schemes are implemented by many agencies resulting in duplication of work and affects quality of work. Various departments/ organisations are involved in implementation of policies and programmes linked to natural resource management. Absence of coordination between these organisations of government adversely impact on sustainable management of natural resources.
- iii. The Department faces dearth of staff for extending its activities to the entire rural sector. A mobile soil testing lab and two soil and plant health clinics were started without sanctioning posts required for functioning. Government needs to assist the department in adopting technological solutions to address constraints in human resources and develop capacity of the officials to use technology tools.

### 1.2.2 Recommendations

- i. Systems for ensuring coordinated and joined up functioning of organizations involved in management of natural resources and implementation of policies and programmes in the sector needs to evolve. Department of Soil Survey and Soil Conservation needs to work in close coordination with the department of Agriculture. Joined up/merged functioning of the two departments is essential for conservation of soil and water and for maximising returns to the farmer without compromising on sustainable agricultural production.
- ii. It needs to be ensured that any infrastructure created under the programmes implemented by the department of Soil Survey and Soil Conservation is created in consultation with Agriculture and Allied departments and are beneficial to the farmers and promote sustainable development of the sector.
- iii. Restructuring/strengthening of the Department and increased adoption of technological solutions is essential for better delivery of the services to the people.
- iv. Proper follow up of assets created needs to be ensured. Line departments need to undertake continued activities in the areas in order to reap benefits of natural resource conservation work for stakeholders. All assets created shall be geo-tagged and handed over to Local Self Government Institutions for further maintenance. Sufficient funds shall be provided for maintenance and regular monitoring of the assets.
- v. State specific land use plan for various Agro-Ecological Units (AEUs) of the state needs to be formulated. Planning of soil/land conservation activities needs to be based on the plan. Soil properties need to be given due consideration while formulating the plans.

- vi. Mandatory land utilisation under spatial plan zonation measures needs to be undertaken. Kerala State Land Use Board and the Town and Country Planning Department shall be entrusted to evolve and impose participatory land zonation program in the next plan period.
- vii. All studies pertaining to soil in the state that is carried out under different programmes shall be brought together. Data generated needs to be pooled and made available to all stakeholders. The State shall have a common protocol for soil sample analysis, data pooling and dissemination.
- viii. ARC recommends that Government needs to restructure the functioning of the department to ensure effective management and conservation of soil and soil fertility for sustainable development practices for the benefit of the farmer.
- ix. Selection of NGOs and other civil society organisations for undertaking schemes of the department for natural resource conservation needs to be based on their performance and experience. Manual on the processes of watershed management shall be prepared and a common platform for interaction of all agencies devised. Department of Soil Survey and Soil Conservation department may be designated as the nodal agency for coordinating all activities based on watersheds.
- x. IIWDM-K - institute run by the department at Chadayamangalam, Kollam district caters to needs of training youth and farmers and other stakeholders in natural resource management. Government may consider using this institute as a centre for training in Green Skill Development Programmes of the Central Government.

### **1.3 Fisheries**

Kerala is blessed with an abundance of water resources. Ten percent of the total coastal area of India is in Kerala. The state is also endowed with many inland water resources. These include about 5.43 lakh hectares of inland water bodies, 3092 kilometers of rivers and canals, 2.40 lakh hectares of brackish water, 0.30 lakh hectares of tanks and ponds and around 2.5 lakh hectares of flood plains and tracts of land left dry by receding water (derelict waters). Contribution of Fisheries sector to the economy of the state is around 3 percent. The sector is considered vital in the development matrix of the state and provides employment and income to more than one million people, directly or indirectly. Kerala has been the leading marine state in India in capitalising coastal resources. Despite losing its momentum to other states in recent years, Kerala continues to be one of the leading states in marine fisheries with around 20 percent of the total landings. Amidst this marine wealth, fisherfolk continue to be marginalised and are left out of the general development path. In order to enable the fisherfolk to overcome the limitations faced by them, government has implemented projects and programs for increasing production, conserving and ensuring sustainable exploitation of fish wealth, promotion of cultivation of fish and prawns, development of fishing harbours and areas for landing fish, strengthening the marketing system for fish and for the upliftment of the fisherfolk in general.

Total population of fisherfolk, including inland fisherfolk in the state is 10,39,175. Of this around eight lakh persons are dependent on marine fisheries for their livelihood (estimated fishermen population 2018-19). Fisherfolk in the state continue to be a marginalised community amidst a marine wealth of about three-fourth of fish resources in the country.

There are various enactments in force in the State in the fisheries sector (Annexure III)

### **1.3.1. Department of Fisheries**

The Department of Fisheries was established on 1st November, 1956. Vision of the Department is to work towards upliftment of fisherfolk.

Duties include:

- Implementation of the policy of the government for the socio-economic development of fishermen.
- Undertaking various production-oriented schemes for the development of the fisheries sector
- Serving as an agency for sustainable fishery and conservation of fish resources
- Extension of fish culture in available water sources
- Protect the interest of fisherfolk, fish farmers, fish traders and exporters/ consumers
- Ensure disease-free quality shrimp/fish seed to farmers
- Taking steps to assist fishermen and fish farmers to get better returns
- Implementing schemes for increasing infrastructure in the coastal area
- To develop new technologies in the fisheries sector
- Implement schemes for the welfare and upgrade of fishermen
- Implement schemes for upgrading the educational status of the children of fishermen
- Taking steps to assist fishermen and fish farmers to get better returns
- Stabilisation of the price of shrimp/fish seed
- Development of marketing infrastructure for early marketing of the yield
- Maintenance of hygienic fishing harbours, landing centres and auction halls
- Make simplified rules and procedures and to be vigilant against all malpractices



Organisations of the Department are:

- Marine Enforcement
- Kerala Fishermen's Welfare Fund Board
- Matsyafed
- Kerala State Fishermen's Debt Relief Commission
- Kerala State Fisheries Management Council
- Kerala State Fish Seed Centre
- Society for Assistance to Fisherwomen (SAF)
- Agency for Development of Aquaculture Kerala (ADAK)
- Kerala State Coastal Development Corporation
- Fisher folk Development Agencies (FFDA)
- Kerala Aqua Ventures International Limited (KAVL)
- Project Implementation Unit (Vizhinjam package)
- Project Monitoring Cell
- National Institute of Fisheries Administration and Management (NIFAM)

### 1.3.2 Governance Issues

- i. At present, legislation to recognise and vest traditional rights and occupation of fishing through traditional means is not available in the state. Absence of a legal framework to protect the interests of traditional fisher folk in fishing and fish products is detrimental to their interests and leads to exploitation by middlemen and organised groups in pricing and marketing of fish and fish products.
- ii. Potential for production of value-added products from fish and other marine catch is not fully explored. A sizable number of educated youths could be skilled in fish processing and other value addition processes.
- iii. Inland fisheries are not given adequate importance in the planning process. Inland and marine fisheries face threats from indiscriminate use of pollutants like insecticides, pesticides, weedicides and other chemicals.
- iv. Activities of the department and organisations have grown manifold over the years. To cite one example, the department implements a housing scheme. When the scheme started operating, the number of applications was around 20-25. Currently the number of applicants is in the range 500-800. But there has been no strengthening of the department. Increasing thrust given to enhancing fish production forces the department to stretch its resources thinly. Large number of applications under each project makes it difficult to assess the eligibility properly.

- v. For any service, the easiest way for fisherfolk to gain access is through the Matsya Bhavans. But they do not have required infrastructure and resources to ensure quick delivery of services.

### **1.3.3 Recommendations**

- i. ARC recommends enactment of a Traditional Fisher folk (Protection of Rights) Act in the state to recognise and vest traditional rights on fisherfolk engaged in fishing through traditional means. Inland, coastal, and territorial waters shall be included in the scope of the legislation.
- ii. Pricing and marketing of fish products needs to be under the regulatory authority of Matsyafed to protect fisherfolk from exploitation by middleman and other interest groups. Through involvement of cooperatives and micro enterprises, micro savings shall be utilised for supporting traditional fishermen.
- iii. Comprehensive capacitation programs for youth and students among fisherfolk, and skill upgradation measures need to be carried out in the coastal area through the leadership of LSGIs, and support of other departments. One of the focus areas of the programme can be value added fish production and marketing.
- iv. Inland and marine water resources face serious threats from the indiscriminate use of various pollutants like insecticides, pesticides, weedicides and other chemicals. Instead of department wise panaceas, comprehensive inter departmental and inter sector mechanisms based on watershed management plans need to be introduced on a war footing to prevent extinction of indigenous fish varieties and other water species. Kerala State Biodiversity Board needs to coordinate with departments and agencies concerned to ensure that developmental activities do not hamper balanced ecosystems of water bodies.
- v. In the light of the widespread reports of catching exotic species from natural waters and their possible threat to the native species, Fisheries Department may regulate the introduction of exotic species by confining them to aquaculture farms that are secured and prevented from the possibility of escape.
- vi. Comprehensive work study of the department and associated agencies needs to be done by government and recommendations of the study implemented without delay. Government needs to make available technology solutions for assisting the department for better service delivery. Assistance of the department needs to be extended to the LSGs to assist the farmers in sustainable development of inland fish resources and implementation of the Aquaculture policy of government.

## **1.4 Biodiversity**

“The term biodiversity (from “biological diversity”) refers to the variety of life on Earth at all its levels, from genes to ecosystems, and can encompass the evolutionary, ecological, and

cultural processes that sustain life' (Centre for Biodiversity & conservation). Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems ([www.greenfacts.org](http://www.greenfacts.org)). Biodiversity is maximum in tropical forest ecosystems which cover less than ten percent of the surface of Earth but is home to about ninety percent of species in the world.

Five major mass extinctions and several minor events have led to extensive and sudden reduction in biodiversity. Period since the emergence of humans account for faster and continuous reduction in biodiversity and loss in genetic diversity.

Biodiversity tends to cluster in hotspots. Western Ghats is one of the biodiversity hotspots of India and is also included among natural world heritage sites. Although it accounts for only over 1.1 percent of the national geographic area, western ghats sustain around 24 percent of national plant biodiversity and 35 percent of fish biodiversity in India. Malabar region is one of the 22 agro-biodiversity hotspots in India. Three endemic centres are also located in Kerala- Agasthyamala, Anamalai and Silent Valley. Agasthyamala Biosphere Reserve is one of the ten UNESCO identified biosphere reserves of the world. Kuttanad is a globally important agricultural heritage system. It is evident that Kerala is rich in biodiversity, and that intervention in any form needs to be with caution.

Biodiversity is the centre of many economic activities particularly relating to agriculture, fisheries, animal husbandry and forestry. Conservation of biodiversity requires cross sectoral strategies. Kerala State Biodiversity Board has identified 28 organisations which directly or indirectly implement schemes related to biodiversity management causing positive or negative impacts on biodiversity. They include Fisheries, Forests, Agriculture, Livestock and Animal Husbandry, Mining, Education, LSGIs, etc. Integrating biodiversity concerns with the way various sectors operate can have immediate benefits in improving environmental quality and productivity and can also serve as a long-term safeguard against climate change.

The legal framework and government orders issued at National and State level for protection of biodiversity and regulations are given in Annexure IV. These enactments and policies are implemented by the Kerala State Biodiversity Board at the State level and Biodiversity Management Committees (BMCs) at the local level.

#### **1.4.1 Kerala State Biodiversity Board**

Kerala State Biodiversity Board is an autonomous body of the state government and comes under the State Environment Department. Headquarters of the Board is at Trivandrum. The Board was formed in February 2005. Major activities of the Board include advising the state government on guidelines issued by the central government on matters relating to conservation of biodiversity. The Board advocates sustainable use of biological resources and equitable sharing of benefits arising out of its utilisation. The Board holds the authority to

grant approvals for requests on commercial utilisation/bio-survey and bio-utilisation of any biological resource by Indian nationals. The Board also implements provisions of Biodiversity Act and recommendations of government for conservation of biodiversity.

Vision of the Biodiversity Board is "the conservation of biodiversity and the sustainable utilization of the biological resources for the benefit of mankind" and mission of the Board is "To ensure clean air, clean water, healthy soil and safe food to mankind".

#### **1.4.2 Governance Issues**

- i. Biodiversity is at the centre of many economic activities particularly relating to Agriculture, Fisheries, Animal Husbandry and Forestry. It is affected in turn by activities of departments concerned that may cause loss.
- ii. Primary impact of quarrying and mining sectors on biodiversity is alteration of habitats and land irreversibility, and direct loss of biodiversity.
- iii. Multiple enforcement agencies are involved in the management of natural resources in the state: Forest Department is mandated with managing forest areas; State Wetland Authority manages Ramsar sites and other notified wetlands; Integrated Coastal Zone Management Authority is responsible for Coastal zone management. In addition, multiple enforcement agencies are responsible for water resources management as major irrigation and minor irrigation. Kerala State Biodiversity Board has identified 28 organisations including the departments of agriculture, forest, fisheries, animal husbandry, mining, education, local self government institutions etc., as dealing with biodiversity directly or indirectly.
- iv. Kerala State Biodiversity Board has requested Local Self Government Department to constitute District Biodiversity Coordination Committees (DBCCs) under DPCs. Suggestions on the role of DBCC, structure, activities and members are also included in the suggestions. Digitisation of People's Biodiversity Registers, training to the Biodiversity Management Committee (BMC) through Kerala Institute of Local Administration (KILA), maintaining a register for biological resources accessed, a local biodiversity fund, new ways to identify suitable BMC members, etc., are also suggested. Action on the request is yet to be taken.
- v. Amendments are required in Biodiversity rules for clarity and for ensuring smooth implementation of the rules.
- vi. Main objectives of Biological Diversity Act are conservation of biodiversity, sustainable utilisation, and fair and equitable sharing of benefits. Although the Board was established in accordance with international commitments in 2005, it does not have any permanent staff at the state level or adequate functionaries at the district level to ensure successful and effective implementation of the Act. The Board has three scientific officers who are appointed on deputation basis.

### 1.4.3 Recommendations

- i. Effective and targeted measures need to be taken to offset loss of biodiversity through economic activity of departments. Schemes for biodiversity conservation need to be included in sectoral schemes of all the 28 departments dealing with biodiversity, either directly or indirectly.
- ii. There is absence of an overarching land use policy for promoting sustainable use of bio resources. Implementation of a plan for the whole state can ensure balance in the use of land and restrictions on different areas, depending on sensitivity and proximity to lands of other use.
- iii. Biodiversity conservation is to be made a mandatory function of all levels of Panchayati Raj Institutions (PRIs) by amending the Kerala Panchayat Raj Act and Kerala Municipality Act. Revamping Local Self Government Biodiversity Management Committees with adequate powers and responsibilities is essential. World over it is recognised that involving communities living in and around natural resource rich areas in the management and use of the resources is an effective tool in conservation of the resources.
- iv. Industries including public sector undertakings which utilise bio-resources commercially, shall share a portion of their revenues, 0.1 to 0.5 percent annually. Section 7 of the Biological Diversity Act, 2002 and Rules 2008 needs to be amended accordingly.
- v. Andhra Pradesh Government, utilising the legal framework of 'Access and Benefit Sharing regulations conducted global E-auction for sale of high economic value Red Sanders by Indian and international bidders before accessing the biological resources. Successful bidders should pay 5 percent of the bid value to National Biodiversity Authority or State Biodiversity Board. Remaining 95 percent of total benefits were to be transferred to Biodiversity Management Committee at the local level. Use of ABS in this case apart from providing people a source of income, by engaging them in decision making encouraged them to ensure sustainable utilisation of genetic resources and changed the way companies utilise genetic resources. Forest Department while auctioning high value timber needs to resort to Access and Benefit Sharing (ABS) as done in Andhra Pradesh in the case of Red Sanders, as per Regulations of Access and Benefit Sharing 2014 of MoEF.
- vi. Synergy/coordinated functioning of all connected departments/agencies needs to be ensured in planning and implementation of schemes linked to biodiversity to promote sustainable development. Government needs to form Watershed Management Committees (WMC) for all major watersheds in Kerala. These committees shall be entrusted responsibility of supervision and monitoring of all activities concerned with biodiversity of the identified organizations /departments based on the Biodiversity Code of Conduct developed by Biodiversity Board. Water Resources Department/Soil Survey & Soil

Conservation Department may be the core department for coordinating functions of these Committees. Representatives of Biodiversity Board, Pollution Control Board, State wetland Authority, KCZM Authority shall necessarily be the members of WMCs.

- vii. Biodiversity Management Committees, a statutory body constituted at all LSGIs needs to be involved in all biodiversity conservation activities of Haritha Keralam, Suchitwa Mission, Literacy Mission, MNREGS activities, etc.
- viii. Schemes for agro-biodiversity conservation shall be incorporated in agriculture and allied sector departments' schemes and programmes.
- ix. Mandatory revision and updating of biodiversity reports in LSGIs are essential. Quinquennial consolidation of the reports needs to be provided in the rules. Adequate funds for the purpose shall be provided in the budget of LSGIs.
- x. Suggestions of Kerala State Biodiversity Board to Local Self Government department to constitute District Biodiversity Coordination Committees (DBCCs) under DPCs need to be considered by government.
- xi. The Board is a statutory body and needs to be strengthened with adequate human and financial resources including office infrastructure at the district level, to fulfill the mandate as per the Act.
- xii. The Kerala Biological Diversity Rules, 2008 needs to be amended based on suggestions made during sittings of subordinate legislative committees at Nelliampathy and Wayanad, for effective implementation of the Act and rules.

#### ***'An Eraviperoor Model'***

*The Eraviperoor Biodiversity Management Committee (BMC), constituted in 2015, is one of the models of multi-stakeholder partnership in local biodiversity conservation, sustainable management of water resources, promotion of renewable energy and enhanced livelihoods. The BMC has rejuvenated a tributary of the river Pampa, successfully recovered 13.5 acres of riverbank and did exemplary work in plastic waste management, with support from Government of India, civil society organisations and academic institutions. It has also successfully revived the traditional cultural practice of boat racing. With innovative ideas and an optimistic vision, the BMC also leveraged financial and technical resources and plans to become carbon neutral by 2020.*

### **1.5. Forests**

Kerala has three different kinds of geographical regions- the highlands, the midlands, and the lowlands. Highlands slope down from the Western Ghats, which lie at an average altitude of 900m. Midland lies between the mountains and the lowlands and is made of undulating hills and valleys. Lowlands comprise the coastal areas, made up of river deltas, backwaters, and shores of the Arabian Sea.

Until the middle of the 19th century, 70 percent of the geographical area of the state was dense forests. This came down to less than 50 percent by the 20th century. The forests were initially focused on for revenue generation, and so the concept of conservation had not quite reached the state. Slowly, protected areas were declared as the concept of conservation began to take form.

At present total extent of forests in Kerala is 11,524.411 km<sup>2</sup> (29.85 percent of the geographical area of the state) of which an extent of 9,339.186 km<sup>2</sup> is Reserved Forests; 284.218 km<sup>2</sup> is proposed Reserve and an extent of 1,900.979 km<sup>2</sup> is under Vested Forests & Ecologically Fragile Lands. These range from tropical evergreen, semi-evergreen, moist-deciduous, dry-deciduous, shola-grasslands to mangrove forests. Forests are the source of all the 44 rivers of Kerala, and they provide innumerable and invaluable ecosystem goods and services. There are about 1000 human settlements (both tribal and non-tribal) and private estates located as 'enclosures' within the forests in remote far-flung locations.

Despite their decisive role in sustainable development, forests of the state are subjected to substantial degradation. Commercial tree plantations (e.g. teak, eucalyptus etc.), cash crop cultivation (e.g. cardamom, coffee, tea, rubber, pepper etc.), cattle grazing, road construction, river-valley projects, urbanization, mass tourism etc. has considerably dwindled forest cover. Economic backwardness among forest-dependent communities continues to exert pressure on forests. Besides, encroachment, wildfire, proliferation of invasive species, poaching, mining, excessive firewood collection, non-compatible land-use, changes in cropping pattern, climate change induced ecosystem reactions etc. have accelerated degeneration, fragmentation and loss of vital habitats. Outcome of these ecological threats is visible in the extreme and erratic weather events, destructive cycles of drought and flood, human-wildlife conflict, diminishing livelihoods from forests, social unrest etc.

The devastating flood that wreaked havoc in Kerala during August 2018 and 2019 caused colossal damage to the social, economic, human, and ecological infrastructure of forested landscapes through loss of vegetal cover, wide-spread landslides, washing away of humus & topsoil, formation of gullies and ravines, reduction of overall water retention capacity etc. The poor and disadvantaged, particularly the tribal living in forest enclosures suffered maximum during the floods. A Post Disaster Need Assessment (PDNA) Report prepared by the state identifies this 'heightened vulnerability' of forest enclosures and calls for integrated and innovative approaches for protecting forested landscapes.

It is evident that securing the remaining forests of Kerala and improving their functional capacity is an imperative that needs to be given high priority. This is to be anchored on the theme of water security as all the rivers of Kerala have their origin in the mountains and forests have an unmatched role in ensuring sustained recharge of these rivers. The idea is all the more important as water scarcity is the single biggest threat looming over the world. There are enactments related to forests at the National and State level (Annexure V).

### 1.5.1 Forest Department

Objectives of the department include:

- To conserve and expand unique and complex natural forests of Kerala for posterity, in particular with regard to water, biodiversity, extent, productivity, soil, environmental, historical, cultural and aesthetic values, without affecting their ecological processes
- To increase the productivity of forest plantations through appropriate management interventions and the use of modern technology to meet the needs of the present and future generations
- To increase the tree cover both inside and outside the forest to meet the timber & non-timber demands of the society
- To conserve, maintain and enhance the existing gene pool of the state for posterity
- To reduce the pressure on the forest through appropriate interventions
- To meet the livelihood needs of tribes and other forest dependent communities
- To sustainably conserve and manage biodiversity-rich and sensitive ecosystems such as mangroves, sacred groves, coastal areas, wetlands, homesteads, private plantations, etc., which are outside the control of the Forest Department
- To improve the standard of living of the forest dependent tribes and village communities.

### 1.5.2 Governance Issues

- i. Areas in and around Kerala's forests are undergoing rapid land-use changes. This creates excessive pressure on forests and other biodiversity-rich areas. In these situations, economic imperatives – a critical component of development, often override conservation considerations. Policies and guidelines governing economic sectors may not contain effective provisions for minimising adverse impacts on forests and biological diversity. Experiences and capacities for effectively integrating ecological considerations in economic activities are also limited, at present.
- ii. At individual level many Protected Areas (PA) in the state have performed impressive roles in preserving species diversity. But at the landscape level their management effectiveness remains critically suboptimal due to



- relatively small size of most of the PAs,
  - incomplete representation of biota – both flora and fauna,
  - connectivity issues (e.g. Idukki Wildlife Sanctuary), and
  - prevailing and emerging threats including climate change.
- iii. In the current scenario, the existing PAs, already small sized and under considerable stress from various factors will lose their functional effectiveness and will have disastrous consequences for ecological and hydrological integrity of the state.
- iv. Progress in implementation of Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is very slow. The Act is as much about managing forest biodiversity at the grassroots level as it is about the recognition of historical rights of forest-dwellers. The Act has immense scope to simultaneously address the challenges of poverty and loss of biodiversity.
- v. There is a tendency to dump waste in the forest and also to pollute water bodies inside the forests. Examples are pollution by hotels, restaurants, resorts, and home stays by dumping waste near protected areas, and other polluters inside forests. There are no provisions in the Kerala Forest Act for punishing such offences and no program for educating tourism operators and tourists to keep the forest areas free of waste and pollution.
- vi. Section 29 of the Wildlife (Protection) Act, 1972 prohibits destruction/damage/diversion of the habitat of any wildlife in the protected areas. There is a lack of required awareness among different stakeholders about these provisions. The Fisheries Department, as part of an effort to increase productivity, resort to reservoir fisheries. But most of the targeted reservoirs form part of diverse natural forests and are pristine habitats of rich aquatic flora and fauna. Their sustainability will be under threat from the release of any species, especially exotic invasive species, and can lead to competition for food, space, and other hitherto unknown impacts.
- vii. Violation of the provisions of the Kerala Captive Elephant (Management and Maintenance) Rules, 2003 was dealt through penal provisions in the rules. But the new rules of 2012 do not have any provision to deal with violation of rules. Only option available at present is to adopt penal provisions of the Wildlife (Protection) Act. Provisions under the Wildlife (Protection) Act are stringent and may be unjustified, as punishment in the Act does not distinguish between wild and captive elephants.
- viii. There is provision for shifting tribal families from protected interior forests to protect them from wild animals, to fringes of forests, where human-animal conflict is comparatively low. This is done with their consent and they have to surrender their possession rights in the

interior areas. Similar provision for swapping of lands is not available for tribal families in the non-protected areas/reserve forests

- ix. As per Rule 9 of the Kerala Forest (Regulation of sawmills and other industrial units) Rules, 2012 amended in 2015, industries under the categories 1 and 3 to 7 started after 30/10/2002 are not eligible for license until assessment of availability of wood from all sources, by the advisory committees. Rule 3 requires submitting application for the license to run industries that existed before 30/10/2002 within 6 months of commencement of amendment rule of 2015. Those who failed to submit application in time could not attain license. Approval of request for new sawmills using only rubber wood is also not considered in the regulation.
- x. Ministry of Environment, Forests & Climate Change with support from the NGO, the Wildlife Trust of India, New Delhi identified seven critical elephant corridors in Kerala in 2017. Of the seven, one (Thirunelli–Kudrakote corridor) is already completely secured. Consolidation of remaining corridors at the earliest is essential.
- xi. There are many instances of wildlife-vehicle collisions which cause casualties to wildlife. Government of Kerala order G.O (Rt) No 204/2011/F&WLD dated 11/05/2011, regulates speed of vehicles to 30kmph when passing through protected areas. But the implementing agency for speed regulation is Motor Vehicles Department (MVD). MVD has no mechanism to regulate speed in forest areas. Roads in the forest areas are built and speed-breaks and signage installed and maintained by the Public Works Department (PWD). Multiplicity of agencies in the management of roads passing through protected areas creates difficulties for Forest department in regulating speed, despite government orders.
- xii. According to G.O (Rt) No.485/16/F&WLD dated 24/12/2016, the amount earmarked for protection of mangroves is Rs. 4000/ha. Protection of mangroves in private land is based on 'Promotion of Tree Growth in Private Land Act' as part of the Kerala Forest Act. Since mangrove areas are scattered in various Social Forestry Divisions, it is difficult to calculate financial aid in acres. Protection of mangroves could not be done properly due to difficulty in assessing compensation for protection.
- xiii. While granting clearance under the Forest (Conservation) Act, 1980 for the diversion of 28,588 ha. of forest land for issuing title deeds to regularise encroachment prior to 01.01.1977, Government of India had stipulated that all post 01.01.1977 encroachments are to be evicted. Regularisation of the pre 01.01.1977 is not completed as the equal extent of non-forest land need is yet to be located for afforestation and post 01.01.1977 encroachments are not evicted.
- xiv. Non-Timber Forest Products (NTFP) are estimated to contribute up to 60 percent of household income in some of the poorest rural villages. They generate employment, substantial income and enable rural communities to offset vulnerabilities including that of

- climate change. Despite its economic, social, and ecological significance, there are several critical issues affecting NTFP sector in Kerala. Distribution, quantum, and scale of NTFPs available in forests of the state and pattern of resource-use are inadequately known. Markets for NTFPs are poorly studied and remain largely opaque. Rights of collectors are tenuous and access regulations unclear in the absence of incomplete declaration of Community Forest Rights (CFRs). Collection practices are often not sustainable and value addition is weak. Moreover, primary collectors get only a small portion of the overall value of the produce.
- xv. Kerala has many Community Conserved Areas (CCAs) encompassing a broad spectrum of habitats and landscapes (e.g. sacred groves, mangrove forests, rookeries, turtle nesting sites etc.). These CCAs are critical for maintaining ecosystem services and biological heritage outside state-owned forests. Despite their critical role, CCAs are not given the recognition they deserve. They face threat from multiple quarters– from erosion of traditional values to competing land-use claims.
  - xvi. Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall strategy to help people adapt to adverse impacts of vagaries of nature including climate change. Healthy forests can play a vital role in maintaining and increasing resilience to climate change and in reducing climate-related risk and vulnerability. Ecosystem-based approaches are increasingly seen as part of overall adaptation strategies that can help facilitate multiple social, economic, and cultural co-benefits for local communities. Potential for integrating Ecosystem-based Adaptation (EbA) into regular development planning is yet to take root in Kerala. Similarly, in the planning process, there is a tendency to give priority to engineering solutions over natural ones.
  - xvii. India's Wildlife (Protection) Act, 1972 follows a 'terrestrial approach' for governance of protected areas. This approach is not found appropriate for coastal and marine areas where communities have overlapping stakes in the resources as they depend on these resources for their livelihoods. This results in conflict between considerations of conservation of coastal and marine areas and interests of local fisher-folk.
  - xviii. Many of the marine species are listed as protected in the schedules of Wildlife (Protection) Act, 1972. Still, illegal trade of scheduled species and their stranding and by-catch is often reported. Forest Department faces difficulty in gathering information regarding these issues leading to ineffective enforcement. There is a lack of institutional mechanism for coordination and concerted action.
  - xix. Joint Forest Management (JFM) institutions provide a baseline for mobilising forest-fringe communities to adopt sustainable forest management. Initiated during the mid-1990s, the JFM programme in Kerala has grown and expanded with 190 Eco development Committees and 400 Vana Samrakshana Samithies. The programme is based on an executive order issued by the Ministry of Environment & Forests in 1990, revised subsequently in 2000 and 2002.

- xx. Central Zoo Authority comes under the Ministry of Environment and Forests (MoEF) at the central level. In most states, management of zoos is with the Forest and Wildlife Department. Residents of the zoo are wildlife and they are protected under the Wildlife Protection Act. Zoo management requires expertise of wildlife and service of veterinarians. Wildlife management in zoos often do not follow requirements as per Wildlife Protection Acts and Rules.
- xxi. Forest governance in Kerala is at cross-roads as it faces conflicting priorities and complex challenges. Conservation institutions and community organisations that are engaged in biodiversity governance need enhanced capacities to handle realities of changing times.
- xxii. Quarries operating near the forest areas cause serious danger to wildlife and its habitat. Ministry of Forest and Wildlife (MoEF) insists that approval of National Board for Wild Life (NBWL) is required for quarries to function within 10 Kms of a wildlife sanctuary. In 2009, MoEF asked all states to fix Ecologically Sensitive zones (ESZ) around wildlife sanctuaries. GoK fixed this as 1 km and recommended it to MoEF. This is under consideration of the MoEF.

### 1.5.3 Recommendations

- i. Government needs to consider evolving a 'landscape-based land-use policy' for varied agro-ecological zones of Kerala with associated legal safeguards for minimising adverse impact of land-use change on forests and biodiversity.
- ii. ARC recommends that government needs to take urgent action for rationalising boundaries of existing protected areas through a technically robust and socially conscious process to cover more high value biodiversity areas under the Protected Area network.
- iii. A significant portion of Kerala's biological resources lies outside the administrative jurisdiction of Forest Department and is under grave threat in the absence of biodiversity mainstreaming policies governing these areas. These areas play a vital role in ensuring ecological linkages in the landscape. They are also relevant for climate change adaptation in providing scope for shifts in species distribution. There has to be programmes and schemes for the conservation of these areas along with required changes in the legal and policy framework.
- iv. Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 is a landmark legislation. It is important to harness its strength to transform local communities into responsible guardians of natural resources. Agencies like the Forest Department, Scheduled Tribes Development Department and Panchayati Raj Institutions (PRIs) need to create synergies and provide adequate capacity building support to Grama Sabha to discharge conservation responsibilities vested on them through timely and appropriate recognition of individual, community and developmental rights.

- v. Necessary provisions need to be incorporated in the Kerala Forest Act, 1961 for punishing dumping of waste and other pollutants inside forests and protected areas or officials may be delegated responsibility to take action against the polluters under the Environment Protection Act, 1986. Programs for educating tourism operators and tourists on the need to keep forest areas free of waste and pollution also need to be formulated. Kodaikanal in Tamilnadu is a very good example in this matter. Every shopkeeper takes the responsibility to intervene and prevent tourists from leaving any plastic material behind.
- vi. Releasing fish fingerlings of exotic varieties shall not be permitted in reservoirs inside the protected areas. Fingerlings of selected indigenous varieties only may be released in the reservoirs in forest areas and protected areas for ensuring sustainability of the rich flora and fauna in these areas
- vii. Kerala Captive Elephant (Management and Maintenance) Rules, 2012 needs to be amended to include appropriate penal provisions for dealing with violation of the rules.
- viii. Provision for resettlement from interior forests protected areas, with consent may be extended to non-protected areas.
- ix. Kerala Forest (Regulation of sawmills and other industrial units) Rules, 2012 amended in 2015 may be amended again to provide more time for submitting assessment reports, and one more chance to submit applications for the industries started before 30/10/2002. Provisions for liberalising commencement of new sawmill using only rubber wood and coconut trees shall also be included.
- x. Gap in coordination between Forest department, Motor Vehicles Department (MVD), Public Works Department (PWD) and the Police Department in dealing with issues connected to enforcement of regulations on speed of vehicles passing through protected areas needs to be overcome by holding quarterly meetings at DFO level.
- xi. As an interim measure government needs to consider providing financial aid for protection of mangroves in private land based on the 'Promotion of Tree Growth in Private Land Act as part of the Kerala Forest Act' according to the number of seedlings in the land if the area is less than 1 acre. For areas greater than 1 acre, the aid can be provided according to area. But as a permanent solution government needs to consider acquisition of all private holdings with mangroves by paying adequate compensation.
- xii. For ensuring survival of CCAs and their engagement in effective conservation of natural resources, government and the civil society need to give greater recognition to local community groups, grant formal recognition to CCAs as a category of protected area system, carry out comprehensive documentation, and provide necessary technical and financial assistance to people engaged in conservation. Legal and policy framework also needs to be revisited to provide security of tenure over the area that CCAs conserve. Certain CCAs, if agreed to by the communities, can be developed as Community Reserves under the Wildlife (Protection) Act, 1972. They could also legalise governance of CCAs by invoking the Forest

- Rights Act, 2008. Government needs to consider providing financial assistance for sustainable management of CCAs as part of conservation or rural development programmes.
- xiii. Equally important is the need for developing miniature forests in urban areas educational institutions that can reconnect urban-dwellers and youth with nature apart from the ecological benefits accrued from these green patches.
  - xiv. Government needs to expedite action in securing all the elephant corridors identified by GoI. This will help reduce issues of human-wildlife conflicts in some of the most disaster-prone areas of the state (Wayanad and Nilambur landscape) under forest cover.
  - xv. Issues in current understanding of range of NTFPs collected from forests, their classification, socio-economic value, technical packages, trade, market mechanisms and policy and legal contexts for their sustainable use and require adoption of a game-changing strategy. Government needs to ensure an increase in the share of the value of NTFPs accruing to the marginalised communities. This will have a strong impact on poverty and on the stability of democratic governance in some of the backward areas of the state. Interventions aimed at greater transparency in the commercial value of NTFPs and more equitable sharing of revenue shall incentivise forest-dependent communities and Forest Department to conserve biological diversity.

In view of the above, the following actions are suggested to streamline management of NTFPs from forests of Kerala:

- Listing out all important NTFPs sourced from forests,
- Assessment of total quantity and distribution of NTFPs in the forests,
- Assessment of scale, nature, quantum of current collection and use of NTFPs by both formal (e.g. Eco shops, FDAs, ST Federations etc.) and informal channels (e.g. middlemen),
- Developing sustainable harvesting protocols for NTFP collection,
- Identifying primary collectors and their capacity development through training,
- Developing / upgrading value addition facilities, and
- Identifying and tying-up with potential buyers for sale of NTFPs and instituting mechanisms for sustainable and fair trade.

As Kerala Forest Department is preparing to give further impetus to the JFM programme, it is important that the concept and practice of JFM be incorporated into the existing legal framework of the conservation sector particularly in sync with the provisions of the Forests Right Act,

2006. This will reduce operational conflicts and ensure long-term institutional sustainability of JFM programme.

Ecosystem-based adaptation needs to be integrated into development planning more explicitly to help people adapt to adverse impacts of vagaries of nature, including climate change. Government also needs to take steps to remedy the tendency to give priority to engineering solutions over natural ones in the planning process.

Possibility of sourcing private lands (through relocation and acquisition) as non-forest land for the regularisation of remaining areas of pre 01.01.1977 encroachment, needs to be considered by government. Along with this effort to evict all post 01.01.1977 encroachments (7,801.10 Ha) and to implement schemes for eco restoration of these areas need to be continued.

Integrating peculiarities of coastal and marine resource-use into the legal and policy framework of the conservation sector is essential for protection of coastal and marine areas. This needs to be given priority. Government needs to consider setting up a 'Marine Conservation Foundation' for providing a platform for coordination and joint action involving different stakeholders leading to better conservation, and thereby ensuring sustainable development. Inclusion of forest officials in KCZMA (Kerala Coastal Zone Management Authority), also need to be considered.

Government needs to consider bringing all zoos under the administrative control of Forest Department where wildlife experts and veterinarians are available to provide service.

Investing in developing capacities of governance institutions assumes more importance as participatory resource management (e.g. through JFM, Biological Diversity Act, 2002 and Forest Rights Act, 2006) has become an integral part of biodiversity governance.

More attention needs to be paid to emerging issues like managing forests for water, eradication of invasive species, mitigating human-wildlife conflict, addressing climate change etc. Changes in approach and focus need to be reflected in working plans and management plans of protected areas. Government also needs to promote solution based applied research in forestry research.



# Waste Management, Pollution, Health and Sanitation

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## CHAPTER 2

High density of population, unplanned urbanisation and resultant generation of unmanageable quantities of waste material is a challenge for people and government. Management of waste is of great concern in the day to day life of inhabitants of any area. Lack of systems for proper management of waste materials leads to unsanitary living conditions, affecting health, ecology, environment, flora and fauna, and inhibits sustainable use of natural resources. Majority of the 17 Sustainable Development Goals (SDGs) adopted by UN are linked to waste management showing its critical importance in sustainable development. Developing countries face more difficulties in management of waste produced due to many reasons. Rapid growth in urban population due to migration, changes in consumption habits in the urban areas, improper/absence of urban planning leading to haphazard development, are some of the major causes for accumulation of waste. It is also worth noting that there is no conspicuous urban-rural divide in the state as the whole of Kerala is an urban continuum with high density of population. These factors aggravate issues in waste management in the state. Waste is often dumped in open land or in drains, leading to health risks among the residents of the area, clogging of drains resulting in flooding etc. Level of pollution in an area affects not only the residents of that area, but the whole environment. Unchecked pollution can lead to other hazards in time. Health, sanitation, pollution, and waste management are all linked together. Hence sustainable management of all types of waste material is crucial for urban and rural areas. It is not enough that technology is available for solving problems regarding economic and social sustainability of waste management activities. Governance aspects of waste management are also crucial in ensuring effectiveness of technological solutions and participation of people.

Waste management is an intrinsic component of public health and sanitation. Nations across the globe have realised that existing solid waste management practices do not satisfy the objectives of sustainable development. Consequently, they have shifted/are shifting from unplanned to planned management of waste. In India, the subject is in the State List and is under the administrative and legislative jurisdiction of the states. The 74th constitutional amendment transferred responsibility for collection, treatment, and disposal of municipal waste from state governments to Local Self Government Institutions (LSGIs).

Acts, Rules, Procedures for management of waste, pollution, health and sanitation in the state is on Annexure VI



## **2.1 Implementing Agencies**

Responsibility for implementation of legislations and policies in the sector are of departments of Health and Family Welfare, Environment and Climate change, and Local Self Government Institutions. Kerala State Pollution Control Board, Food Safety Commission, Clean Kerala Company Ltd., Suchitwa Mission, Haritha Keralam Mission etc. are other agencies responsible for activities associated with these sectors.

### **2.1.1 Department of Health**

Vision of the department of Health is a 'state with quality health care, affordable and acceptable to all' and its mission is 'prevention, control and management of communicable, non-communicable and lifestyle diseases, disaster management, healthy pollution free environment, nurturing a mindset among the public to identify health needs and utilise health services by implementing various national health programmes'. The department aims to achieve its vision and fulfill its mission through primary health care based on the principles of equity, inter-sector coordination and community participation.

At present there is no comprehensive National Public Health Act. Ministry of Health and Family Welfare has started the process for developing a National Public Health Act. In Kerala, Travancore - Cochin Public Health Act, 1955 and The Madras Public Health Act 1939 are critical in addressing social determinants of health - sanitation, general hygiene, ensuring clean drinking water, vector control, etc. Panchayat secretaries are implementation officers of the Act. Health Officers of the Municipality and Corporation are responsible for implementation of Public Health Act in urban areas.

### **2.1.2 Department of Environment & Climate Change**

Environment Department was formed in 2006 by delinking 'Environment' from Science, Technology and Environment Department. Environment Management Agency was constituted in 2007 and was entrusted with implementation of subjects allotted to Environment Department, scrutiny of environment related proposals from departments/ organisations, and coordination and execution of schemes. In 2010, Environment department was renamed as Department of Environment & Climate Change and Environment Management Agency became Directorate of Environment and Climate Change in the same year.

### **2.1.3 Local Self Government Institutions (LSGIs)**

73rd and 74th amendments to the Constitution of India laid the way for a paradigm shift in governance system of the country. From a two-tier system of National and State governments, a new tier was introduced which could be broadly called local government. Many subjects are transferred to LSGIs. Public health, sanitation, conservancy, and solid waste management are

among the subjects transferred. In health sector, all institutions other than medical colleges and large regional specialty hospitals are placed under the administration of LSGIs. Sanitation and rural water supply are also the responsibility of LSGIs.

LSGIs lack infrastructure, manpower, technology, and funds to undertake effective management of solid waste. Kerala has formed Suchitwa Mission and Clean Kerala Company to support LSGIs in waste management. The state has a well laid policy on Solid Waste Management. Haritha Keralam Mission, an umbrella mission integrating the components of waste management, organic farming, water resources management etc., was constituted in 2016 in the state.

#### **2.1.4 Suchitwa Mission**

Suchitwa Mission is a Technical Support Group (TSG) in the waste management sector under the Department of Local Self Government. The Mission is responsible for supporting Local Self Governments technically and managerially, and also for conceptualising, planning and conducting workshops, training programmes, sector related studies, etc., in waste management. The Mission provides policy, strategy, planning, implementation, and monitoring support for solid and liquid waste management and is the nodal agency for implementing Swachh Bharat Mission and the Communication and Capacity Development Unit (CCDU) in the State.

Vision of Suchitwa Mission is 'Waste-free Kerala with an unpolluted environment, public hygiene and cleanliness with a better quality of life, which leads to improved health and general well-being, economic gains, better aesthetic surroundings and overall environmental upgradation.

#### **2.1.5 Clean Kerala Company Ltd**

Clean Kerala Company was formed to address issues faced by LSGIs in collection, transportation and processing of solid waste in the State. The company also addresses issues in management of non-biodegradable waste.

Vision of the Company is 'To serve the people of Kerala and protect the environment by scientifically managing non-biodegradable solid waste in harmony with the Local Self Government Institutions and embracing human values.'

Its mission is 'To create a waste free environment in the State by adopting scientifically proven methods to manage non-biodegradable waste holistically, by encouraging people's organisation, ensuring leadership of local governments, creating partnerships with entrepreneurs within a period of five years, and to make it sustainable thereafter'.

Clean Kerala Company provides technical and management support to Resource Recovery Facilities (RRF). Segregation of waste, operation of machines, bailing, etc., are attended by people selected from among Kudumbasree SHGs and trained in segregation, processing and selling of the final product. Shredded plastic from these facilities is used in polymerised road construction. The Company collects and hands over e-waste to authorised recycling companies

The Company handles collection and disposal of empty beer bottles and glass waste, collection of hazardous waste from Kerala Enviro Infrastructure Ltd., and endeavors to make the state waste-free through cleanup activities including removal of waste from the Ramsar sites - Vembanad, Sasthamkotta and Ashtamudi wetlands, e-waste dismantling facilities in all districts, material collection facilities in all government offices, operation and maintenance of all LSGI RRFs, waste collection facilities in supermarkets and malls, plastic recycling facilities in the three regions of the state, expansion of polymerised road construction, promotion of usage of plastic waste for soil stabilisation, recycling unit for glass management, establishment of tie-ups with furnace-based industries etc.

### **2.1.6 Haritha Kerala Mission**

Haritha Keralam is an umbrella mission integrating components of waste management, organic farming, water resources management, etc. Its ambitious outlook is to address issues of piling up of waste, impending droughts and health hazards due to consumption of pesticide treated vegetables, and agricultural dependency of the State. The Mission aims to integrate important and inter-related sectors through three sub-missions- waste management, organic farming and water resources management, household level segregation and safe disposal of organic waste through feasible options, rejuvenation of tanks, ponds, streams, rivers, etc., and promotion of organic agriculture. Under the Mission, efforts are taken to conserve and protect 44 rivers, 50,000 ponds and 60,000 wells, lakes, and streams in the state.

### **2.1.7 Kerala State Pollution Control Board**

Management of waste materials and monitoring of pollution levels in the state are done by the Kerala State Pollution Control Board. The Board assists other agencies, LSGIs, Suchitwa Mission, Clean Kerala Company Ltd, Food Safety Department etc., in enforcement of waste disposal through scientific methods, control and monitoring of pollution, monitoring of food quality, etc., aimed at the wellbeing of people of the state.

Kerala State Pollution Control Board (PCB) was formed in 1974, in order to control pollution of the state's water bodies. Its area of work was later broadened to include air and sound pollution, control of pollution related to chemicals, hazardous wastes, waste generated from battery production and their disposal, management of biomedical waste, solid waste, e-waste, etc. The board has offices in all districts and a central laboratory at Kochi. The various statutes administered by the Board are given in Annexure VII.

### **2.1.8 Commissionerate of Food Safety**

Commissionerate of Food Safety was constituted in Kerala in July 2009 under Section 30 of the Food Safety & Standards Act, 2006, to ensure implementation of the act, rules and regulations made under the Act. The Commissionerate has Enforcement and Analytical divisions.

Vision of Commissionerate is to 'work hand in hand with the community towards building Kerala into a model State renowned for its food safety and quality, thereby realizing the motto- 'Safe Food for a Healthy Life'.

## **2.2 Governance Issues**

- i. Acquiring sufficient land for setting up waste treatment facilities is one of the major hurdles faced by LSGIs. Opposition towards setting up of these plants, by the public is another major issue. Lack of awareness among the public is a factor that plays a significant role in resistance of the public.
- ii. Dumping of waste by people in public areas and absence of an effective mechanism to prevent it continues to be a huge challenge in waste management. Mechanisms currently used/practiced for collection of waste are not ideal and lack of proper system for disposal leads to public littering along sides of the roads and dumping into rivers.
- iii. Due to the increase in workload of the LSGIs- Grama Panchayats, Municipalities and Municipal Corporations, it is observed that required attention is not given to waste management.
- iv. Another issue identified is lack of interest of LSGIs in setting up wastewater or garbage treatment systems as they generate low potential dividends on investments. It can be seen that master plans of most of the cities/towns in Kerala do not include land for treating/ processing waste.

### **2.2.1. Other issues**

- i. Lack of institutionalisation and sustainable functioning of waste management mechanisms and management of waste at source. There are many standalone success stories in management of waste. However, no action seems to be taken for adaption/adoption/scaling up of successful models for extensive roll out. Disaster management and environment protection mechanisms are not integrated with a decentralised governance system in the state.
- ii. Compatibility of centralised schemes in a high population density state like Kerala is yet to be proven. Failure of few such projects, especially in the absence of forward linkages adds to skepticism about similar projects. Government needs to study the issue in detail before installing centralised solutions.
- iii. Absence or low capacity of septage treatment plants is another area of concern. Most of the septic tank type latrines in households in Kerala were constructed in the 1980s and are presently reaching saturation stage. Timely emptying of these tanks and scientific treatment of septage has emerged as a social and ecological issue. Unauthorised septic tank cleaners collect septage from households and often empty it in streams, rivers, and remote places

- iv. Panchayat Secretaries are implementation officers of Travancore - Cochin Public Health Act, 1955 and Madras Public Health Act 1939. Officers of the Health department have no role in implementation of these Acts. There is no coordination with the department of Health in the implementation of these acts. PHC and other medical facilities available with the LSGIs are not involved in implementation of the acts.
- v. Medical officers and Health Inspectors of the Primary Health Centers in urban areas do not have any role in the implementation of the Food Safety Act. Salary scale and service conditions of medical officers of health wing of urban local bodies are not attractive and lead to delay in filling up vacancies of doctors in the wing.
- vi. Absence of a uniform public health act for the entire state causes many challenges in community health care. The Health Services Department needs to have a unified state act replacing Travancore - Cochin Public Health Act, 1955 and Madras Public Health Act 1939, reflecting policies needed to deal with challenges in the sector.
- vii. Kerala State Pollution Control Board deals with management of waste and pollution control in the State. Issues regarding waste management need to be addressed rigorously to ensure cleanliness and hygiene in the State. It is noted that most of the pollution is attributable to unscientific/improper disposal of waste and lack of planning in handling and treatment of waste generated, especially in urban areas.
- viii. Noncompliance of laws, policies, and directions on collection, disposal, and treatment of waste by local bodies and the public is an issue to be addressed urgently. Lax enforcement of laws leads to non-compliance. Inordinate delay in finalising legal proceedings is a hindrance in taking quick and deterrent action against noncompliance. There are no provisions for levying of fines by any authority other than the courts.
- ix. In 2019, National Green Tribunal evolved the principle of 'Environmental Compensation' which in effect is a financial penalty on polluters. NGT directed the State Pollution Control Board to impose compensation on delinquent urban local bodies.
- x. The state does not have sanitary landfills and there are no successful facilities for segregation or reuse of demolition waste. At present, there is only one common biomedical waste treatment facility in the state- that too was set up amidst protest by the public against its location. Absence of these facilities is an issue in management of demolition, bio medical waste etc.
- xi. Absence of technical know-how at the local level for monitoring and maintenance of treatment and processing facilities reduces running efficiency of the installed facilities.
- xii. Low priority given to Research and Development (R&D) of efficient solutions for waste management is an issue that causes concern. Constant upgrading/adoption of technologies are a prerequisite for meeting emerging challenges in waste management. Absence of ability

- to adopt fitting solutions lead to dependence on obsolete technology and resultant failure in proper management of waste. Hence the importance for R&D of required technologies.
- xiii. LSGIs have not constituted environment/sanitation cells for exclusive monitoring of environment management activities/projects.
  - xiv. Each department has their own procedure for imposing penalties for violations. There are no specific guidelines for coordinated action between departments. Penalty fixed in the Kerala Panchayat Raj Act and the Kerala Municipality Act for violation of rules and regulations in management of waste is extremely low compared to penalties in the Environment (Protection) Act.
  - xv. Several gaps are noticed in provisions in the Kerala Municipality Act and Kerala Panchayat Raj Act concerning management of waste. The acts do clearly mention usage of incinerators. Burning of plastic is prohibited, but there is no provision for imposing a penalty by LSGIs. Method of disposal of sanitary wastes like diapers and sanitary napkins remains ambiguous.
  - xvi. Non availability of land for establishment of waste management facilities is a major issue in proper processing/management of waste. There is protest against the establishment of integrated waste management systems by people in many areas as there is no plant at present that can serve as a common model.
  - xvii. Lack of coordination between departments is another obstacle in ensuring efficiency in waste management systems. Effective management of waste requires inter departmental coordination and breakdown of departmental silos. There is no convergence between existing waste management systems and schemes like Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Ayyankali Urban Employment Guarantee schemes, etc. Institutional framework of Suchitwa Mission is not robust enough for them to lead and coordinate all activities linked to waste management.
  - xviii. There are no clear guidelines on handling and disposal of waste from the food sector. Lack of coordination between the Commissionerate of Food Safety and other departments engaged in waste management is an issue in ensuring proper management of food waste. A rule on management of waste generated by food stalls is yet to be formulated.
  - xix. At present, there is only one Food Inspector for each Assembly constituency, which is inadequate for effective coverage. Food safety assumes greater relevance in the background of present pandemic and recurring occurrence of contagious diseases.
  - xx. Absence of scientifically designed and managed slaughterhouses and violation of rules for running meat/butcher shops threaten the health of people. Owners of butcher shops usually ignore rules laid down for proper running of the shops.
  - xxi. Tests to determine presence of chemical adulterants in fish is available in Kerala and other states. Prevalent system for disposing fish in which chemicals are present, is to bury them in

- a dug-out hole. This practice is not safe and sustainable. Safer and more sustainable disposal of unsafe fish needs to be ensured.
- xxii. Narcotic substances in the form of toffees, drinks etc., seized, especially from premises of educational institutions are charged under provisions to tackle food adulteration charges. This creates wrong notions about these substances drugs as food items and puts an additional burden on food safety authorities.
  - xxiii. Waste management, pollution, health, and hygiene may function under a single umbrella to ensure coordination

### 2.3 Recommendations

- i. ARC recommends that selection and acquisition of land for establishing waste management facilities shall be done only after its suitability is examined by a technical team constituted for the purpose. The technical team needs to ensure that only required minimum land is selected for acquisition/ purchase. Terms of reference of the technical team shall include environmental suitability and legal suitability, apart from logistical issues. In order to reduce opposition from people and to build confidence in the local community, details of proposed plant, technology adopted etc., needs to be published. Only plants using the latest technology, and which are sustainable and suitable for the terrain/location shall be considered.
- ii. Density of population, steep rise in land value, previous experiences of unscientific and unhygienic waste dumping yards, possibility of fall in land value by the proximity to waste treatment plants are some of the reasons for opposition from people. Use of state-of-the-art technology, targeted and intensive efforts to develop public consciousness about the need for scientific waste disposal, establishment of model waste treatment plants, mixed use of decentralised and centralised waste disposal systems etc., will help to address these issues.
- iii. Lack of interest of local self-governments in setting up of wastewater or garbage treatment systems needs to be addressed. Setting aside an appropriate proportion of the budget mandatorily, for installation of waste treatment systems in every local body may be effective in solving this issue. Master plans of cities shall include land for processing waste.
- iv. A huge informal group is associated with the waste management sector. Sorting of waste, dismantling of e-waste etc., is done by this informal group. Better management of this informal sector and presence of decentralised units is needed to improve efficiency and ensure safety of waste management processes. Government needs to put in place procedures for authorising units of informal groups associated with waste management to help in ensuring safe, hygienic and efficient running of the units. Proper maintenance of these units can improve efficiency of the system to a large extent. Timely processing and treatment of large quantities of waste that arrive at the units needs to be handled in time to avoid accumulation of waste in the units.

- v. Segregation of waste generated needs to be the primary responsibility of the producer of waste. Proper facilities in selected locations in a town/city need to be ensured for waste collection, segregation, and disposal. This will minimise the issue of dumping waste in public places and along roadsides etc. LSGIs need to be vigilant in preventing the public from disposing of waste in public areas. Areas prone to dumping of waste can be under CCTV surveillance. Penalty for disposing waste in public areas needs to be reasonably high to act as a deterrent.
- vi. Septage to compost or septage to energy are options available in septage treatment. ULBs need to enhance capacity of existing septage treatment plants urgently to avoid the ecological disaster that is waiting to happen. Each district shall have septage treatment plants for facilitating septage treatment of rural/semi urban local bodies.
- vii. Appropriate technology for management of biodegradable waste needs to be evolved considering wet content and climatic conditions specific to the state. RVG Menon Committee report on appropriate technology for solid waste management in Kerala needs to be considered for adoption. Systematic procedure for collection of biodegradable waste from households through LSGIs, and its proper management till final scientific disposal needs to be evolved. Public and waste management agencies need to be trained in this regard. There are several examples of best practices. But a common protocol for aggregation, collection and disposal of waste throughout the state may be developed.
- viii. ARC recommends that clear guidelines need to be issued for proper disposal of sanitary waste as waste generated from use of diapers and sanitary napkins is expected to increase in the coming years. Government needs to amend Municipality and Panchayat Raj Acts based on Waste Management Rules (Solid, Plastic).
- ix. LSGIs need to give more importance to waste reduction, reuse, and recycling, rather than focusing only on waste disposal. Densely populated states like Kerala may not have enough space to accommodate centralised waste management facilities.
- x. In order to resolve the issue of lack of attention given to waste management by LSGIS due to multiplicity of responsibilities grass root level functionaries like Village Extension Officers, Health Inspectors, whose services are transferred to LSGIs need to be entrusted with the responsibility of waste management. Proper training on concerned acts, rules and technological innovations in waste management will also be beneficial to the employees to ensure proper management of waste.
- xi. Government needs to consider the relevance and scope of making Green Appraisal Protocol mandatory for all development projects/initiatives as part of decentralised planning and development process in the state.
- xii. Public health system to manage general hygiene, sanitation, ensuring clean water etc., needs to be made more effective. Unified Public Health Act needs to be enacted for Kerala.



Involvement of medical officers in the management of Public Health Act needs to be ensured by LSGIs and necessary amendments in Kerala Panchayat Raj Act and Kerala Municipal Act and rules shall be made.

- xiii. Government needs to consider creation of separate Public Health Wings under Health Standing Committees in grama panchayats, municipalities, and municipal corporations. Services of Medical Officers/Health Inspectors transferred to LSGIs and LSGI engineers shall be made available to these Public Health Wings. Kerala State Pollution Control Board, Suchitwa Mission, and Clean Kerala Company shall extend necessary support to LSGIs to address issues in connection with public health and waste management.
- xiv. Government needs to develop synergy in the functioning of urban health wing and department of Health Services and ensure that the salary and other perquisites of medical officers and health inspectors of urban local bodies are on par with that of similarly placed officials of the department of health.
- xv. To ensure smooth and effective implementation of Public Health Act, doctors of the Health Department in urban areas may be delegated powers. Other options like combining the Urban Health Wing with the Health Services Department may also be considered.
- xvi. Experts in the technical/scientific institutions need to be given longer tenures/posted on permanent basis to acquire expertise necessary for providing quality service. Assessment of staff strength, especially of technical personnel, against present roles and responsibilities of KSPCB needs to be carried out to strengthen licensing, enforcement and monitoring roles of the institution. Capacity building and periodic training of the officials for constant upgrading of skills and technical knowledge, needs to be given the importance it requires.
- xvii. Technical employees of LSGIs need to be given periodic training for up gradation of knowledge and skills. Courses offered under Green skill Development programme (GSDP) can be utilised for the same. Appropriate changes in qualification of technical personnel needs to be made in the rules for recruitment, so that only skilled and qualified persons are responsible for management of waste. Existing employees shall be re skilled through training, utilising GSDP or other appropriate short-term courses.
- xviii. Training of employees of LSGIs, Suchitwa Mission, and other agencies involved in waste management shall be done periodically and only trained employees be allowed to carry out waste management and pollution control activities.
- xix. Law enforcement mechanisms in waste management needs to be strengthened by amending relevant Sections in Panchayat Raj and Kerala Municipality Act. Sections 219 A- 219 U of the Kerala Panchayat Raj Act and Sections 326- 345 in the Kerala Municipality Act are on management of solid waste in Panchayats and Urban areas, respectively. There are sufficient provisions in the above Acts and other Rules for penalising and compounding violations in waste management. Considering the seriousness of health and hygiene aspects connected

with scientific disposal of waste, government shall consider increasing penalties for violations in waste management. The penalty amount shall be increased in the concerned Acts to impose the 'polluter pays principle' and each fine needs to be increased by 5-10 percent, at least once in five years. Agencies imposing penalty shall have uniform norms and all concerned agencies need to effectively work in tandem.

- xx. Section 219 F in Kerala Panchayat Raj Act regarding provisions for final disposal of solid waste, uses “കൈയാശിയുക” as translation of the word ‘disposal’. This needs to be replaced by “തരം തിരിച്ച്, പരിസ്ഥിതിക്കു ദോഷകരമാകാത്ത വിധം സംസ്കരിക്കുകയോ വളമാക്കി മാറ്റുകയോ ചെയ്യണം” (segregate and dispose without harm to environment or convert to manure)
- xxi. Offences, other than those covered under Sec.219 S, 219T, and 219 U shall have specific provisions for penalising and compounding by the Secretary of the Panchayat.
- xxii. Section 229 regarding common slaughterhouses shall incorporate court directions in this regard. Public protest and lack of availability of land are major constraints for the Grama Panchayats in the construction of slaughter houses. Proper systems for slaughtering animals for meat need to be implemented for ensuring hygiene and availability of good quality meat to the consumers. Proper shops for sale, compliance with regulations, maintaining hygienic environment, implementation of waste management systems and modern slaughterhouses are desirable changes that need to be made.
- xxiii. Government needs to strengthen Suchitwa Mission and make it capable of leading and coordinating all activities linked to waste management. There is a lack of technical manpower that can provide technological advice suitable for local bodies. The Mission needs to be restructured with skilled manpower. Services of sufficient number of environmental engineers and public health experts need to be made available to Suchitwa Mission as consultants or on contract. Time bound action needs to be taken to include/ adopt provisions of Central Acts and Rules in State Acts and Rules.
- xxiv. Food safety at the local level needs to be ensured through coordination with health department. Protocol and Standard Operating Procedures for synergy in the functioning of Food Safety department, Health department and LSGIs in waste management needs to be developed. Guidelines on the handling and disposal of waste from the food sector including food stalls need to be incorporated in the solid and liquid waste management rules. Scientific procedures for the management of waste generated by hotels and restaurants needs to be ensured.
- xxv. Government needs to consider the feasibility of reframing jurisdiction of food inspectors as Block Panchayats, for better synergy with LSGIs. Sanctioning of more posts of food inspectors or delegation of powers to medical officers in charge of Community Health Centre, after providing required training and capacity building for enforcement of Food Safety Act, is desirable.

xxvi. Effective implementation of financial compensations on local bodies, based on the principle of 'Environmental Compensation' evolved by the National Green Tribunal is desirable to ensure compliance of rules and for effective waste management. This is also needed for ensuring accountability of personnel and institutions responsible for management of solid and liquid waste, leading to sustainable development, protection of environment and control of contagious diseases.

xxvii. Sanitary landfills and facilities for segregation or reuse of demolition waste needs to be set up in all districts/regions. Common biomedical waste treatment facilities shall be set up in more locations by adopting latest and most efficient technologies.

xxviii. Government needs to consider mandating provision of land alongside project sites by major waste producers/polluters and setting up recycling parks in industrial parks. Uploading of land use maps can help in determining optimal positioning of sites for waste management. If land is not provided, transport of waste to longer distances becomes necessary for treatment and disposal and is not a sustainable model. Land deep inside large agricultural farms, plantations, Industrial estates etc., may be considered for centralised waste treatment plants for appropriate items of waste. Design and implementation of the projects needs to be done based on optimal solutions to speed up the process.



#### **Constructed wetland in slum area of Alappuzha**

*In the middle of the town of Alappuzha, wastewater from about 50 houses in Chathanad is collected and treated in a constructed wetland before discharging into the drain.*

#### **Continuous Ambient Air Quality Monitoring**

*Pollution Control Board is conducting continuous ambient air quality monitoring through seven real time ambient air quality monitoring stations in the State. The stations are at Plamoodu(Thiruvananthapuram); Kollam, Eloor (Ernakulam); M.G Road, Ernakulam-Central city; Vyttila bus stand, Ernakulam-commercial area, Palayam bus stand, Kozhikode and in Kannur city. Details are available at <https://keralapcb.glensserver.com/public/graph.html>. The Board also has 24 air quality monitoring stations under National Ambient Air quality monitoring programme and six stations under State Ambient Air quality monitoring programme. Results are available in Water and Air quality directory published by the Board since 2008. Board conducts monthly monitoring of water bodies at 64 stations in 42 rivers, 7 stations in six tributaries, four lakes, seven estuaries, five reservoirs, three canals, two ponds, and in 34 wells. Summary of results is available in the Water and Air quality directory, published since 2008.*

- xxix. Technical support systems need to be set up at local level as it is crucial in ensuring proper functioning of installed facilities for treatment of waste, according to policies and enactments in force and to achieve the intended objective.
- xxx. Research and Development (R&D) needs to be an integral process of scientific waste management. R&D institutions in the state need to focus on innovative solutions in waste disposal leading to use of appropriate technology for waste management in different regions. Science and Technology department needs to take up research programmes in collaboration with national /international institutions in this regard. R&D institutions shall work in close cooperation with the Local Self Government Institutions.
- xxxii. Establishing relationships between LSGIs and educational institutions will help in accessing required research inputs and assist the institutions to partner in user specific research. Designated officials in each department shall facilitate coordination between departments and educational institutions.
- xxxiii. Government needs to evolve systems for joined up functioning of all concerned departments /stakeholders in the sector. Appointment of nodal/liaison officers in each department/organisation may be a short-term solution to facilitate coordination between departments.
- xxxiiii. Units and individual workers in the informal sector in waste management are doing a service that is not easily replaceable. A system for mainstreaming and giving them legal acceptance can ensure safe, hygienic, and efficient running of these units. This sector needs to be made part of the chain for waste collection and management. Proper maintenance of these units can improve efficiency of the system, ensure timely processing and treatment of the large amount of waste that arrives at the units avoiding accumulation of waste in the units and will assist in hygienic handling of waste by these units.
- xxxv. Mechanisms currently in use/practiced for collection and management of waste need to be revamped/improved. Extended Producer Responsibility (EPR) needs to be implemented to ensure that a workable system for collection of waste material (mainly packing covers, and similar material) by the producers/sale points after the consumer uses its contents leading to a reduction in dry waste to be handled by LSGIs.
- xxxvi. Online database of State PCB on waste collection, disposal needs to be made more efficient.
- xxxvii. Transparency in the system for all activities connected to waste management including voluntary disclosure of documents related to procedures, orders, permits, agenda and minutes of meetings etc., of all the concerned agencies and departments including State PCB will help in reducing complaints regarding delay in approval etc., and minimise corruption.



# Energy, Industries, Infrastructure and Tourism

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## CHAPTER 3

### 3.1 Introduction

Kerala consumes around 20038.25 million units of electricity leading to 16030 tonnes of CO<sub>2</sub> emission. Considering environment sensitivity of the State, the State Government gives top priority in enhancing energy efficiency in all sectors. Kerala generates power from four main sources – hydel, thermal, solar and wind with hydel as the main source. Kerala has 24 hydroelectric projects with a total capacity of 2107.91 MW, two thermal projects with 234.6 MW capacity, three solar plants of 80 MW capacity and a wind farm of 2 MW capacity. In recent years, government has taken several steps to promote solar power generation.

Domestic and commercial sectors account for a major share of consumption of electricity in the state. Past trends in consumption indicates high growth in demand for both sectors, especially the domestic sector. Kerala's energy consumption is estimated to increase by approximately 52 per cent above current consumption over the next 10 years. (Economic Survey 2017)

Industrial Policy Resolution of 1948 laid the foundation in India for defining the policy that separates the role of State as an entrepreneur and an authority. This was followed by the implementation of the Industries (Development & Regulation/) Act, 1951, also known as the IDR Act. This Act defines guidelines for implementing Industrial Policy and allows Union Government to invest directly into desired channels of activity in the industry. Industrial policy since 1991 includes more means for facilitating development in the sector rather than enforcing permits and controls. This policy shift has led to the abolition of industrial licensing in all but 4 industries, where there are concerns related to security, strategy and the environment. These industries are:

- Electronics, aerospace and defense equipment- all types
- Industrial explosives
- Specific hazardous chemicals, and
- Cigars, cigarettes, and manufactured tobacco substitutes

The Micro, Small and Medium Enterprises Development (MSMED) Act, 2006 stepped up investment limit in plant and machinery to Rs 5 crore for small enterprises, and Rs 10 crore for medium enterprises. Since then, government pruned the list of items reserved for manufacture

by the MSME sector and has finally reached a position where no item is reserved. Similarly, the number of industries reserved for the public sector has also come down.

Steps taken for Ease of Doing Business include introduction of online application for Industrial License (IL), round the clock Industrial Entrepreneur Memorandum (IEM) at eBiz website, increase in validity of Industrial License from 2 to 3 years with provision for extension of validity up to 7 years, simplification of application forms, etc.

Kerala Industrial and Commercial Policy, 2018 aims to transform Kerala into a vibrant investment destination with an effervescent entrepreneurial society through inclusive, eco-friendly and sustainable economic growth. The policy envisages creation of employment opportunities with reasonable wages. Kerala aims to become one of the top 10 ranking states in the country as far as Ease of Doing Business is concerned.

Kerala MSME facilitation Act 2010 (16 of 2019) and rules dated 06.01.2020 is one of the key initiatives under Ease of Doing business (EoDB) Reforms of Industries & Commerce Department, for establishing and operating MSME units in Kerala. It is part of online single window clearance mechanism for MSME units and provides introduction of self-certification, parallel processing of applications by various departments, deemed approvals post mandated timelines, elimination of redundant clearances and spot approval for registration through nodal agencies, which are the single window board at State, District and Industrial parks.

Infrastructure development of the state is at a new phase with financial support from KIIFB, World Bank and other multilateral funding agencies. National Highways Authority of India (NHAI) recently cleared NH development works from Thalappady in Kasaragod to Kazhakkootam in Thiruvananthapuram. Other major road works under Kerala State Transport Project (KSTP) are also progressing. Kerala's Semi High-speed Rail project that may cost around Rs.63,941 Crore is also cleared by government. The Second and Third Phases of Metro project in Kochi is progressing. GAIL Pipeline project is nearing completion. Coastal road projects, Hill highway, Vizhinjam Container Terminal etc., are other major infrastructure projects presently progressing in the state. These major infrastructure development projects may improve the economy and employment generation potential of the state but raises socio-environmental and sustainability concerns. Construction materials, especially natural resources like rock, sand and earth required for these projects is to be found from within the state itself.

Kerala, mostly unknown in the tourism circuits, started emerging as a tourist destination in the 1980s through aggressive marketing campaigns by the department of Tourism. The state transformed itself into a popular destination for domestic and foreign tourists in the succeeding decades. At present, Kerala is considered as one of the tourist destinations with highest brand recall. The tagline 'Kerala – God's own Country' has evolved into a global super brand. As per statistics published by the department of Tourism, 10,96,407 foreign tourists (an increase of 0.42 percent over the previous year) and 1,56,04,661 domestic tourists (an increase of 6.35

percent from previous year) visited Kerala in 2018. Foreign exchange earnings from the sector were 87,64.46 crores and total revenue (direct and indirect) from the sector was 3,62,58.01 crores in 2018.

### **3.2. Organisations in the sector**

Departments of:

- Kerala State Electricity Board Ltd
- Energy Management Centre
- ANERT
- Industry and Commerce
- Mining and Geology
- Public Works
- Town and Country Planning
- Transport
- Tourism

### **3.3. Governance Issues**

#### **3.3.1 Energy**

- i. Conservation of energy and projects for bridging the gap between energy production and consumption demand are given top priority. But the mechanism for ensuring compliance with rules and regulations is quite weak, making infructuous efforts at conservation and closing the gap between consumption and production of electricity.
- ii. Sufficient storage is not available in the grid to absorb excess generation of renewable sources of energy like solar, wind etc., during periods of high generation and release of stored energy to the grid once the wind or sun recedes, and renewable energy supply stops.
- iii. Availability of land is a major constraint in expanding generation of power from solar/wind and other non-conventional sources of renewable energy. This has given rise to the need for land neutral projects like roof tops, floating solar plants, etc.
- iv. Kerala Solar Policy, 2013 does not fully reflect radical changes happening in the renewable energy sector. There are no open access charges for solar projects supporting wheeling of power within the State. Solar Procurement Obligation (SPO) is mandatory for commercial consumers and LT industrial consumers and for all HT/EHT consumers in a phased manner. These provisions are inconsistent with the provisions of the Central Act. There is a lack of legal framework in solar power generation, distribution etc.

- v. Seasonal and diurnal variations in consumption of electricity in the state are still very high despite campaigns to promote demand side management.
- vi. Implementation of Energy efficiency based on G.Os, notifications and guidelines issued under the Energy Conservation Act, 2001, requires inter-ministerial and inter-departmental coordination and an effective feedback mechanism through the Energy Management Centre.
- vii. Energy audit is mandated as per GO (Rt) No. 2/2011/PD dated 01/01/2011 of Government of Kerala and is to be carried out once in 3 years. Very few consumers comply with the requirement and there is no penalty for noncompliance.
- viii. Energy Conservation (Energy consumption) Standards for Equipments and Appliances) vide G.O (P) No 21/2015/PD dated 11/05/2015 permits inclusion of energy efficient appliances/ equipments in the Schedule of Rates (SoR) to remove objections, if any for the procurement of star labeled appliances even when on star labeled appliances are available at lower rates.
- ix. Agriculture tariff is lower/subsidised and energy efficiency is not often considered as a required parameter by the Agriculture department/ DISCOMs (power distribution companies).
- x. Department of Electrical Inspectorate was responsible for issuing sanction directly to the applicants for constructing buildings under overhead lines that have sufficient clearance, as per The Indian Electricity Rules, 1956. With the introduction of Regulation 60 and 61 of the Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010, construction of buildings under any existing overhead lines is no longer permitted.
- xi. Regulation 36 of the Central Electricity Act defines high rise buildings as buildings that have a height of more than 15 meters. KMBR have specified the same as 16 meters and the National Building Code as 15 meters. This leads to difficulties in segregating high-rise buildings on the basis of KMBR.
- xii. There is lack of clarity in the role and functions of ANERT.
- xiii. Power policy and laws governing the power sector require relook to achieve sustainable goals in the sector.

### 3.3.2 Industries

Physical features of Kerala like its geographical position in the political map of India, size, large number of rivers and other water bodies, unique position between Western Ghats and Arabian sea etc., other unique features like high density of population, urban- rural continuum etc., and absence/shortage of industrial raw materials, make the state less attractive for investment in large industries.

- i. Litigations against decisions of the DIC in allocation and management of land in industrial estates and parks ties up land in court cases and prevent utilisation of land for development of industries and resultant creation of employment.



- ii. Optimum utilisation of land acquired by government for development of industries is often delayed for absence of viable projects and also from closure of failed units.
- iii. There are several institutions in the state like Kerala State Industrial Development Corporation (KSIDC), Small Industries Development Corporation (SIDCO), Kerala State Industrial Enterprises Limited (KSIE) besides the department of Industries and Commerce for promotion of industries. Functional area and operational outcome of the institutions are the same. There is no synergy between these organisations in functioning.

### 3.3.3 Mining and Geology

Mining is seen as a destructive activity and hence it is imperative for government to take steps for conservation, preservation and selective utilisation of mining resources to ensure sustainable development.

- i. Mining and Geology Department was re-organised in 1997. Since then, mining industry has grown manifold and revenue generated by the department increased from Rs. 4 crores in 1997-1998 to Rs. 171 crores in 2018-2019. Inadequacy of human resources makes it difficult to curb illegal, mining, transport and stocking of materials. Revenue in 2018-19 is only Rs.171 crores which is far from what could be collected, considering the volume of mining activities in the state. This is not a matter of only revenue collection, but of concern in enforcement of regulations for environmental protection.
- ii. Ordinary earth was listed as a minor mineral in 2012 and sanction from the department is required for transport of ordinary earth dug out for construction of buildings. The department of Mining and Geology receives an average of over 6500 applications for transport requirements in a year, but is unable to provide timely service to the public due to constraints in human resources and availability of required IT solutions.
- iii. Quantifying mined minerals is an important parameter to assess revenue loss, but the department has no surveyor or equipment to carry out surveys. Measurements are currently done using tapes or with the help of Taluk Surveyors, in important cases.
- iv. Data of all vehicles registered in the country is available in the portal of Motor Vehicles Department. But Mining Department insists that lorry owners enroll vehicles in the department portal for ePass. This creates an additional layer of registration.
- v. Any mining using explosives comes under the Mines Act. This Act as well as the Metalliferous Mines Regulations stipulates that there shall be qualified persons deployed in each mine in the position of Mines Manager, Foreman Blaster, Mate, etc. In Kerala, there are no mining engineering courses and hence the mine owners find it difficult to appoint qualified persons from within the state. Most of the persons appointed are from other states and that too, mostly on a temporary basis or only on paper.

- vi. Mining is an activity that faces resistance from the public due to noise, dust, water pollution, etc. At least 5 licenses are required for carrying out mining. For any developmental activity, mining is unavoidable. Violations of provisions of the licenses are rampant and inability of the government machinery to check violations is a governance issue in sustainable development and needs to be addressed.
- vii. The Kerala Riverbank Protection and Regulation of Sand Mining Act 2001 and Rules 2002 are introduced to control sand mining. Government has also enacted the Kerala Minerals (Prevention of Illegal Mining, Storage and Transportation) Rules, 2015. Penalty provisions in both the rules are different. This issue needs to be addressed.
- viii. Identification of different types of sand is difficult as the sand mined from paleo-river channels has the same physical characteristics as that of river sand, and the same is the case with imported river sand. Interception of vehicles may not be successful in preventing illegal mining as identification of the sand itself is a hurdle.
- ix. Single window clearance systems for industries do not have mechanisms to provide clearances under Environmental Protection Act.

### 3.3.4 Infrastructure

Majority of Infrastructure development projects in the state, whether large or small, are not implemented as part of a long term plan or vision. Processes followed for formulating infrastructure projects are usually opaque and prime stakeholders viz the people who are intended beneficiaries of the project have no say in the need of the project or are aware of its benefits.

- i. Spatial plans, in most cases, are confined to administrative boundaries and are not addressed in the Town and Country Planning Act, 2016. This creates issues in planning for Industrial corridor development plans, plans for the conservation and development of Western Ghats, etc.
- ii. Master Plan and detailed town planning scheme, prepared to promote and regulate development of a local body with a long range vision is prepared based on the Town and Country Planning Act, 2016. But the scheme is not linked to the Panchayat Raj Act.
- iii. Land Registration Act deals with ownership of land, but does not mention anything about use of the land, creating difficulties/ inconvenience to owners. For example, purchasers of a land may not be able to construct the type of building she wants to construct due to a different land use proposed in the master plan of the area.
- iv. Development proposals in the plans do not stipulate a time frame for realisation of proposed projects. Land Acquisition Act, 2013 stipulates that once a land is notified for acquisition it shall be acquired within a specific period.

- v. District Planning Committee constituted under Section 53 of the Kerala Municipalities Act, 1994 is authorised to prepare Development Plan for the district, but procedure for preparation of plan is not included in the Act. District Plan has no reference to perspective plan and execution plan in the Town and Country Planning Act, 2016.
- vi. In the Kerala Panchayat Raj (issue of licenses to factories, trades, entrepreneurship activities and other services) Rules, 1999 mining is not included as an item for which license is to be obtained. But government orders under this rule insist on permits/leases from LSGIs for quarrying granite and building stones. There is ambiguity on whether licenses are required for mining of other minerals.
- vii. Provisions in the Kerala Conservation of Paddy Land and Wetland Act, 2008 often have an overriding effect on Master Plans prepared for an area. This results in the side-lining of proposals in the Master Plan. Master Plans usually include proposals of land use considering development prospects of the local body and existing developments and are the result of widespread consultation process.
- viii. The Kerala Municipality Building Rules, 2019 and the Kerala Panchayat Building Rules, 2019 provide that construction of a building in a plot shall be as per Building Rules. The construction also has to fulfill regulations of Fire and Rescue Department, Pollution Control Board, National Highway Authority, Coastal Zone Regulation Authority, Ministry of Defence, Airport Authority, Electrical Inspectorate, Railways, Kerala Urban Arts Commission, Archaeological Survey of India, etc. Multiplicity of clearances, governed by scattered legislations, rules and guidelines may result in noncompliance with certain instructions and cause distress to the land owner. Absence of uniform building rules covering all the required clearances and single window clearance is a governance issue in sustainable development in the infrastructure sector.
- ix. Increasing price and acute shortage of major construction materials like sand, stone and other aggregates have pushed up the cost of highway construction/maintenance.
- x. Permission is required from the department of Mining to take earth from burrow pits for land filling. Permission is often delayed, thereby slowing down progress of development projects. Hot mix asphalt plants are necessary for any big road project. But public protest is quite common while installing the plants.
- xi. Kerala, a long and narrow coastal state with high density of population faces enormous challenges in allocation of land for transportation corridors. Kerala is one of the few states where all the four modes of transport (road, rail, water, and air) are available and are actually used.
- xii. Unplanned infrastructure development in the state has led to growth of roads from country roads to state highways and even to national highways and is an example of lack of long-term

vision and adhocism in infrastructure development. State has not planned for a green field 6 lane highway instead, what is done is to develop an 8 metres country road to 12 metres and to 36 metres within a time span of 40 to 50 years. At present most of these roads have no room for further widening.

### **3.3.5 Tourism**

- i. Department of Tourism has initiated projects to provide basic amenities at places where tourists arrive in large numbers. Many of these areas are on the banks of lakes, rivers and on the seashore. Getting CRZ clearance for these projects is usually delayed because of location.
- ii. In many cases, land of other departments is allotted for tourism projects causing delay in handing over and obtaining permission to use the land.
- iii. Immense potential of Farm tourism and Health tourism in the state is yet to be fully exploited.
- iv. Indiscriminate licensing and failure of regulatory agencies causes concerns in houseboat tourism in Alappuzha. Number of house boats operating in Alappuzha and nearby is way above the carrying capacity of the Ramsar site of Vembanad Lake. Pollution caused by these boats destroys the fragile ecosystem of Vembanad Lake and Kuttanad. Kerala gets awards for responsible tourism. Is it correct to make sweeping statements unless we pinpoint the measures that are not observed to make them observe the necessary regulations
- v. Grid expansion plans usually do not integrate future development potential of renewable energy sources and results in significant generation losses and revenue losses.

## **3.4 Recommendations**

### **3.4.1 Energy**

- i. Periodic audit of energy needs to be made compulsory for power intensive industries and energy conservation measures needs to be enforced in government buildings. The building plans must take in to account flow of light and air to avoid excessive use of ACs and fans etc
- ii. ARC recommends that government needs to create more storage for power generated from solar/wind and other emerging sources of renewable energy, within a specific period. It may be made mandatory to establish sufficient energy storage for projects above a level decided by government.
- iii. Floating Solar Photovoltaic (FSPV) power project is a new and emerging concept in India and can be an option for Kerala. A PV system can be installed on water bodies like lakes, saltwater, lakes, reservoirs, irrigation ponds, small water sources, dams, rivers, etc. Except for float design, tracking mechanism, internal cabling, and all other components, is the same as those used in conventional solar PV installations.

- iv. ARC recommends that government needs to revisit solar policy/frame a new policy for non-conventional renewable energy considering fast paced developments in the renewable energy sector. Government also needs to study the potential of all sources of renewable energy including biomass, technologies based on algal oil, biofuel, waste to energy etc. According to Biomass Resource Atlas of India, Kerala has a potential of 501 MWs of power generation based on biomass. However, to ensure sustainable development and sustainable use of biomass/ biofuel as sources of energy, government needs to address challenges in assessing and projecting resource availability of biomass/ biofuel in the rapidly changing land use pattern of the state with increasing diversion of agricultural land to land for non-agricultural use and land under food crops to cash crops. Therefore, necessary legislations and regulations need to be framed in the non-conventional renewable energy sector for faster development of the sector.
- v. Household production of solar energy and integration with the general grid shall be incorporated in the Building Rules as part of construction activities in the state.
- vi. ARC recommends that use of renewable energy need to be made mandatory to all power intensive industries/buildings and households. 25 percent of energy needs to be mandatorily from renewable sources.
- vii. Considering the seasonal variation in solar power generation, providing appropriate incentives/implementing net metering can help in achieving a target of meeting 10 per cent yearly demand for large establishments from solar.
- viii. Government shall consider creation of a fund for giving support and encouragement to universities for R&D in developing energy efficient solar panels and green technology. Technological University may take the lead role in R&D projects for improving energy efficiency and conservation of energy.
- ix. The state needs to develop an advance plan for production of renewable energy from non-conventional sources and support it through advanced grid planning leading to reduction in the construction time in optimal management of power generated.
- x. Power policy and laws governing the power sector require relook to achieve sustainable goals in the sector. Generation, storing, and distribution of green energy needs to be part of state policy. Provisions to discourage wastage of power shall be included in the policy. Periodic audit of energy needs to be made compulsory for power intensive industries. Energy conservation measures shall be enforced in government buildings. Provision to address violations needs to be incorporated.
- xi. Campaigns to promote demand side management of energy needs to be strengthened. Government shall also develop/adopt better technology for ensuring efficient use of energy. Electric vehicles may be promoted as grid balancing devices.

- xii. Energy Management Centre shall be placed in a pivotal position in conceiving and implementing adaptable measures for maximum energy efficiency and conservation.
- xiii. Energy Management Centre needs to develop a roadmap for achieving sustainable development goals by facilitating inter-ministerial and inter-departmental coordination. A committee chaired by the Chief Secretary may be constituted to monitor energy efficiency and conservation activities in the state.
- xiv. Energy mapping and auditing needs to be implemented by LSGIs so as to prepare sustainable energy utilisation and distribution methods all over the state. Lacunae in conduct of energy audit as mandated by government order of 2011, needs to be addressed. Government needs to impose penalty for noncompliance of energy audit for ensuring conservation and safety in use of energy.
- xv. There is lack of clarity in the role and functions of ANERT. Government needs to redefine the role of ANERT to enable development of effective alternatives in energy sector especially for remote rural villages, tribal settlements etc. Government also needs to consider a joined-up functioning/merger of Energy Management Centre and ANERT for improving operational efficiency.
- xvi. LSGIs are the implementing agencies of Energy Conservation Building Code (ECBC) notified vide GO (P) No. 3/2017/PD dated 11/04/2017. ECBC needs to be included in the Kerala Municipality Building Rules (KMBR) to enable municipalities to take actions in accordance with the Order.
- xvii. Necessary amendments needs to be made in the Stores Purchase Rules to reflect permission given in Energy Conservation (Energy consumption) Standards for Equipments and Appliances) vide GO (P) No 21/2015/PD dated 11/05/2015 the government order of 2015 for inclusion of energy efficient appliances/equipments in the Schedule of Rates (SoR) .
- xviii. Monitoring and verification of installation of energy efficient agricultural pumps needs to be carried out by Agriculture department and Distribution Companies (DISCOMs) to ensure conservation and efficient use of energy. Government needs to ensure that electricity connections at subsidised rates are given exclusively for agriculture purposes. Government also needs to consider pumping subsidies directly to the farmers through Agriculture department instead of giving tariff.
- xix. Considering density of population of the state, government may take up the issue with Government of India and request to direct Power Grid Corporation of India Ltd (PGCIL) to mark available clearance for constructing residential buildings for applicants under the lines that are maintained by the PGCIL. The Department may be permitted to directly issue sanctions for applications that have sufficient clearance, as was done previously.

- xx. Necessary steps may be taken to fix the height of high rises as 15 meters in the KMBR, 1999 to address issues in segregating buildings as high rise for electrical installation due to differences in stipulated height of high rises in central and state acts.
- xxi. Household production of solar energy and integration with general grid shall be incorporated in the Building Rules as part of construction activities in the state.
- xxii. Power policy and laws governing power sector require relook to achieve sustainable goals in the sector. Generation, storing, and distribution of green energy needs to be part of state policy. Provisions to discourage wastage of power shall be included in the policy. Periodic audit of energy needs to be made compulsory for power intensive industries. Energy conservation measures shall be enforced in government buildings. Provision to address violations needs to be incorporated. ARC recommends that use of renewable energy need to be made mandatory to all power intensive industries/buildings and households. At least 25 percent of energy shall be mandatory from renewable sources. Green building protocol needs to be encouraged in the state. Government shall consider mandating adoption of Green building protocol in the construction of all new government funded buildings.
- xxiii. Energy efficient electric appliances with specific standards alone should be made available in the market and use of standard appliances to be made mandatory. Government buildings, buildings under public funding should have only star rated appliances. Rules to regulate the usage should be incorporated.
- xxiv. Changes required in the environmental regulations for enhancing production of green energy needs to be brought to the notice of the Union Government. Government also needs to address hurdles in availability of land for producing green energy in the state.
- xxv. Linkage between Department of Power, KSEB, ANERT, Energy Management Center, Electrical Inspectorate and Local Self Government Institutions needs to be ensured to achieve Sustainable Development Goals.

### **3.4.2 Industries**

- i. Antipathy of the public towards manufacturing enterprises, mainly due to pollution hazards, is a general issue which needs to be dealt with through appropriate IEC methods.
- ii. The state needs to concentrate on small and medium enterprises especially in food processing industries, IT hard wares, electronics, tourism, organic agriculture products, etc., in MSME sector that are suitable for industrial development of the state.
- iii. Government needs to create a facilitatory environment for these industries to flourish by providing required clearances, licenses, and other support systems through Invest Kerala Portal and Kerala Single Window Interface for Fast and Transparent Clearance (K-SWIFT).

This assumes more importance in the wake of expatriation of large numbers of skilled Keralites from various parts of the world. ARC suggests a penalty of Rs. 3000 per day after permissible period of implementation as per the agreement. Similarly, mortgaging of industrial land for bank loans should be avoided as this provision is widely misused.

- iv. Land available with industrial units of the state needs to be effectively utilised through joint venture projects under public sector control/ with private participation/PPPs or through collective investment by labour or employees' cooperatives.
- v. Comprehensive study needs to be undertaken covering all industrial estates including industrial parks promoted by KINFRA in the state to assess present performance of these entities compared to objectives at the time of inception. Infrastructural facilities like availability of sufficient water, power, logistics, optimum utilisation of land, facilities for proper disposal of industrial waste, safety measures etc., shall be included in the study. The study may be entrusted to Centre for Management Development.
- vi. Introduction of the Investment Promotion and Facilitation Act, 2018 and K-SWIFT online single window system are welcome steps of the state government in promotion of sustainable industrial development. Government needs to monitor progress in implementation of the Act and take steps for development of Invest Kerala Portal.
- vii. There are a number of institutions in the state like KSIDC, SIDCO, KSIE etc., with same operational outcome and functional area. They shall be brought under one umbrella organisation with effective leadership and statutory responsibilities as an incorporated body.

### **3.4.3 Mining and Geology**

- i. Government needs to conduct work study urgently to assess workload based on mandated duties and responsibilities of the Mining department. Government may also consider bringing Mining and Geology Department under the department of Environment. Strengthening of the Department with engineers, diploma holders and ITI holders is desirable.
- ii. Intensive training for at least a month needs to be given to officials of the department for the use of advanced technology like drone mapping, use of differential Global Positioning System (GPS), use of new mapping technology, use of different software, etc. ILDM may be entrusted with the task of training. Mining done by observing relevant rules and regulation and using the latest available technology in the sector are necessary to ensure sustainable mining and to create a sense of safety to the public.
- iii. Systems need to be strengthened to check illegal actions of officials including acceptance of bribes, to avoid harassment and ensure protection of honest officials. Transparency in the functioning of the department through use of IT tools shall be done. Transparency in the functioning of the department needs to be ensured through increased use of IT tools.



- Amendments in the Kerala Minor Concession Rules has imposed number of additional conditions for mining without assessing ability of the department for enforcement of the conditions. ARC recommends that government needs to revisit rules and regulations for operating quarries and ensure compliance and transparency in enforcement of regulations.
- iv. Mining department shall access data of vehicles registered in the country through web service of Motor Vehicles Department to make the process of obtaining e-pass easier for vehicle owners and avoid enrolling vehicles in the Mining Department portal for ePass by the lorry owners.
  - v. One of the areas that require policy change is regarding maximum carrying capacity of vehicles for transporting minerals. A policy should be made in this regard by the Government, involving all stakeholders. Use of GPS in trucks carrying minerals can check movement of trucks and prevent the fraud of carrying more than load allowed in the pass. This is essential to prevent revenue loss.
  - vi. Drones are increasingly being used for 3D mapping. Excess extraction of minerals can be checked if government makes it a policy to conduct drone surveys before granting mineral concessions. Government may consider periodic drone surveys mandatory.
  - vii. ARC recommends that Government needs to consider introducing at least one diploma course in mining engineering to address the shortage of qualified persons. When qualified people are posted in mines, mining can be carried out in a scientific manner.
  - viii. Development of Information Technology solutions for the department needs to be time bound in the scenario of fast paced developments in the state. Government needs to capacitate IT Mission to take the lead role in coordination and development technology solutions for all departments including the department of Mining.
  - ix. Quarry/mine owners and contractors need to be educated about the necessity to follow conditions in the licenses for mining and encouraged to use state of the art technology in their own interest. For example, when NONEL technology is used in blasting, vibrations caused are less.
  - x. Government needs to enforce use of modern technologies and equipment for mining activities. The department shall adopt best practices available worldwide in the sector for safeguarding the environment and to ensure sustainable exploitation of scarce natural resources. It is desirable to provide modern equipment like GPS and drones to the department for expediting field work.
  - xi. Several factors, such as insufficient resources, lack of effective coordination between various institutions and a lack of social responsibility etc., contribute to the gap between legislative theory and reality. Well established stakeholder engagement and communication channels, legal and administrative services, risk management services, social audit and other

compliance mechanisms, projects management, information and communication technology and resource management services, review and evaluation mechanisms and feedback and complaint handling mechanisms can all help overcome these hurdles.

- xii. Single window clearance systems for industries do not have mechanisms to provide clearances under Environmental Protection Act. A new system to provide time bound environmental clearance for industries, infrastructure projects; mining, tourism projects etc., in the state are required. The Environment department shall establish a State Authority to ensure speedy environmental clearances for permissible projects.

#### **3.4.4 Infrastructure**

- i. Infrastructure development in the state needs to be based on a master plan that include requirements of the state in key public infrastructure like roads, railways, airports, seaports, buildings for hospitals, offices, educational institutions, social security institutions, warehouses etc. Master plan needs to be prepared after wider stakeholder consultations and required research, and shall have allied financial plans, timeframes, institutional mechanisms, plans for construction materials and environmental plans etc. All new proposals for infrastructure development shall be consistent with the Infrastructure Master Plan.
- ii. Master plans are usually prepared for a period of 20 to 30 years. Along with the master plan, an implementation plan also needs to be prepared and strictly enforced. Yearly review of master plan is needed to factor in required changes. Any deviation or updating shall be based on the recommendation of a group of experts constituted for the purpose and approval of government.
- iii. Master plan needs to include a specific timeframe for implementation of proposed projects as in the case of Land Acquisition Act, 2013 which stipulates that once a land is notified for acquisition it shall be acquired within a specific period.
- iv. Government needs to ensure that master plans are prepared considering provisions of all relevant acts and rules to avoid conflict between master plan and other acts and resultant issues in implementation of projects in the master plan.
- v. District Plan needs to be prepared with reference to perspective plan and execution plan in the Town and Country Planning Act, 2016. ARC recommends that government needs to take steps to include provision for inter district spatial plans in the Town and Country Planning Act, 2016. Government shall ensure appropriate linkage between Town and Country planning Act 2016 and Kerala Panchayat Raj Act.
- vi. ARC recommends to government to take steps for inclusion of all required clearances into building code/building rules and evolve a system of single window clearance for construction permits to ensure compliance and reduce distress of applicants. Compliance with all regulations is essential for sustainable development of infrastructure, including houses.

- vii. Government needs to consider taking steps to address the escalating cost of construction in the state. These may include suggestions for modifications to CRZ notification to enable offshore mining of sand, without adverse impact to environment, fast track environmental clearance for quarrying stones from quarries near projects sites etc.
- viii. Government needs to identify burrow pits as part of the project proposal and permission obtained for removal of earth from specified pits to avoid delay in construction of government projects and resultant time and cost overrun.
- ix. Contractors need to be mandated to use plants using the latest available technology. Frequent testing of emissions from the plants shall be done to ensure health and hygiene and smoothen progress of road projects.

### 3.4.5 Tourism

- i. Considering the importance of GSDP contribution from tourism sector KCZMA may expedite proceedings in the issuance of clearances for projects in tourism sector. At the same time, department of Tourism needs to be aware that CRZ clearance is a prerequisite for all projects in such areas and move application for clearance at the initial stage itself.
- ii. Tourism projects shall be permitted only after getting all environmental clearances. Projects that do not comply with environmental regulations shall not be encouraged. Effective green appraisal, life cycle appraisal and socio-economic appraisal of all tourism projects needs to be ensured before initiation of projects. A committee exclusively for examining these aspects of a project shall be formed in the department of Tourism.

#### ***Integrated Tourism circuit of Aymanam Village***

*Blessed with natural beauty and historical importance, the suburban village of Aymanam in Kottayam district did have potential to evolve into an attractive tourist destination. Appearance, as a character and location in acclaimed writer Arundhati Roy's Booker prize winning novel "God of Small Things" made her renowned all over the world. Aymanam Panchayat has implemented the grand vision of translating the tourist potential of the village into development initiative with cooperation of the people and department of Tourism. The Panchayat also adopted governance model that is people centered in delivery of services*

*The natural bounty of proximity to backwaters, lagoons, canals, lakes, rivulets, streams and presence of paddy fields, sites of historical and religious importance, uniqueness of cuisine, and home to renowned men of letters and artists, musicians, traditional arts and crafts, traditional industries – all are seamlessly integrated to provide visual treat and unforgettable experience to tourists.*

*The Canal Village Project proposed by the panchayat envisages integration of cultural, spiritual and eco-tourism and include development of walkway and cycling path along shores of the lagoon, floating cafeteria, park, watch tower in the middle of the lagoon, hanging bridge, solar illuminated row boats, sun set viewing facility etc. This initiative exemplifies possibilities and potential of LSGIs in formulating innovative and sustainable tourism projects promoting eco-friendly tourism with the participation of local people.*

- iii. Government needs to intervene and facilitate inter departmental handing over/ transfer of land to expedite projects, especially tourism projects. The Commission, in its report on 'Infrastructure' will submit detailed recommendations in this regard.
- iv. Kerala Wetland Authority has an important role in regulating issues caused by unchecked pollution from house boats. Government has taken steps to register all boats. But progress in the process is tardy. Government needs to take appropriate stringent measures to address the issue of pollution caused by house boats and other connected issues through coordination of the stakeholders and government departments/organisations.
- v. Immense potential of farm and health tourism needs to be exploited further for ensuring development of sustainable tourism.

Enactments Related to Energy, Industries, Infrastructure and Tourism is given in Annexure VIII.



### 4.1. Introduction

Water availability and its quality are of prime importance anywhere around the globe. Water is required for daily use of all living beings. Besides this, water is required for agriculture, power generation and for running industries. Availability of water for these requirements and disposal of wastewater from anthropogenic activities needs to be managed sustainably to ensure quality of water and its availability, in the long term.

Water, i.e. water supplies, irrigation and canals, drainage and embankments, water storage and waterpower, is included in List II of the Seventh Schedule of the Constitution of India - the state list. The states are empowered to legislate on these aspects. Considering it as a national resource, several policies, acts and rules and other regulations through notifications are issued by Government of India for governing the water sector. National and state enactments in the sector are analysed in this chapter.

Kerala is blessed with water resources. These include about 5.43 lakh hectares of inland water bodies and 3092 kilometers of rivers and canals. Water of the state can be classified into wetlands, rivers, groundwater and oceans. Groundwater is defined as water which is below the surface in the zone of saturation and wetlands as lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface, or the land is covered by shallow water. All the water bodies play a vital role in maintaining sustainability of the environment. They act as a source of drinking water, recharge groundwater, act as sponges to control flooding, support bio-diversity and provide livelihoods to many. These water bodies are vital, environmentally, socially, and economically.

The 44 rivers in Kerala with an average length of 80 kms and a watershed area of 700 sq.km. forms a major source of water for the state. Rivers of Kerala are comparatively small and entirely monsoon/rain-fed. Some of them turn into rivulets in summer. Average annual rainfall of the state is 3,000 mm and about 70 per cent of it is received during South-West monsoon, from June to September. Kerala also gets rains from the North-East monsoon between October and December. Groundwater remains the main source for meeting domestic needs of more than 80 percent of rural population and half of urban population. Surface irrigations constitute the majority of irrigation infrastructure in the state. The state has 14 irrigation dams with storage, and 4 barrages. Despite these abundant water resources, Kerala is water stressed with the lowest

per capita share of freshwater resources. Evidence shows that availability of freshwater sources is declining over the years amidst growing demand for water caused by high population density and changing water use habits.

Wetlands are defined differently by countries in their domestic legislation. Most of the countries have given narrow interpretation to the definition to limit the ambit and scope of protection to wetlands. According to most widespread definitions wetlands are defined as: "lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water". Ramsar Convention on Wetlands defines wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres". Wetland (Conservation and Management) Rules 2017 defines wetland as an "area of marsh, fen, peatland or water; whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters, but does not include river channels, paddy fields, human-made water bodies/tanks, specifically constructed for drinking water purposes, and structures specifically constructed for aquacultures, salt production, recreation and irrigation purposes". Kerala Conservation of Paddy land and Wetland Act, 2008 defines wetland as "land lying between terrestrial and aquatic systems, where the water table is usually at or near the surface, of which is covered by shallow water or characterised by the presence of sluggishly moving or standing water, saturating the soil with water and includes backwaters, estuaries, fens, lagoons, mangroves, marshes, salt marshes and swamp forests, but does not include paddy lands and rivers". Lack of protection of wetlands is attributed mainly to its different categorisation in legislation.

#### **4.2. Legal Framework in the Water Sector**

The Indian Forest Act, 1927 was the most comprehensive and oldest piece of legislation enacted to protect the environment at the time when environmental problems had not assumed threatening dimensions as they have today. Constitution (42nd Amendment) Act, 1976 marked the beginning of a new milestone in the history of environmental protection in India. Article 48A requires that "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". Art. 51-A (g) provides that, "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures." These two Articles direct the State and citizens the duty not only to adopt protective measures, but also take steps to improve the already polluted environment and to preserve and safeguard the forests, flora and fauna.

The three lists - Union, State and Concurrent lists do not clearly mention as to who will legislate on matters relating to wetlands. Although the State List consists of a number of items like public health and sanitation, agriculture, water-supply, irrigation and drainage, and fisheries, the Union List apparently does not mention environment. Article 253 empowers Parliament to

legislate on any residual matter and implement international obligations and decisions taken by international conferences, associations etc. Forestry as a subject is mentioned in the Concurrent List. Wetlands are mostly considered as water bodies and come under the State List and states have exclusive jurisdiction to legislate on wetlands in the federal system of India.

The Environment (Protection) Act, 1986 is an umbrella Act enacted to protect and improve the environment and connected matters. 'Environment' as defined in Section 2 of the Environment (Protection) Act includes water, air and land and the interrelationship which exists between water, air and land and human beings and other living creatures, plants and micro-organisms and property. The Act has been instrumental in protecting wetlands. Several significant regulations/notifications are enacted under the Act for monitoring pollution and safeguarding the environment. Coastal Regulation Zone notification imposing restrictions on industries, operations and processes in the coastal zone areas (500 metres from the high tide line and the area between the high tide line and low tide line) and The Environment Impact Assessment Notification of 1994 and 2006 are issued under the Act.

States are empowered to legislate on all aspects of water as it is included in the State list of the Constitution. However, since groundwater is recognised as a national priority, Government of India (GoI) has set up institutions like Central Ground Water Board (CGWB) for managing groundwater resources. Although GoI provides guidelines for regulation of groundwater, states are to adopt them with required modifications to suit requirements of the state concerning availability of groundwater. In 1970, GoI moved the Groundwater (Control and Regulation) Bill through the Ministry of Agriculture in 1970 and circulated to all the states with advice to formulate an Act, with necessary modifications. Accordingly, Kerala Groundwater (Control and Regulation) 2002 was enacted.

The Act bestows controlling authority for development of groundwater to the State Water Authority. Government, along with recommendations of the State Water Authority, can notify any area in order to regulate extraction of groundwater. Any individual in the notified area, who needs to dig a well or convert the existing well into pumping well needs to apply to the authority for grant of permit for the purpose. Owners of existing wells in the notified areas also have to apply for registration. All groundwater users in the state require to be registered with the authority. Digging of wells within thirty metres of any public drinking water source is prohibited to protect public drinking water sources. The authority can change conditions given in permit or registration depending on a situation and has the authority to cancel permit or registration issues. The Act has penalty provisions for violation of rules framed under the Act.

Government of Kerala enacted the Kerala Protection of River Banks and regulation of removal of Sand Act, 2001 to protect river banks and river beds from degradation caused by indiscriminate large scale dredging of river sand and to protect biophysical environment of river systems and regulate removal of sand. The Act envisages preparation and implementation of 'Riverbank Development Plan' for upkeep of biophysical environment of rivers using River Management Fund.

#### **4.2.1. Policies for conservation of water bodies**

The first National Water Policy was formed in 1987. Conservation of water bodies was addressed at the national level only in 2002, when the National Water Policy, 1987 was revised, and included only revival of traditional systems. The policy was revised again in 2012 and envisages 'need for a comprehensive legislation for optimum development of interstate river and river valleys and enable establishment of basin authorities with appropriate powers to plan, manage and regulate utilisation of water resources in the basins. The policy also envisages integrated perspective to govern planning and management of water resources considering local, regional, and national contexts and is environmentally sound.

#### **4.2.2. Kerala Water Policy 2008**

Objective of The Kerala Water Policy is evolution of an integrated and multi-sectoral approach for planning, development, and management of water resources, its optimal utilisation with micro watershed as the basic unit of conservation. Importance of comprehensive watershed conservation and management plan is emphasised in the policy. The policy also emphasises water quality management and water resources plan and stresses on appropriate institutional mechanisms and legal measures for sustainable water resource management and development. The enactments that are applicable in the water sector are given in Annexure IX.

#### **4.3. Implementing Agencies**

- Central Water Commission (CWC)
- Central Ground Water Board (CGWB)
- National Coastal Zone Management Authority (NCZMA)
- Kerala Irrigation Department
- Kerala Environment Department
- Kerala Water Authority
- Groundwater Department
- Jalanidhi
- Command Area Development Authority (CADA)
- Kerala Irrigation Infrastructure Development Corporation (KIIDC)
- The State Wetlands Authority

#### **4.4. Governance Issues**

- i. At present, no authority/legal entity is solely responsible for monitoring and protection of rivers in the state. Department of Water Resources is mandated with management and protection of rivers, lakes, and other water resources.



- ii. Several departments are associated with the subject of water and it is handled at different levels in the State. Multiplicity of agencies in the sector necessitate sharing of data related to water resources between all concerned agencies to ensure effective management of available/potential water resources.
- iii. Absence of a common platform for consolidation, use and dissemination of data creates challenges in water management and protection of water resources. For example, data available with Irrigation department is not readily available to related departments and agencies like local governments, departments of soil conservation, agriculture etc. There is no single repository of scientific data. Different departments have different data sets with them. Sharing of data, collected at huge cost to public finance needs to be shared for easier and speedier designing and implementation of projects.
- iv. Lack of coordination between departments in activities that require input and approval from various departments leads to duplication of work and often result in wastage of time, resources, and revenue. Sustainable development requires all institutions to work in coordination, rather than in organisational isolation. Coordination is required not only across sectors, but also between different levels, and active involvement of all stakeholders.
- v. The National Water Policy, 2012 includes descriptions on "Adaptation to climate change", "Enhancing water available for use", "Conservation of river corridors, water bodies and infrastructure" and "Management of flood and drought" - these topics are not covered in the State Water Policy.
- vi. A study of Central Water Commission pointed out drastic reduction in carrying capacity of Vembanad Lake as one of the factors for floods in Kuttanad and surrounding areas in 2018. It is learnt that Government of Kerala has announced a major scheme for desilting Vembanad lake and canals in Kuttanad. The scheme is yet to be completed.
- vii. M S Swaminathan Commission and other studies have indicated that single crop agriculture practice has adversely affected sustainable development of Kuttanad and its ecology.
- viii. CRZ 2011 notification declared certain environmentally sensitive areas including the Vembanad as Critically Vulnerable Coastal Areas (CVCA) for promoting conservation and sustainable use of resources. The notification directs government to prepare Integrated Management Plans (IMP) for managing CVCA with the involvement of local coastal communities including fisher folk. According to the notification the Ministry of Environment, Forests and Climate Change (MoEFCC) has to provide detailed guidelines for identifying, planning, notifying, and implementing CVCA in consultation with the stakeholders - state governments, local coastal communities and fisherfolk. IMP for Vembanad is not prepared and MoEFCC has not issued guidelines for the same.

- ix. Absence of a proper system to regulate opening and closing of 'Thanneermukkom regulator cum bridge', deficiencies in operating 'Thottappally spillway' are governance failures cited as major reasons for ecological issues attributed to existence of the bund and spillway.
- x. Kerala Ground Water (Control and Regulation) Act, 2002 includes provisions for regulation of groundwater development by various sectors. Implementation of the provisions of the Act has not been successful due to lack of sufficient awareness among the community, human resource constraints of the departments, etc. Mandated registration of bore wells in the State is not completed till date. Onus of registration is on the people who dig bore wells. The act lacks provisions to control agencies who drill bore wells in the State leading to indiscriminate drilling of bore wells by various agencies.
- xi. Non Revenue Water (NRW) is water produced but is "lost" before it reaches the consumer. Losses can be real losses through leaks or apparent losses through theft or inaccuracies in metering. High levels of NRW affect the financial viability of water utilities and also quality of water. It is learnt during the study that around forty five percent of the water generated by Kerala Water Authority (KWA) is lost through theft and leaks, compared to national average of fifteen percent, pushing the organisation into financial instability. Improper metering is another factor contributing to NRW.
- xii. Another reason for dismal financial performance of KWA is non revision of water rates. Rate of water supplied by KWA is not revised periodically to reflect increase in cost of production and inflation.
- xiii. KWA is mandated to take up the responsibility of wastewater management and presently covers only four percent of the sewerage sector in the state. Current facilities in the state for wastewater management are - 37 per cent coverage for sewerage with about 90,000 connections in Thiruvananthapuram city, Guruvayur drainage with 3 MLD STP is almost completed except some finishing mechanical works. The project is to provide an effective drainage system to cover the entire inhabited areas under Guruvayur Municipality. Ernakulam has a small system with 1000 connections. Two projects for Kollam and Kozhikode are in progress. From these figures it can be seen that wastewater management is not given adequate importance in the planning process. Absence of proper systems for wastewater management and awareness among people about the importance of effective management of wastewater are among the main reasons for dwindling availability of freshwater resources in the water blessed state.
- xiv. In Kerala, Thodu's (small streams and rivulets etc) and its adjoining 'Poramboke (government land adjoining private property)' are managed by Grama Panchayats and rivers and other water bodies by the Irrigation Department. Original width and vigor of these water bodies have shrunk with rapid growth of population and resultant exponential growth in construction of houses leading to increased demand for land. They are encroached/obliterated through

illegal constructions and deposit of debris. This unbridled attack on the veins and arteries of natural flow of water cause irremediable damage to nature and its sustainable existence.

#### 4.5 Recommendations

- i. Integrated Water Resources Management (IWRM) considering river basin/sub-basin as a unit needs to be the main principle for planning, development, and management of water resources.
- ii. For scientific and sustainable use of the rivers, formation of an independent legal entity in the form of a River Basin Authority for the state is desirable. The Authority needs to be multidisciplinary and authorised to oversee management of all river basins by departments and allied agencies based on approved watershed management plans. Coordination/ joint functioning of stakeholder departments and agencies also needs to be carried out by the Authority.
- iii. Watershed Management Committees shall be formed for major watersheds of all rivers. The committee shall devise river management plan for each river, specific to each area. Watershed Management Committee shall collect and regularly collate data on rainfall, river flows, area irrigated by crops and source, utilisation of surface and groundwater for various uses and publish water accounts every ten days, every year, for each river basin. Water accounts need to include an appropriate water budget and based on hydrologic balances. Water budgeting and accounting needs to be carried out for each aquifer. All these require coordinated functioning between different departments and a watershed management committee. All stakeholders, including local bodies need to be included in the Committee and in devising plans.
- iv. As a first step, government may constitute a separate Vembanad Development Authority (VDA) with adequate representation of local bodies and District Collectors of Kottayam, Alappuzha, Pathanamthitta and Ernakulam districts as members. Chairman of the Authority may be a senior Secretary to Government. VDA shall function under the supervisory control of State River basin Authority. Technical Advisory Committee may also be constituted under VDA. A portion of River Management Fund shall be set apart for functioning of the Authority and Committees.
- v. ARC recommends that government needs to ensure availability of all relevant data on a common platform for easy access of all concerned government departments/agencies and other stakeholders. A state web portal on water resources and its conservation in line with [www.indiawaterportal.org](http://www.indiawaterportal.org) may be developed for this purpose.
- vi. Nodal agencies may be constituted for ensuring synergy between different departments and other agencies in the water sector. State River basin Authority can act as the nodal agency and function under the department of Water Resources/LSGIs.

### ***The Kuttanad Below Sea-level Farming System (KBSFS)***

*Kuttanad comprising of Lower Kuttanad, Upper Kuttanad and North Kuttanad covers Alappuzha, Kottayam and Pathanamthitta districts in the state. The area is serviced by 4 major rivers- Pampa, Meenachil, Achankovil and Manimala which drain into the Vembanad backwaters. The Kuttanad Below Sea-level Farming System (KBSFS) is unique and is the only system in India that practices rice cultivation below sea level. Food and Agriculture Organisation (FAO) has declared Kuttanad farming system as Globally Important Agricultural Heritage System (GIAHS).*

*Two developmental interventions designed to enhance paddy production in the region are the Thottappally spillway, designed as a permanent solution to the flood situation in Kuttanad by diverting flood waters from the rivers to the sea before it reached Vembanad lake, and the Thaneermukkom bund to prevent water from entering Lower Kuttanad during summer season enabling the farmers to raise an extra crop per year.*

*These interventions have improved the quality of life of the farmers but have caused environmental problems and has affected sustainable development of the region. The bund prevents salt water from entering the region affecting the abundant fish wealth of the region which require a small amount of salt water for its breeding. The bund has caused deterioration of fish varieties in the region and has disrupted harmony of the sea with the backwaters resulting in unforeseen problems like widespread presence of water weeds. Cessation of cleansing of the backwaters by salt water has led to pollution of the backwaters and the entire land nearby.*

*It is imperative to find solutions to ensure sustainable development of the region and livelihood of the people. Unique geography and contiguous nature of the region which forms part of three administrative districts necessitates that any intervention in developmental activities and operational issues concerning Thaneermukkom bund/Thottappally spill way etc., requires coordinated and unified activities by the district administration of the three districts. Participants of a seminar organised by ARC in Kuttanad pointed out absence of an effective coordination mechanism in administration covering the entire region as a major lacunae in sustainable development of the region.*

#### ***Recommendation:***

*Kuttanad is a major watershed covering Alappuzha, Pathanamthitta and Kottayam Districts. Any intervention in this watershed needs to be based on scientific studies and with the active participation of the people. Development projects in Kuttanad cannot be carried out in isolation based on administrative boundaries. Absence of an efficient and coordinated administrative mechanism covering the whole of Kuttanad remains one of the major issues in the sustainable development of the region. The Commission recommends that government needs to take steps for creation of a coordination mechanism with representatives of farmers of the three districts, developmental and environmental experts and scientists, District Collectors, District Panchayat Presidents of Alappuzha, Kottayam and Pathanamthitta, state level representatives from departments of Water Resources, Fisheries, Agriculture, Animal Husbandry, Environment, Disaster Management etc. A Senior Secretary to Government shall be Chairperson and District Collector Alappuzha the Member Secretary. This forum may be in the form of an Advisory Council. Decisions of the Council shall be recommendatory and shall not adversely affect responsibilities and authority of District Panchayats or other local bodies as enshrined in the Kerala Panchayat Raj Act or Kerala Municipality Act. Developmental projects that transcends the geographical boundaries of any local body may be approved by DPC after consultation/deliberation in the Advisory Council. Departmental projects/schemes for Kuttanad shall also be examined by the Council. ARC suggests that government may form the coordination council through an enactment.*

- vii. Water Policy, 2008 of the state was formulated before the National Water Policy was introduced in 2012. Since its formulation, the sector itself has experienced many changes. Review of the State Policy or a new water policy to align with the changed scenario is essential.
- viii. While rolling out the project aimed at increasing absorption capacity of Vembanad lake and carrying capacity of canals to ensure free flow of water, government needs to put in place a time bound action plan covering micro level aspects like participation of local governments, depositing or alternate use of sludge or clay removed, involvement of manual labour and machines, possible impacts on flora and fauna in the area, strengthening of bunds etc.
- ix. As indicated by MS Swaminathan Commission, Kuttanad needs to distance itself from single crop agriculture practice and resort to multi commodity farming based on biodiversity, in a phased manner for sustainable development of the region and conservation of its unique ecology.
- x. ARC recommends that government needs to consider construction of large rainwater reservoirs - with sufficiently high earthen bunds to protect the structures in unusable paddy lands of Kuttanad, utilising impervious nature of soil, special to Kuttanad. These facilities can be used as a freshwater source for water supply schemes in Kuttanad.
- xi. Government may take up with MoEFCC in GoI, the matter of issuing guidelines for preparation of Integrated management Plan for management of Vembanad lake included under Critically Vulnerable Coastal Areas. State watershed management plans for Vembanad lake need to be prepared after GoI issues guidelines.
- xii. Proposed Vembanad Development Authority may be able to regulate timings for opening/closing Thanneermukkom regulator cum bridge and ensure effective operation of Thottappally spillway to ensure smooth inflow and outflow of water from Kuttanad.
- xiii. Floods in 2018 and 2019 in the state brought to light the necessity to erect and maintain stream gauges (staff gauges) in places where people need to take precaution/make preparations on possibility of flood/dangers of inundation. Government may also take steps to build permanent structures similar to stream gauges to mark the flood levels in 2018 and 2019 in various rivers in our state for the benefit of future generations.
- xiv. Government needs to take steps to ensure registration of agencies engaged in digging bore wells. Only registered agencies shall be allowed to dig bore wells in the State. Agencies shall be mandated to file monthly returns with details of drill logs, estimated well yield, recommended capacity of pump and duration of pumping, distance from nearest bore well, etc., for each well drilled. Government needs to issue necessary regulations in this regard urgently. The Act needs to be amended to enforce penal provisions for violations.
- xv. Ground water department needs to take urgent steps to complete collection of data on bore wells and upload the data on the web portal for water resources, suggested above. This will assist in monitoring and speeding up the registration process of bore wells.

- xvi. Kerala Water Authority (KWA) needs to take urgent and effective steps to reduce NRW (Non-Revenue Water) in its accounts. Annual inspection of all pipelines shall be carried out to ensure that all lines are unimpaired. Accountability and responsibility in this regard may be distributed among Assistant Engineers (AE) in the Circle to Chief Engineers at the state level. In the case of water supply schemes which are not handed over to KWA, annual inspection shall be the duty of AE in the local body.
- xvii. ARC recommends that KWA needs to periodically revise rates of water supply, for improving financial stability of the organisation, to prevent wastage of water and to build up the organisation's ability to supply safe drinking water to people across the state. Enhancement may be linked to inflation or limited to a fixed percentage increase every year, as done by government for several non tax revenue sources.
- xviii. It is learnt from published information that KWA is using IBM Analytics and Mobility solutions to analyse, monitor and manage water distribution in the city of Trivandrum and to curb non-revenue water losses due to leaking infrastructure and unauthorised use of water. The solution assists KWA to respond to water leakage cases in near real time and helps in tracking its 2,10,000 water meters across the city on consumption and reducing billing anomalies and improving revenue collection by more than 10 percent.
- xix. KWA needs to consider rolling out the IBM Analytics and Mobility solutions to other parts of the state, to begin with to other cities to reduce NRW and improve efficiency in water supply.
- xx. Sewerage treatment plants with modern facilities need to be set up in all cities, within a fixed timeframe. Transport of sewerage to the plants shall be regulated by KWA. All LSGIs in nearby areas shall be permitted to transfer septage to these treatment plants. KWA needs to provide safe and secure vehicles for this purpose through participation with private carriers as in the case of fuel transportation of oil companies, on demand from local bodies and on payment by the LSGI for providing the service.
- xxi. Government in association with LSGIs, NGOs and other Civil Society Organisations needs to create awareness among people on the importance of proper and systematic management of wastewater to improve fresh water sources in the state and availability of safe drinking water, and for better health and sanitation.
- xxii. Encroachment/obliteration of streams/rivulets and other water bodies is a statewide issue and needs to be addressed without any further delay for ensuring, sustainability of ecosystem, sustainable agriculture practices, and for improving quality and availability of water. Considering the seriousness of the issue, ARC recommends that government needs to formulate and implement time-bound action plan to survey and demarcate the original boundaries of these water bodies and evict all encroachments. This shall be done through a joint action of Land Revenue, Survey, Irrigation and LSG Departments.



# Climate Change and Disaster Management

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CHAPTER 5

## 5.1. Introduction

### 5.1.1. Climate Change

Climate change is a reality and has direct impact on sustainable development. It impacts all areas of life including health, food and water, migration, peace and security. If the changes caused by climate change are left unchecked, development achieved over the past decades will roll back and make further progress impossible. Climate change can be addressed by reducing greenhouse gas emissions and by building climate resilience. Climate change and sustainable development are therefore, two sides of the same coin. (<https://www.un.org/sustainabledevelopment/development-agenda>)

India faces the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change. With an economy closely tied to its natural resources base and climate-sensitive sectors, it is a huge challenge to address projected changes in climate. Government is responsible to chart out a developmental trajectory ecologically, mindful of responsibilities to the present and future generations. Articles 48-A and 51A (g) of the Constitution of India mandate state's obligation to protect the environment and bestows corresponding duty on the people. Disasters attributable to climate change are on the increase making it important to look within the framework of changing climate. Disaster and climate risk management is a vital factor for sustainable development. Mainstreaming climate change adaptation within development planning process is not a simple linear technical or bureaucratic process. It requires consideration of current and future climate risks and opportunities for reducing risks and enhancing opportunities at every stage in the decision-making process. Enabling the environment for tackling climate change requires a strong policy framework with cross-sectoral policies and plans in place.

### 5.1.2. Disaster Management

Indian Disaster Knowledge Network states that 85 percent of the land of the country is prone to natural hazards that are likely to be disasters. Proactive preventive and mitigation approaches are called for, according to the National Policy on Disaster Management (2009), under the Disaster Management Act, 2005. National Disaster Management Plan of 2016 integrates Sendai Framework for Disaster Risk Reduction ([https://niti.gov.in/writereaddata/files/India%20VNR\\_Final.pdf](https://niti.gov.in/writereaddata/files/India%20VNR_Final.pdf)).

## 5.2 Enactments related to Climate Change and Disaster Management

Enactments for addressing issues related to environment, climate change and disaster management are given in Annexure X.

### 5.2.1 Agencies in the sector

The Environment (Protection) Act, 1986, the Environment (Protection) Rules, 1986, the National Environment Policy (2006) and the Kerala State Environment Policy (2009) are implemented by Environment Department/ Directorate of Environment and Climate Change (DoECC) through the following organisations.

- Kerala State Disaster Management Authority (KSDMA)
- Environment Department
- Directorate of Environment and Climate Change (DoECC)
- State Wetland Authority, Kerala (SWAK)
- Kerala Coastal Zone Management Authority (KCZMA)
- State Environmental Impact Assessment Authority (SEIAA) / State Environmental Appraisal Committee (SEAC)
- Kerala Centre for Integrated Coastal Management (KCICM)

#### 5.2.1.1 Kerala State Disaster Management Authority (KSDMA)

State Disaster Management Authority (SDMA) is a statutory body constituted under the Disaster Management Act, 2005. Chief Minister is Chairman and Minister for Revenue is Vice Chairman of the Authority. Chief Secretary chairs the State Executive Committee. As per DM Act, SDMA was reconstituted in 2007. State Emergency Operations Cell (SEOC) was established in 2014 for effective disaster response. Most of the field level disaster response activities in the state are carried out by local bodies. District Collectors chair District Disaster Management Authorities (DDMA) and District Panchayat President is the co-chair. Disaster Management Plans were prepared in 2015 and 2016. However, dynamic components of the plan, which requires yearly revision, are not scrupulously followed.

#### 5.2.1.2 Environment Department

Department of Environment was created in 2006 by delinking the subject environment from Science, Technology & Environment Department. Primary concerns of the Department are implementation of policies and programmes relating to conservation of state's natural resources, biodiversity and prevention and abatement of pollution. Department is guided by the principle of sustainable development and enhancement of human well-being in implementation of these policies and programmes.



### **5.2.1.3 Directorate of Environment and Climate Change (DoECC)**

Directorate of Environment and Climate Change (DoECC) under Environment Department was constituted in 2010. It is the nodal agency for the planning, promotion, coordination and overseeing implementation of Central and State environmental protection and conservation policies and programmes. The Directorate also serves as the nodal agency in formulating climate change related schemes, plans, programmes and their execution.

Main functions of DoECC are:

- Take up State level environment development programmes and implement them in collaboration with appropriate agencies;
- Coordinate the programmes for the revision and implementation of State Action Plan on Climate Change (SAPCC), set up Climate Change Cell at various sectors;
- Exercise administrative control of all environmentally related authorities / institutes being established in State;
- Conduct environmental appraisal at planning level related to the development schemes of the State Government;
- Coordinate the environmental awareness and incentives programmes in education institutes and society to evoke the responsibility of individuals to respect, protect, and preserve the environment.
- Encourage environmental research and development to broaden the knowledge and to develop new sustainable novel technologies.

### **5.2.1.4. State Wetland Authority, Kerala (SWAK)**

State Wetland Authorities are constituted as per provisions of Wetland (Conservation and Management) Rules 2017. SWAK is authorised to list all wetlands including wetlands notified by the State, recommend identified wetlands based on regulations, carry out comprehensive digital inventory of all wetlands, develop comprehensive list of activities to be regulated and permitted within the notified wetlands, define strategies for the conservation and proper use of wetlands within their jurisdiction, review integrated management plans for each notified wetland and advise on any other matter suo-moto, or as referred by the State Government.

SWAK is the nodal agency for all wetland specific activities in the State, identifies mechanisms for convergence by coordinating implementation of integrated management plans through various line departments, issue necessary directions for the conservation and sustainable management of wetlands to concerned agencies and undertake measures for enhancing awareness within the stakeholders and local communities on values and functions of the wetlands.

### **5.2.1.5. Kerala Coastal Zone Management Authority (KCZMA)**

Coastal Zone Management Authorities are constituted by Government of India as per provisions in the Environmental Protection Act, 1986. KCZMA is authorised to implement provisions of Coastal Zone Regulation notification issued by Government of India under section 3 of Environmental Protection Act, 1986 and is chaired by Principal Secretary of the department of Environment. Director, DoECC is Member Secretary of KCZMA.

### **5.2.1.6. State Environmental Impact Assessment Authority (SEIAA)/ State Environmental Appraisal Committee (SEAC)**

State Environmental Impact Assessment Authority and State Environmental Appraisal Committee are constituted by Government of India as per the provisions in the Environmental Protection Act 1986. The Authorities are authorised to implement provisions of EIA notification 2006. Director of DoECC is Member Secretary of SEAC and Principal Secretary, Department of Environment is Member Secretary of SEIAA.

### **5.2.1.7 Kerala Centre for Integrated Coastal Management**

Kerala Centre for Integrated Coastal Management (KCICM) is the state project management unit for implementation of Integrated Coastal Zone Management Plan (ICZMP) and is supported by Government of India. KCICM is a registered society under the societies act and currently Director of DoECC is holding additional charge of the society.

Kerala State Disaster Management Policy 2010 is implemented by departments of Disaster Management and Revenue, Kerala State Disaster Management Authority and Institute of Land and Disaster Management. Disaster Management Center (DMC) was established under the National Institute of Disaster Management (NIDM) for training and capacity building in the state, on disaster management. DMC was merged with Institute of Land Management and renamed Institute of Land and Disaster Management (ILDLM), which acts as a training/capacity building arm of the state in disaster management. State Disaster Management Authority (SDMA) was established in 2003 and reconstituted in 2007. State Emergency Operations Cell (SEOC) was established in 2014 for effective disaster response.

## **5.3 Governance issues**

### **Kerala Conservation of Paddy land and Wetland Act 2008**

- i. The Kerala Conservation of Paddy land and Wetland Act 2008 do not contain any provision concerning climate change. The Act is intended to promote sustainable agricultural growth and needs to have measures for climate change adaptation for sustainable development.
- ii. In Section 2(xvii) of the Act, Kole wetlands is not categorised specifically in the definition of wetlands. Kole wetlands have an important place in the wetlands of the state as filtration

ponds of water and as carbon sinks. Wetlands in flood prone areas of the State are not included in clause 3 of the Act, which has details of prohibition of activities in wetlands. Clause 4, do not specify measures/incentives to assist the farmers to augment production of paddy in the State. Clause 5 (2,3) of the Act provides for constitution of local level committees and includes its functions and powers. But there is no provision for assessment of infrastructure, human resource etc., of local/district/state level committees.

- iii. There is no reliable/comprehensive data of wetlands in the state. GIS based digital spatial-temporal database and information system of the wetlands is not maintained as mandated in the Wetlands (Conservation and Management) Rules, 2017.
- iv. State Wetland Authority of Kerala (SWAK) was reconstituted by the government. The authority faces constraints in availing continuous service of trained technical personnel essential for carrying out responsibilities entrusted to SWAK.

### **Environment Policy, 2009**

- i. Environment Policy, 2009 stresses the importance of conservation oriented development and mentions that environmental concerns have to be in the mainstream of all developmental activities. The policy mentions the necessity of integration of environmental concerns in economic and social development. But is silent on the need for climate change resilient and disaster resilient development.
- ii. Section 2 (2.2) of the policy describes the importance of mangrove ecosystems and states the need for integration of sectoral planning for the conservation of mangroves. Mangroves are important in reducing the impact of natural hazards like tsunamis, sea surges, floods, etc., and they play an important role in climate change adaptation and resilience. But accurate data on the extent of mangroves in the state is not available.
- iii. In Section 3.8, decentralised development systems are established through three-tier Panchayat institutions to effectively address issues of conservation of environment at the grass-root level. But the existing systems lack strength to address the issues.

### **Disaster Management Act, 2005**

- i. As per Section 34 (xii) and (xiii) of the Disaster Management Act, 2005, the District Disaster Management Authority (DDMA) is responsible for organising and coordinating specialised training programmes for different levels of officers, employees, and voluntary rescue workers in the district. Institute of Land and Disaster Management (ILDMA) is the administrative training institute for conducting disaster management training programmes for officials. Capacity building of officials is carried out by the Institute with the support of the National Institute of Disaster Management (NIDM) and the State Government. Chapter VII of the Disaster Management Act (Section 42) states the role of the NIDM. Training /capacity building

activities to be carried out by the state is not mentioned in the Act of 2005, but section 6.8.1 of the State Policy of 2010 specifies the role of training in Disaster Management (DM) in coordination with the Revenue department. Although ILDM provides capacity building to an average of 4000 persons per annum and has trained more than 39,000 school students in the year 2018-19, involvement of the community is not apparent in disaster response as described in the act of 2005. Involvement of the community in disaster management and their timely response to disasters can minimise loss due to disasters. For this, appropriate training is required.

- ii. State Disaster Management Policy, 2010 Section 8 recommends participation of NGOs and civil society organisations in pre- and post-disaster activities as mandated by the DDMA and the SDMA. The Disaster Management (DM) Act, 2005 does not specify roles and responsibilities of NGOs and other civil society organisations in disaster management. According to the Policy of 2010, specialised knowledge in Disaster Management has to be shared in the Public-Private-NGO sectors, and not limited to only the government sector.
- iii. According to the DM Act, 2005 Section 41(1) and (2), local authorities may take measures as may be necessary for disaster management as per direction of District Authority. No specific role is defined for local bodies in the Act though they are the most accessible authority during disasters. The State DM Policy, 2010, section 9.7 recommends realisation of community-based disaster management plan, which is not yet implemented in the state.
- iv. Section 25 of DM Act lists district collector as chairperson of the DDMA along with other members including an elected representative of the local authority, chief executive officer of the district authority, superintendent of police, chief medical officer of the district and not exceeding two other district level officers, not exceeding two to be appointed by the state government. Roles of members in the DDMA are not defined clearly and cause confusion.
- v. During or immediately after a disaster, people get scattered information from the media. History of disasters at the local level is not known. Local people are not aware of the level of risk to them. Perception of risk will increase capacity of the people to withstand or respond to the risk.
- vi. CBSE has included disaster management in their curriculum. State government has made a reference book on disaster management through SCERT but is yet to include it in the curriculum. Safety of every citizen is the responsibility of the government.
- vii. Information on disaster is shared by different authorities through different media. It is often observed that messages from various stakeholder agencies before/during a disaster overlap or are contradictory.
- viii. The state has linguistic minorities along the border. Disaster related information is shared only in English and Malayalam in the state, resulting in translation issues and resultant confusion about information disseminated.

- ix. Safety audit is mandatory for multi-storied buildings and is to be carried out by fire and rescue services. In section 30, sub section 2 (23), DDMA is entrusted to examine construction in any area of a district. However, annual audits/assessments as envisaged in the law are not performed.
- x. District disaster management authority has only one hazard analyst for technical analysis. A single person may not be able to manage all disaster management activities of the district.
- xi. Section 31 sub section 4 of the DM Act recommends annual review and updating of district DM plan. DM plans available on the website of SDMA were prepared in 2015 using data of 2011.
- xii. Presently, the SDMA office houses an emergency operations centre which issues directions during a disaster. A similar control room is functional in the disaster management cell of the Land Revenue Commissionerate. Multiple controls may result in chaos in disaster management.
- xiii. Climate change and disaster management are state specific and hence need state specific approach rather than common national framework.

#### ***Intervention by DoECC***

*To ensure sustainable development, the DoECC is supporting various activities through the "Environmental Awareness and Incentives" scheme. Under this scheme, 369 BhoomithraSena Clubs (BMCs) are established and functioning in the Higher Secondary Schools and Colleges to promote environmental conservation and awareness activities across the State.*

*DoECC received funds from National Adaptation Fund for Climate Change (NAFCC) for the project, "Promotion of Integrated Farming Systems of Kaippad and Pokkali in the Coastal Wetlands of Kerala", and is executed by the 'Agency for Development of Aquaculture in Kerala' (ADAK).*

#### ***Steps taken towards Sustainable Development by State Disaster Management Authority***

*The State has embarked on consultations with the following stakeholders and the public in the following domains under the title "Nammal Namukkay" to ensure disaster risk reduction from the perspective of sustainable development.*

*Land utilisation, Agriculture, Town and Country Planning, Mining, Risk Zone Specific Disaster Risk Reduction Activities, Water Management, Forest Management, Local Community and Resilience, Transport, Communication and Technology.*

*On completing the consultations (February 2020) changes required in the techno-financial and legal frameworks of the State for ensuring disaster risk reduction will be recommended to government by SDMA.*

## **Police Department**

State Disaster Response Force (SDRF) battalion was formed in 2012 and 100 posts were created, but only 7 of these officers have obtained SDRF training. The trained officers have moved to other districts. Frequent occurrence of disasters in the state in the last few years necessitates urgent formation of a disaster management team.

## 5.4 Recommendations

### Environmental (Protection) Act 1986

- i. Government needs to consider including Minister of Local Self Government department as Vice Chairperson of the State Disaster Management Authority to ensure increased participation of LSGIs in disaster management. If amendment in Disaster Management Act, 2005 is required, for this change it may be done with the consent of GoI. Similarly, Secretary to government in LSG department needs to be a member of the executive committee of SDMA.
- ii. Directorate of Environment and Climate Change (DoECC) needs to be responsible for implementing various regulations under Environmental (Protection) Act 1986. Scientific/technical officials of DoECC shall be trained and equipped to discharge the responsibilities. DoECC needs to be restructured and government may consider formation of district offices in place of zonal offices or retain zonal offices and link its functioning at the district with an appropriate departmental office at the district level, for better implementation of environmental regulations and for effective monitoring. Work-study to assess activities of the DoECC is essential for improving its functioning. District Disaster Management Authority needs to be strengthened with regular employees/experts/technical persons.
- iii. Clause (a) of section 19 of the Environmental (Protection) Act 1986 authorises the State government to take cognizance of offences under the Act. However, this power is not delegated to DoECC.
- iv. Authorities functioning in the DoECC like SEIAA, SWAK and KCZMA are part of the activities of the directorate and better synergy between these organisations needs to be ensured through coordinated functioning and restructuring of the organisations. This will make the implementation of provisions of various acts more effective.
- v. Kerala State Council for Science Technology and Environment is the nodal agency in the State to coordinate R&D activities in the State. Research in climate change and disaster management including funding for research shall be entrusted to Kerala State Council for Science Technology. Synergy between DoECC, Kerala State Biodiversity Board and Kerala State council for Science Technology and Environment needs to be ensured for functional research and development of solutions on Environmental issues.
- vi. Hazards related to climate change are on rise in the state. The State Disaster Management Authority (SDMA) needs to have more expert members. SDMA and the Institute of Land and Disaster Management (ILDm) shall work together in providing training. Training organised currently by ILDM on disaster management shall be brought under SDMA or needs to be conducted under the guidance of SDMA.

- vii. Government needs to consider the creation of a special force in the Police department for disaster management in addition to the SDRF Battalion. Fire and Rescue Services department needs to be strengthened with more personnel with training in disaster response. ARC recommends that government may consider bringing SDRF under the administrative control of Fire & Rescue department. In addition, all police personnel need to be given required training in disaster response within a short timeframe.
- viii. Disaster management plans in the state need to be updated and local level plan preparation for each local body needs to be carried out.
- ix. People living in zones highly susceptible to hazards may be relocated or stringent measures to regulate activities in such zones. It needs to be incorporated in the building rules applicable to each area. Government needs to formulate land use policy conducive for mitigation of disasters and manage the impact of climate change in the state. The activities shall be planned based on the susceptible zones to reduce the impact. The issue of settlement should be clearly addressed in the policy document.
- x. Awareness on climate change, hazards etc., shall be disseminated up to the local level and teams for disaster response shall be formed at ward level of a local body.

### **Environment Policy, 2009**

- i. Government needs to amend the Environment Policy, 2009 to include climate change resilient and disaster resilient development along with development oriented towards conservation. Wherever emphasis is to be given for sustainable development, the concepts of climate change mitigation and adaptation need to be incorporated as subjects of equal importance.
- ii. Data on the total extent of mangroves in the State needs to be developed, and strict policies implemented for conservation of mangroves and prevention of reclamation of their habitats. Besides this, incentives need to be given to the local people for conservation and promotion of mangroves.
- iii. The policy shall include climate resilient farming, use of indigenous crop varieties, promotion of organic farming and measures to improve soil resilience.
- iv. Requirements of decentralised development systems established through three-tier Panchayat institutions for addressing issues of conservation of environment at the grass-root level including skilled technical support, training needs to meet goals and institutional framework, need to be assessed and improved wherever necessary. Environmental experts with qualification in Environmental Science need to be available at the grass root level to ensure strengthening and empowerment of conservation activities at the local level. Local level Action Plans on Climate Change (LAPCC) needs to be developed and implemented at the Local Self-Government (LSG) level. Record of present state of environment, environmental resources, issued at the panchayat level etc., needs to be prepared and maintained by the

panchayat authorities and awareness created among the local people about local resources and need for conservation of these resources. Local Level Climate Change Cells (LLCCCs) with focal team members need to be formed at the LSG level for its effective implementation. These LLCCCs need to be aligned to the state Climate Change Cells (CCCs) under the DoECC. Environment/climate experts shall be responsible for coordinating and monitoring various issues and their probable solutions, climate resilience and adaptation strategies at the local level.

Other changes required in the policy include:

- i. Measures for improving/increasing groundwater recharge and water harvesting, and links between climate change and rainfall pattern in Section 6, (6.1),(6.1.1).
- ii. Carrying out desilting and maintenance of dams within fixed timeframes and periodical monitoring of these activities.
- iii. Implementation of seasonal assessment of water availability of all rivers and measures for monitoring river flow systems.
- iv. Inclusion of assessment of water holding capacity of wetlands to ensure management of floods by reducing its impact.
- v. Encouragement of green building technologies by use of energy efficient designs, layouts and construction materials is mentioned in section 15. Besides this, climate resilience and disaster resilient constructions need to be made mandatory.
- vi. Digital environmental database needs to be created and made available online to support decision making and improve transparency.
- vii. DoECC and KSDMA need to provide technical assistance/timely information to officials, employees, and voluntary rescue workers when required. LSGIs shall take the initiative to introduce skill development activities like swimming, medical first response through the fire and rescue departments, or through other suitable agencies. ILDM needs to facilitate such activities with the help of KILA/ LSGDs. Training and capacity development wing may concentrate on subjects like crowd management, lightning risk management, chemical emergency management, extreme weather events due to climate change, etc. Incident Response System (IRS) training needs to be provided to all stakeholder departments of the state.
- viii. Construction activities allowed in the coastal regulation zone needs to be climate proofed and disaster resilient as per Coastal Regulation Zone notification, 2011. Coastal Zone Management Plan (CZMP) shall be made easily accessible to the public. Delegation of powers on CRZ violations is limited to the Secretary (Environment), Chairman/Member Secretary, Pollution Control Board and District Collector. Further delegation of powers needs to be given.



- ix. Government shall take steps for participation of NGOs and civil society organisations in the pre- and post-disaster activities as mandated by the DDMA and the SDMA. Outreach activities need to be strengthened.
- x. As the state has an effective 3-tier Panchayati Raj system, the local authority may be entrusted to respond to Level 0 disasters. Every LSGI needs to have their own disaster management plan including various hazards the area is prone to, vulnerable locations, risks, mitigation measures, large scale multi hazard zonation maps, etc. There shall also be a community level task force for immediate disaster response at the local level. Role of the local body at the relief camps needs to be clearly defined to minimise issues in camps and to enable effective identification of needs and assistance required in camps.
- xi. Role of all officials in DDMA need to be clearly specified to avoid confusion about their inclusion and role. Prevention rather than cure needs to be emphasised in disaster management.
- xii. Information Education Communication (IEC) materials need to be published, before/ during/ after every disaster. After every drought/chemical emergency/pest attack, Panchayat or ward level vulnerability index needs to be made available to the public. Grama Sabha shall discuss the level of risk that a ward or community is exposed to and mitigation measures to be adopted. Information related to hazard science, vulnerability, etc., needs to be made available to all concerned departments and any other individual. Steps shall be taken for data sharing, accessibility of databases, sharing of information related to rainfall or floods, etc. Details of casualties/damages in flood and other natural disasters in various reports and in the public domain need to be consistent.
- xiii. Skills on disaster response such as do's and don'ts of lightning, earthquake, fires, cyclones, etc., needs to be taught to every individual of the community and in the schools as part of curriculum.
- xiv. State Disaster Management Authority, Department of Environment and Climate Change, Indian Meteorological Department, etc., need to take steps to provide specific information relevant to the public through the media after co-ordinate. Joint press releases can be issued or only a single competent authority may issue press releases.
- xv. Disaster response strategies need to be shared in various languages. All warnings, alerts and reports on disaster management shall be made available in required languages.
- xvi. Steps need to be taken to carry out a safety audit annually, through a competent agency. Agencies need to be accredited for the purpose. Expenditure for safety audit may be borne by owner of the building.
- xvii. India Disaster Resource Network (IDRN) provides country specific information, which needs to be customised to state specific needs and language. The database shall be updated once in 6 months.

- xviii. Disaster management professionals need to be deployed at least up to taluk level and shall work according to a specific ToR. They need to ensure that every panchayat has its own disaster management plan and provide technical assistance wherever required. Reports of previous droughts, floods, etc., can be made public through these officials. Disaster management documents shall be translated into Malayalam and ensured that they are available at the LSGIs. Annual updating of district DM plans needs to be ensured by the DDMA.
- xix. Climate change and disaster management need formation of integrated state/ district /local level institutions with effective public participation. Preparedness, planning incentive-based inputs, carbon footprints, benchmarking, Green Appraisal Protocol etc., needs to be enforced in the state. State Disaster Management Policy Framework shall be revisited and reformulated to meet the requirements of emerging/future disasters. Local Self Government Institutions need to be involved in disaster mitigation and prevention activities. Decentralised resource management and utilisation measures shall be provided in this sector instead of vertical regulatory authorities. Specific protocol needs to be prepared for officials responsible for emergency operations. Coordination with IMD is desirable during natural disasters.

### **Kerala Conservation of Paddy land and Wetland Act, 2008**

- i. The concept of climate change needs to be included in the Kerala Conservation of Paddy land and Wetland Act 2008 to sustain the ecological system in this scenario of changing climate. Climate change adaptation measures need to be implemented for effective sustenance of the ecosystem. Government needs to consider replacing the term 'to promote agricultural growth', in the Act with, "climate resilient sustainable agriculture".
- ii. Specific definition of Kole wetlands needs to be included in section 2 (xvii) considering its important role as filtration ponds of water and its dual role in carbon sequestration and methane emission. Wetlands in the flood prone areas of the state need to be included in clause 3 of the Act to regulate construction activities. A policy initiative for implementation of mandatory climate proofing technologies in the construction of residential buildings needs to be made if construction is allowed in flood prone areas. Government may specify measures to assist farmers to augment production of paddy in the state. ARC recommends to government to consider inclusion of incentives to farmers to adopt climate resilient farming techniques, promote crop insurance and for adoption of flood and drought tolerant crop varieties in clause 4 of the Kerala Conservation of Paddy land and Wetland Act 2008.
- iii. Government needs to consider inclusion of provision for assessment of existing infrastructure, human resources etc., of local/district/state level committees, in the policy. Biodiversity management committee shall be converged with other committees to ensure better management of ecosystem services of the wetlands.
- iv. GIS based digital spatial-temporal database and information system as mandated in the

Wetlands (Conservation and Management) Rules, 2017 needs to be developed and shared with all stakeholders and the people.

- v. Government may consider restructuring SWAK by providing required technical personnel and administrative staff in SWAK Secretariat (DoECC) on permanent basis, or if on deputation, posted for a minimum of 3 years extendable to 5 years. It also needs to ensure that technical and essential ministerial posts for managing the organisation do not remain vacant.
- vi. Government of Kerala has identified DoECC as a nodal agency to manage and regulate activities in wetlands outside protected areas. Hence DoECC shall provide required support to State Wetland Authority Kerala to implement provisions of the Wetlands (Conservation and Management) Rules, 2010/2017.

### **Impact of climate change on health and adoption of One Health policy**

World Health Organisation estimates that climate change is likely to cause approximately 2,50,000 additional deaths per year between 2030 and 2050. Of this 38,000 will be from the impact of heat elderly people, 48,000 due to diarrhea, 60,000 due to malaria, and 95,000 due to childhood undernutrition. Huge increase in emissions of CO<sub>2</sub> and other greenhouse gases have caused earth's temperature to rise by 0.85°C and an increase of 2% will cause irreversible changes in climate. This will lead to rising of sea levels, melting of glaciers, changes in patterns of precipitation and extreme weather events. These will cause serious damage to social and environmental determinants of health, such as drinking water, food and livelihoods.

Rise of ozone and other pollutants increases the incidence of cardiovascular and respiratory diseases. Changing weather patterns could support an increase in the number of vectors such as mosquitoes and water borne pathogens. Destruction of habitats force wild animals to move from forests to human habitations, increasing the probability of viruses, commensal in wild animals, infect humans for them could be disastrous. (e.g. Ebola, SARS-CoV-2).

Health impact of climate change will affect different populations disproportionately. The poor will suffer the most and among them children and elderly people. It is in this context that the concept of One Health Approach to prevent Anti Microbial Resistance has evolved.

### **Recommendations for reducing Anti Microbial Resistance through One Health approach in Kerala.**

#### **Setup a state coordination committee for monitoring One Health:**

Since One Health Approach will need coordination between many departments, including sharing of data and cooperation in prevention or amelioration strategies, it cannot be left to one department. Therefore, a high level coordination committee consisting of representatives from the Agriculture, Animal Husbandry, Dairy Development, Fisheries, Wild life, Health, Environment, Science and Technology along with academic and research institutions dealing

with the subject needs to be set up. The Committee needs to review current literature on the subject, set up surveillance systems, analyse data, develop strategies to deal with it, assign work on each strategy and monitor progress in implementing them. An annual report detailing the present situation and action being taken shall be prepared.

#### **Surveillance of pathogens in animals, birds and fisheries:**

Departments dealing with veterinary, dairy, poultry and fisheries in the state are aware of the implications of monitoring presence of pathogens and antibiotics as they have to comply with phytosanitary conditions imposed by World Trade Organisation for export. However, the same standards are not ensured in products made or imported for domestic use. Animal Husbandry, dairy and fisheries department needs to carry out periodic systematic sampling of animal products and set up micro biology and biochemistry laboratory facilities for testing them. This needs to be compiled and shared with all members of the coordination committee.

#### **Hospital based surveillance:**

While other sectors may play a role in creating and spreading antibiotic resistant pathogens, places where they cause the most damage and are easiest to pick up are in hospitals. Health department needs to put in place a surveillance system for identifying antibiotic resistance at all levels of hospitals. Health care providers shall be trained on symptoms of AMR and hospitals shall have laboratory support to test AMR.

#### **Rational use of antibiotics:**

Main reason for AMR is the irrational use of antibiotics. Doctors need to be trained on how to start with the lowest level of antibiotics warranted by the symptoms, supported to get sensitivity of the drugs tested and trained to de-escalate the drugs based on sensitivity tests. Over the counter sale of antibiotics needs to be strictly controlled by matching inventories to stocks supplied through use of IT. Veterinarians shall be trained on rational use of drugs to treat animal illnesses. There shall be a drug formulary for use with animals and their sale be regulated as with drugs for human beings.

#### **Prevention of infection in hospitals.**

Resistant pathogens are passed on health care settings due to poor infection control. Universal precautions must be strictly enforced by training health care personnel, supporting them with protective equipment and monitoring compliance. Hospital acquired infections must be monitored to find out if the protocol is being followed.

#### **Creating awareness:**

Government must carry out campaigns to generate awareness about AMR. The dangers of using antibiotics irrationally must be explained to the public. Owners and managers of

animal houses, poultry units and fish farms must be trained on the need to be careful with the use of antibiotics and the dangers associated with it.

Antibiotics are good for human health only when they are used rationally. Otherwise they are harmful as they kill good bacteria that keep human beings healthy. No new antibiotic is expected to be available in the near future. If the bacteria develop resistance to the existing antibiotics there would be no medicine left to fight them. Therefore, it is important to conserve the current antibiotics and prevent them from being ineffective. This can be done by rational use of antibiotics and by following the One Health Approach through the collaboration of stakeholders in all sectors that impact humans.



# Epilogue

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Report on 'Sustainable Development- Governance Issues' is the outcome of striving to be in tune with thrust given to balance development and sustainable use of resources. Development is the central agenda of all nations across the world. One of the most prominent classifications of world nations into developed and underdeveloped is based on the level of development each country has attained. There is no dearth of policies for ensuring sustainable development. But an assessment of tangible results in the sector often point to shortcomings/failure in implementation of the policies. In its efforts to be in the league of developed nations, countries often compromise on ensuring sustainability in development leading to degradation of environment/ecology and resultant issues to human/animal and plant life. The report aims to understand issues in sustainable development and link it with governance issues. As processes for development advance drastically, sustainability issues need to be emphasised equally drastically. This requires governance to play a vital role.

This report focuses on five areas of Sustainable Development,

- Agriculture, Fisheries, Biodiversity and Forests
- Waste Management, Pollution, Health and Sanitation
- Energy, Industries, Infrastructure and Tourism
- Water
- Climate Change and Disaster Management.

Legal framework in the selected sectors, agencies responsible for implementation of policies and programmes, strategies adopted by them, governance issues in implementation, and few success stories were studied. Recommendations are made based on studies by the Commission, information gathered from secondary data and inputs from experts.

During the study, it is observed that in most of the selected sectors, there are contradictions and lack of synergy in provisions of the Acts and Rules governing functioning of departments and implementation of programmes and projects. To cite one example, provisions for the penalty for dumping waste in public places differ from department to department and agency to agency. Management of waste and pollution is entrusted with Local bodies/ Pollution Control Board (PCB). But they are not authorised to impose fine or levy penalty for violation of regulations in

waste disposal. Similar anomalies exist in other areas also. Integration and standardisation of administrative tools are recommended in the report to overcome these issues. Integrated/joined up functioning across the five areas specified in this report is essential for sustainable management of development. For instance, promotion of agriculture with biodiversity needs to be free of pollution of air, water and land, which demands integration of laws in the field of waste management and agriculture.

Transparency and people's participation are another issue. Technicalities, working strategies, findings of R&D initiatives and funding details of projects need to be translated to understandable popular language to ensure people's participation in development projects. Feedback and suggestions also need to be given due importance and there shall be legal provision and procedure to do so. Decentralisation in policy making is necessary in all the selected sectors ensuring adoption of scientific principles without any compromise. Proper interaction and exchange of ideas among experts, people's representatives, voluntary organisations and individuals in such matters are necessary. Success stories from the sectors and from each locality shall be taken as a model and made known to others not only for adoption, but as inspiration for innovative solutions.

Whole world is undergoing a great crisis. The state has to evolve alternative development models to adapt to changes caused by climate change and disasters. Lack of productive activities in primary and secondary sectors used to be compensated to a large extent through remittances of migrants to other states in India and other countries and by dependence on the service sector. These inflows helped the state to ensure a basic minimum standard and quality of life. But there is a recent shift in this scenario caused by increased demand for engaging local human resources. Covid 19 pandemic and resultant shifts in the economy of many countries may worsen the prospects of expatriates in these countries.

With social and economic crisis assuming universal proportions, strategies need to be relooked/ restructured. The Commission submits this report with the hope of igniting administrative reforms for improving governance structures to address fast emerging challenges and the need to manage the challenges in a new pattern and direction, sustainably.







## Appendices

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## Appendix I

### **STUDY ON SUSTAINABLE DEVELOPMENT-GOVERNANCE ISSUES Executive Summary of the Brainstorming Session**

**Venue: Centre for Management Development    Date: 11th May 2018**

World Commission on Environment and Development (WCED) defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Our future economic development and quality of life depends entirely on the natural resources and quality of the environment i.e., the quality of land, water and air. Kerala has to adopt a holistic approach to the concept of sustainable development by meshing the development aspirations of the citizens with environmental consciousness. Administrative Reforms Commission (ARC) is conducting a study on "Sustainable Development-Governance Issues". The aim of this study is to understand the implication of rapid economic growth on environmental sustainability, developmental issues, challenges, opportunities and constraints to growth, integration of programmes across key departments and constraints faced in implementation of environmental policies and laws and to recommend measures to address these issues. For the progress of the study, a brainstorming session was held with various government functionaries, dignitaries of Non-Governmental Organisations and members representing the general public.

Smt. Sheela Thomas, Member Secretary, ARC, welcomed the gathering for the brainstorming session. She stated that it is important to consider how effectively we can utilise our land, water and air towards sustainable development. She suggested having a holistic approach to environmental issues instead of tackling them piecemeal.

Sri V S Achuthanandan MLA, Chairman, Administrative Reforms Commission in his opening address stated that the commission has already submitted two reports to the government namely 'Vigilance System — Reformation' and 'Capacity Development of Civil Servants Kerala'. Currently the Commission is conducting studies in other areas and we have gathered here as part of one such study relating to sustainable development. Sustainable development is the term which people of Kerala have been listening to for many years. Unfortunately, the problem is that in many cases, the development interests of this generation are likely to override interests of the next generation. The government is forced to bring out development through continuous constructions which resulted in developmental problems. There are laws and regulations at the international, national and state level, focussing on the environmental impacts of development. But it is observed that every law is violated or mitigated. The Chairman also stated that apart from developments like highways, airports, convention centres and IT parks, we need a generation to enjoy these facilities. Therefore we need to ensure a balance between development and environment. He concluded by hoping that this intellectual exercise would help out fruitful discussions towards sustainable development.

Sri P.H Kurien IAS, Additional Chief Secretary, Government of Kerala, in his keynote address stated that in our state, many important laws relating to environment are violated. The regulatory and enforcement agencies are not able to stop these violations. Due to the lack of a holistic approach, we are not conducting Environmental Impact Assessment. Our belief that compartmentalisation would help us in solving the development issues did not help us towards sustainable development. He voiced his concern towards the new trend of putting flex boards on all occasions. Flex board containing harmful chemicals will create potential health hazards. He opined that apart from Air and Water Act, we have a plethora of acts which only helped to complicate the process. He also suggested addressing issues relating to cross institutional compartmentalisation. He concluded his speech hoping that this discussion would bring positive recommendations.

### **Session I : Land Use, Land Issues**

Session chaired by Sri. A T James IAS, Commissioner of Land Revenue

Sri. James IAS started the discussion by saying that land issues in Kerala are critical due to lack of environment-friendly laws. He affirmed that property right protection is equivalent to protection of life. He also stressed on the relevance of zonation. According to him, Town Planning Act is not practical in Kerala. He highlighted the need for having a Conclusive Land Titling Authority in the state.

The floor was opened for discussion.

Sri. Sajith Babu IAS, Registrar, Co-operative Department opined that in Kerala land utilisation is not properly marked as per the 7th schedule of the Constitution. Also the zones are not marked as per the Town Planning Act. He remarked that as Kerala is having homestead type of settlement, the pattern of Srilanka can be adopted by Kerala for sustainable development. The major suggestions put forwarded are :

- Adopting proper mechanisms against diversion of agricultural land to non agricultural purpose
- Zonation to avoid legal disputes relating to land

Sri Sajith Babu also cited some positive initiatives. They are :

- State government's decision to cut down all Acacia and Eucalyptus trees as they resulted in groundwater depletion
- Initiatives of Cooperative department to take up agriculture activities in barren lands
- LIFE Mission, an important step of the government towards sustainable development

Sri. G Rajeev, Special Secretary, Environment Department, highlighted towards the importance of having environment related policies. He voiced his concern for not considering the sustainable aspects in environment related matters.

Dr.V Santhosh, Chief, Perspective Planning Division, Kerala State Planning Board, stated that out of the 44 working groups constituted by the Planning Board, one group is exclusively working for land and related matters. The major points he made are:

- Lack of effective integration between the registration and survey department
- Modernisation and digitalisation according to Land Settlement Authority Report
- Avoiding GIS based duplication by integrating the activities of the departments
- Scheduling development plans
- Considering the issues of the people residing near the mining places
- Government measures for biodiversity conservation
- To address the major problems that adversely affect the biodiversity like overexploitation, land acquisitions and encroachment

Dr. Sheela A M, Senior Environmental Engineer, Kerala State Pollution Control Board cited that zoning is generally divided into four main categories — industrial, commercial, residential and sensitive zones. She added that as Kerala is a mixed zone, it is difficult to implement this type of zoning. By citing the example of Thiruvananthapuram district, she opined that we are on a trend of urbanization. The points she made are :

- When built-up area increases, vector borne diseases also increases
- Freshwaters are the breeding ground for mosquitoes
- When rural areas get urbanised, environment is adversely affected

Sri. Shibu K Nair, Director, Zero Waste & Climate Change, stressed the importance of Coastal Conservation Act. He highlighted the need for creating public awareness regarding land use rules and regulations for avoiding violation in the field of construction.

Dr. Reena KJ, ADHS — Public Health, opined that the main reason for the wide spread of communicable diseases is due to climate change. She also remarked that unplanned urbanization leads to the increasing rate of vector borne diseases.

Dr. Hari Narayanan, Senior Scientist, Kerala State Council for Science, Technology & Environment opined that the major problem relating to sustainable development is the conflict of laws. He also opined that administrative reform should first start from departments. The main points discussed are :

- Wetland policy revision
- Conflicts in state and central laws
- Violation of land laws relating to construction
- Discrepancy in laws and rulings for departments
- Lack of interdepartmental coordination

Dr. Padmakumar, Director, International Research & Training Centre for Below Sea level Farming, opined that wetland usage is a major concern. Climate changes have resulted in bringing drastic changes in the sea areas. He also pointed that wetlands have been changing to dry lands. He highlighted that Planning Board's study relating to soil acidity in Kerala revealed serious adverse effects on individual health.

Dr. Indu P S, Professor & Head, Community Medicine, Thiruvananthapuram Medical College opined that according to Dengue burden estimate prepared in association with World Health Organisation, Thiruvananthapuram has recorded highest dengue cases. The unused areas which are breeding ground for mosquitoes resulted in increasing the total vector density.

Sri Johnson Premkumar, Suchitwa Mission stressed the need for monitoring the financial expenditure.

Sri. A T James I.A.S concluded the session by saying that proper implementation is the key to reformation.

The key points discussed in this session are:

- Importance of Zonation
- Issues relating to Land Act and Conclusive Land Titling
- Protection and preservation of forest areas
- Coordination between agencies and need for a coordinating agency

## **Session II — Water Resources and Drinking Water**

The session was chaired by Sri. C P Nair, Member Secretary, ARC.

Sri C P Nair opened the floor with a foreword pointing the pathetic condition of water sources like Bharathapuzha and Pamba. He mentioned about the coastal zone violations that are widely happening, as well as regarding the importance of constructing check dams. He then invited the participants for their inputs.

Sri. K Muralidharan Nair, Special Private Secretary to Minister for Water Resources, in his open remarks briefed the activities of the government relating to water resources and also about upcoming projects. He assured that the state will continue to strive for the public and will create awareness activities and practical solutions for conserving water.

Sri.N K Sukumaran Nair, General Secretary, Pampa Parirakshana Samithy gave a brief description about the Pamba Action plan and complained that the authorities are not taking any initiatives for the proper conservation of the water bodies. He also opined that polluting different water bodies is an ongoing process. The major suggestions put forwarded are :

- Active involvement of governing wings/ departments for conservation of all natural resources
- Environment Department has only the role of a sub-department. There is a need to reconstitute it with sufficient power.

Sri. G Rajeev, Special Secretary, Environment opined that we have enough fund for implementing projects. It is due to poor governance, funds are not properly utilised. The major suggestions put forwarded are:

- Authorising an utilization agency for issuing utilization certificate
- Formulating an umbrella agency with the power of a nodal agency

Sri. James Jacob, Director, Rubber Research Institute of India opined that the custodian of river water is Irrigation Department. Issues relating to sand mining and land encroachment are dealt by the Revenue Department. There is bio-diversity committee in every panchayat and this committee can be utilised for solving local level environmental issues.

Sri. Vijayan, Senior Superintendent, Dairy Department stressed the need for recharging the groundwater. He opined that rain harvesting plans should also be strictly implemented.

Dr. Sheela, Senior Environmental Engineer, Kerala State Pollution Control Board opined that pipelines infused in Thiruvananthapuram Corporation in 1945 are constructed near the lakes and rivers. The pumping stations are also located near to it.

Sri. C P Nair pointed the need for having proper awareness, guidelines and attitude for conservation and sustainable development. He concluded the session by making general brief about the points discussed in the session which are given below:

- Aspects of Winning Augmentation Renovation of Water Resources (WAR)
- Sanitation problems relating to solid and liquid waste management
- Controlling water consumption by implementing a standardization technique
- Soil recharge and groundwater charging to increase the surface water level
- Utilising barren lands for water storage
- Need of subsurface dams instead of check dams
- Importance of green areas for absorbing the nitrogen content from the sanitary waste
- Lack of proper utilisation of funds
- Lack of interdepartmental coordination

The major suggestions put forwarded are :

- Developing new scientific techniques for solving water resources related pollutions
- Public awareness for conservation of natural resources
- Protection of water resources and formation of a nodal agency Session III- Sanitation and Waste Management

The session was chaired by Dr Joy Elamon, Director, KILA. Dr Joy Elamon opined that solid waste and sewerage governance is the best term that can include all aspects of sanitation and waste management. Presently, there are no mechanisms for sewerage and sanitation governance. Watersheds help in recharging water stewardship. Water productivity concept should be utilized at all levels and water stewardship incentive should be given for effective utilisation of water. Department wise activity mapping and responsibility mapping will help in fixing the accountability and space for convergence and integration. The adoption of new technology into our structure should be welcomed which enables sustainable development. He also proposes to rethink the human resource structure and to develop their technical capability.

Dr. Elamon opened the floor for discussion.

Smt. Sheela remarked about the Solid Waste Management (SWM) Rules which was re-notified in 2016. She also gave a brief description about the role of various agencies like Suchitwa Mission, Clean Kerala Company and Haritha Karmasena. She further added that no action has been taken with regard to liquid waste management. Smt. Sheela affirmed that decentralised sewage scheme is the best way to address this problem. She remarked that private and public partnerships are essential for bringing changes.

Sri. Shibu K Nair opined about policy conflicts and difficulty of the centralized and decentralized system to coexist together. He stressed the need for having clarity in the Public Health Acts. He also remarked that we need environmental managers instead of sanitation experts by providing them necessary training in the concerned areas.

Sri. Joy N R, Chief (I & I) Division, Planning Board stressed the need for integrating policies, rules and regulations. The points made by him are :

- Integrating different departments to avoid the restrictions for implementing a single window clearance mechanism
- Need to overcome the project management challenges
- Need for an electrical engineering wing in Kerala and ERP solutions to achieve excellence in IT oriented solutions.

Dr. P S Harikumar, cited about the successful waste management system practiced in Kozhikkode by Niravu Agency (an NGO). According to him, septage management is a concern which needed to be addressed, as the state is suffering from its adversities and it can be implemented through Research and Development (R&D).

Sri. Hari Narayanan opined that we are not using the strength of the natural sources and are overdoing things which contribute to pollution. He stressed on the need to promote organic diversity which can improve the hygiene quotient of the society. Liquid waste management should be given more focus and importance. He also acknowledged the Harithakeralam projects which are working towards waste management.



Sri. Rajeev cited the *Almithara Patel vs Union of India*, 1998 case by which a rule to manage solid waste management through aerobic bio compost came up. According to him, political apathy is the main reason for all the waste management related problems.

Dr. Indu pointed out that the state needs an overall planning. She opined that responsibility fixing is very important and it needs regulations for proper functioning. The biomedical rules also need revision. There are lot of rules and regulations which need to be audited for avoiding overlapping. She also opined that there is scope for need based R&D's. She also remarked that the WASH (Water Sanitation and Hygiene) Governance and education plays a major role in ensuring sanitation and hygiene.

Smt. Reena asserted the need for a strict and proper planning for solid waste management activities.

Sri. Nagesh Kumar, Assistant Manager, Clean Kerala Company Ltd. emphasised on the lack of waste management mechanisms. He mentioned the three R's (Reduce, Reuse, Recycle) which forms an important part of waste management. He also opined that 100% recycling is not at all possible.

Sri. Shibu stated that elected representatives should take lead roles for efficient waste management system. He remarked that proper monitoring is essential to avoid further degradation of resources.

Other aspects discussed in the session include :

- Facilities to treat sewage and sullage waste at household level
- Problems relating to waste management
- Need for monitoring
- Research and Development
- Public awareness

Sri. Joy Elamon reemphasized the need for proper monitoring by the government. He concluded session by saying that we have rules but are not implemented in its right spirit. We also have funds, but not fully utilized.

Smt. Sheela Thomas concluded the brainstorming session by saying that discussions were fruitful and helped in generating numerous ideas and suggestions for ensuring sustainable development.



Appendix II

**‘സുസ്ഥിര വികസനം - ഭരണപരമായ പ്രശ്നങ്ങൾ’  
എന്ന പഠന വിഷയത്തിന്റേലുള്ള കൂടിയാലോചനകൾക്കും പഠനത്തിനുമായി  
ഭരണപരിഷ്കാര കമ്മീഷന്റെ ആഭിമുഖ്യത്തിൽ  
2018 സെപ്റ്റംബർ 7ന് തൈക്കാട് ഗവ. ഗസ്റ്റ് ഹൗസിൽ ചേർന്ന യോഗത്തിന്റെ നടപടിക്കുറിപ്പ്**

‘സുസ്ഥിര വികസനം ഭരണപരമായ പ്രശ്നങ്ങൾ’ എന്ന വിഷയം സംബന്ധിച്ച പഠനത്തിനായി ഭരണപരിഷ്കാര കമ്മീഷൻ രൂപം നൽകിയിട്ടുള്ള വിദഗ്ദ്ധ സമിതിയുടെ യോഗം രാവിലെ 10 മണിക്ക് ആരംഭിച്ചു. കമ്മീഷൻ അംഗങ്ങളായ ശ്രീ സി.പി. നായർ, ശ്രീമതി നീലാ ഗംഗാധരൻ, മെമ്പർ സെക്രട്ടറി ശ്രീമതി ഷീല തോമസ് എന്നിവർ യോഗ നടപടികൾ നിയന്ത്രിച്ചു. യോഗത്തിൽ പങ്കെടുത്ത മറ്റുള്ളവരുടെ വിശദാംശങ്ങൾ അനുബന്ധമായി ചേർക്കുന്നു.

സുസ്ഥിര വികസനവുമായി ബന്ധപ്പെട്ട് സംസ്ഥാനത്തിന് പുതിയൊരു നയം രൂപീകരിക്കുകയോ നിലവിലുള്ള നയം പരിഷ്കരിക്കുകയോ ചെയ്യേണ്ടതിന്റെ ആവശ്യകതയിലേക്ക് അടുത്തിടെയുണ്ടായ പ്രളയം വീണ്ടും വിരൽച്ചൂണ്ടുന്നുവെന്ന് മെമ്പർ സെക്രട്ടറി അഭിപ്രായപ്പെട്ടു. കേന്ദ്ര - സംസ്ഥാന തലങ്ങളിൽ നിരവധി നിയമങ്ങളും നിയമ നിർമ്മാണങ്ങളുമുണ്ടെങ്കിലും, സുസ്ഥിരതയെന്ന ആശയത്തെ എല്ലാ വികസന സംരംഭങ്ങളിലും സമഗ്രമായി ഇണക്കിചേർക്കേണ്ട കാലം അതിക്രമിച്ചിരിക്കുന്നുവെന്നും മെമ്പർ സെക്രട്ടറി കൂട്ടിച്ചേർത്തു.

കമ്മീഷൻ അംഗം ശ്രീമതി നീല ഗംഗാധരൻ, നിലവിലുള്ള പ്രളയ സാഹചര്യം കണക്കിലെടുത്ത് സ്വീകരിക്കേണ്ട ഹ്രസ്വകാല-ദീർഘകാല നടപടികളെക്കുറിച്ച് വിശദീകരിച്ചു. നടപടി കൈകൊള്ളുന്നതിന് സഹായകരമായ വിധത്തിൽ തെരഞ്ഞെടുത്ത വിഷയ മേഖലകളെ സംബന്ധിച്ച ശുപാർശകൾ താമസം കൂടാതെ സർക്കാരിന് സമർപ്പിക്കുന്നത് ഉചിതമായിരിക്കുമെന്ന് അംഗം അഭിപ്രായപ്പെട്ടു.

സംസ്ഥാനം അഭിമുഖീകരിച്ച ഏറ്റവും വലിയ പ്രകൃതി ദുരന്തത്തിന് പ്രാധാന്യം നൽകി കൊണ്ട് പ്രസക്തമായ നിർദ്ദേശങ്ങൾ ഈ പഠനത്തിലൂടെ രൂപപ്പെടുത്തി സമർപ്പിക്കാനാകണമെന്ന് കമ്മീഷൻ അംഗമായ ശ്രീ. സി.പി. നായർ അഭിപ്രായപ്പെട്ടു.

10.30 ന് ഉപസമിതി അംഗങ്ങളെക്കൂടി ഉൾപ്പെടുത്തി യോഗം തുടർന്നു.

യോഗത്തിൽ ശ്രീമതി നീലഗംഗാധരൻ രേഖപ്പെടുത്തിയ അഭിപ്രായങ്ങൾ: പിന്തുടരാവുന്ന മികച്ച മാതൃകകൾ കൂടി പഠനത്തിൽ ഉൾപ്പെടുത്തണം. മത്സ്യബന്ധനം, കൃഷി, ജലപരിപാലനം തുടങ്ങിയ മേഖലകളിലെ വിദഗ്ദ്ധരെ കൂടി പഠനസമിതികളിൽ ഉൾപ്പെടുത്തണം. പരിരക്ഷയും വികസനവും തമ്മിലുള്ള ബന്ധം കാലികമാക്കേണ്ടതിന്റെ പ്രാധാന്യം ഉയർത്തിപ്പിടിക്കണം. ഗാഡ്ഗിൽ കമ്മിറ്റി, കസ്റ്റുറിംഗ് കമ്മിറ്റി, ദേശീയ ഹരിത ട്രിബ്യൂണൽ എന്നിവയുടെ ശുപാർശകൾ കൂടി വിശദമായ പഠനത്തിന് വിധേയമാക്കണം. ജപ്പാൻ പോലുള്ള രാജ്യങ്ങൾ പിന്തുടരുന്ന സത്തുലിത വികസന മാതൃകകൾ പിന്തുടരുന്നതിന്റെ പ്രാധാന്യം ഉൾക്കൊള്ളുന്നതിലേക്കായി അത്തരം മാതൃകകൾ കൂടി പഠനവിധേയമാക്കണം.

പൗരരുടെ അവകാശങ്ങളും കർത്തവ്യങ്ങളും സംബന്ധിച്ച ബോധവൽക്കരണ പരിപാടികളുടെ പ്രാധാന്യം കൂടി പഠനത്തിൽ പരിഗണിക്കണം.

കേരള സ്റ്റേറ്റ് കൗൺസിൽ ഫോർ സയൻസ് ടെക്നോളജി ആൻഡ് എൻവിയോൺമെന്റിലെ സീനിയർ സയന്റിസ്റ്റ് ഡോ. പി. ഹരിനാരായണൻ തയ്യാറാക്കിയ ആശയക്കുറിപ്പ് (Concept Note) യോഗത്തിൽ അവതരിപ്പിച്ചു. അതെതുടർന്ന് ആശയക്കുറിപ്പിന്റെ അടിസ്ഥാനത്തിലുള്ള വിശദമായ ഗ്രൂപ്പ് ചർച്ചകളും ഗ്രൂപ്പ് കൺവീനർമാരുടെ റിപ്പോർട്ടിങ്ങും നടന്നു. ജനങ്ങളുമായി ഏറ്റവും അടുത്തിടപഴകുന്ന തദ്ദേശ സ്വയം ഭരണ സ്ഥാപനങ്ങളുടെ ഫലപ്രദമായ പ്രവർത്തനം, അടിയന്തിരമായി പരിഹരിക്കേണ്ട ഖര-ദ്രവ മലിനീകരണ പ്രശ്നങ്ങൾ, നിർവ്വഹണ ഏജൻസികൾ നേരിടുന്ന പ്രശ്നങ്ങളും പരിഹാരവും എന്നിവയെല്ലാം ചർച്ചാ വിധേയമാക്കി. എല്ലാ ഉപസമിതികളും തങ്ങളുടെ റിപ്പോർട്ടുകൾ ഒരു പൊതു ചട്ടക്കൂടിൽ നിന്നുകൊണ്ട് തയ്യാറാക്കുവാനും, രണ്ടാഴ്ചയ്ക്ക് ശേഷം ഉപസമിതിയോഗം വിളിച്ചു ചേർക്കുവാനും തീരുമാനിച്ചു. ഓരോ ഗ്രൂപ്പിലും ഉൾപ്പെടുത്തേണ്ട വിഷയങ്ങളും പുനഃക്രമീകരിച്ചു.

- ഗ്രൂപ്പ് 1 : മാലിന്യ സംസ്കരണം, മലിനീകരണം, ആരോഗ്യവും ശുചിത്വവും
- ഗ്രൂപ്പ് 2 : കൃഷി, മത്സ്യബന്ധനം, ജൈവവൈവിധ്യം, പ്രകൃതിവിഭവ മാനേജ്മെന്റ്, വനം.
- ഗ്രൂപ്പ് 3 : പാർപ്പിടം ഉൾപ്പെടെ അടിസ്ഥാന സൗകര്യങ്ങൾ, ഊർജ്ജം, വ്യവസായങ്ങൾ, ഖനനം, ടൂറിസം
- ഗ്രൂപ്പ് 4 : ജലവിഭവങ്ങളും മാനേജ്മെന്റും
- ഗ്രൂപ്പ് 5 : കാലാവസ്ഥാ വ്യതിയാനവും ദുരന്ത നിവാരണവും

അംഗങ്ങൾക്കു സ്വതന്ത്രമായി പ്രവർത്തിക്കാമെന്നും, പ്രവർത്തനങ്ങൾ എത്രയും വേഗം ആരംഭിക്കണമെന്നും പ്രസ്താവിച്ച് മെമ്പർ സെക്രട്ടറി എല്ലാവർക്കും നന്ദി രേഖപ്പെടുത്തി.

യോഗം 1.30 ന് അവസാനിച്ചു.

**യോഗത്തിൽ പങ്കെടുത്ത മറ്റുള്ളവർ**

1. ഡോ. പി. ഹരിനാരായണൻ, സീനിയർ സയന്റിസ്റ്റ്, കെ.എസ്.സി.എസ്.ടി.ഇ
2. ശ്രീമതി മറിയമ്മ സാനു ജോർജ്ജ് (നിർമ്മല), സ്റ്റേറ്റ് ടീം ലീഡർ, ഡി.എഫ്.ഐ.ഡി - സിസിഐപി
3. ഡോ. ഷീല എ.എം, സീനിയർ എൻവയോൺമെന്റൽ എൻജിനീയർ, കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്.
4. ഡോ. കേശവ് മോഹൻ, ആക്റ്റിംഗ് ചെയർമാൻ, എസ്.എൻ.ഐ.ടി, അടൂർ
5. ഡോ. ലക്ഷ്മി. പി.എം, എൻവയോൺമെന്റൽ സയന്റിസ്റ്റ്, ഡി.ഒ.ഇ.സി.സി
6. ശ്രീ. ബൈജു. കെ, ടൗൺ പ്ലാനർ, ചീഫ് ടൗൺ പ്ലാനറുടെ ഓഫീസ്
7. ശ്രീ. കെ.എം. ധരേശൻ ഉണ്ണിത്താൻ, ഡയറക്ടർ, എൻജി മാനേജ്മെന്റ് സെന്റർ.
8. ശ്രീ. ജോയ്.എൻ.ആർ, ചീഫ് ഐ&ഐ ഡിവിഷൻ, സ്റ്റേറ്റ് പ്ലാനിംഗ് ബോർഡ്
9. ശ്രീ.രമേശ്.എം.ആർ, മുൻ ഡയറക്ടർ, ഭൂരർഭ ജല വകുപ്പ്
10. ശ്രീ.എബ്രഹാം കോശി, കൺസൾട്ടന്റ്, ഹരിതകേരളം മിഷൻ

- 11. ഡോ. ജെയിംസ് ജേക്കബ്, ഡയറക്ടർ, റബർ റിസർച്ച് ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് ഇന്ത്യ, റബർ ബോർഡ്, കോട്ടയം
- 12. ശ്രീ. എം. രാജദാസൻ, അഡീ. ഡയറക്ടർ (എച്ച്), ടൂറിസം വകുപ്പ്
- 13. ശ്രീ. ബി. പ്രദീപ്, ഡെപ്യൂട്ടി ചീഫ് എൻജിനീയർ, കെ.എസ്.ഇ.ബി ലിമിറ്റഡ്.
- 14. ശ്രീ. ജി. ഉണ്ണികൃഷ്ണൻ, ജനറൽ മാനേജർ, കെ.എസ്.ഐ.ഡി.സി
- 15. ഡോ. ആർ.എം. പ്രസാദ്, അസോസിയേറ്റ് ഡയറക്ടർ, ഫാം കെയർ ഫൗണ്ടേഷൻ
- 16. ഡോ. എ. ജലാലുദ്ദീൻ, ഡയറക്ടർ ഓഫ് അക്കാഡമിക്സ് ആൻഡ് റിസർച്ച് (റിട്ട.), ഫാം കെയർ ഫൗണ്ടേഷൻ, തൃശ്ശൂർ
- 17. ഡോ. ഇ.എ. ജെയ്സൺ (റിസർച്ച് കോ.ഓർഡിനേറ്റർ റിട്ട.) കെ.എഫ്.ആർ.ഐ, പീച്ചി
- 18. ശ്രീ. ജഗജീവൻ എൻ, കൺസൾട്ടന്റ്, ഹരിതകേരള മിഷൻ
- 19. ശ്രീ.എൻ.ടി. നിയ്യാസ്, സയന്റിസ്റ്റ്, ഇന്ത്യ മീറ്റീരിയോളജിക്കൽ ഡിപ്പാർട്ട്മെന്റ്
- 20. ശ്രീ.സുരേഷ് കുമാർ. എസ്, ജോയിന്റ് ഡയറക്ടർ, ഡയറക്ടറേറ്റ് ഓഫ് ഇൻഡസ്ട്രീസ്
- 21. ശ്രീ. പ്രതീഷ് സി മാമ്മൻ, സയന്റിസ്റ്റ്, ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ കൈംലമറ്റ് ചേയ്ഞ്ച് സ്റ്റഡീസ്, കോട്ടയം
- 22. ഡോ. ഇന്ദു. പി.എസ്, പ്രൊഫസർ & ഹെഡ്, ഡിപ്പാർട്ട്മെന്റ് ഓഫ് കമ്മ്യൂണിറ്റി മെഡിസിൻ, ഗവ. മെഡിക്കൽ കോളേജ്, തിരുവനന്തപുരം
- 23. ശ്രീ.ജെനിൻ തോമസ് അബ്രഹാം, ടെക്നിക്കൽ എക്സിക്യൂട്ടീവ്,  
ഡി.എഫ്.ഐ.ഡി - സിസിഐപി, തിരുവനന്തപുരം
- 24. ശ്രീ.നാരായണൻ നമ്പൂതിരി. ടി.വി, ഐ.എൻ.എൻ.യു.ആർ.എ എക്സിക്യൂട്ടീവ് എൻജിനീയർ, കേരള വാട്ടർ അതോറിറ്റി
- 25. ഡോ. എസ്. അഭിലാഷ്, കൊച്ചിൻ യൂണിവേഴ്സിറ്റി ഓഫ് സയൻസ് ആന്റ് ടെക്നോളജി
- 26. ഡോ.കെ.കെ രാമചന്ദ്രൻ, ഗ്രൂപ്പ് ഹെഡ്, എൻ.സി.ഇ.എസ്.എസ്
- 27. ശ്രീ. ടി.ആർ. ജയപാൽ, സീനിയർ അഡ്മിനിസ്ട്രേറ്റീവ് ഓഫീസർ, പിഡബ്ല്യൂഡി (അഡ്മിനിസ്ട്രേഷൻ)



Appendix III

**സുസ്ഥിര വികസനം - ഭരണപരമായ പ്രശ്നങ്ങൾ എന്ന വിഷയത്തിൽ  
 ഭരണപരിഷ്കാര കമ്മീഷൻ നടത്തിവരുന്ന പഠനവുമായി ബന്ധപ്പെട്ട്  
 2018 ഒക്ടോബർ 17 ന് കമ്മീഷന്റെ ആഭിമുഖ്യത്തിൽ  
 ഐ.എം.ജിയിലെ 'ശ്രീ' കോൺഫറൻസ് ഹാളിൽ ചേർന്ന കൂടിയാലോചനാ യോഗത്തിന്റെ മിനിറ്റ്സ്.**

ബഹു. ഭരണ പരിഷ്കാര കമ്മീഷൻ ചെയർമാൻ ശ്രീ. വി.എസ്. അച്യുതാനന്ദന്റെ അധ്യക്ഷതയിൽ യോഗം രാവിലെ 10.00 മണിക്ക് ആരംഭിച്ചു. കമ്മീഷൻ അംഗം ശ്രീ. സി.പി. നായർ, മെമ്പർ സെക്രട്ടറി ശ്രീമതി. ഷീല തോമസ് എന്നിവർ സന്നിഹിതരായ യോഗത്തിൽ താഴെ പറയുന്ന വ്യക്തികൾ പങ്കെടുത്തു.

1. ശ്രീ. എസ്.എം. വിജയാനന്ദ് ഐ.എ.എസ്. (റിട്ട.) മുൻ ചീഫ് സെക്രട്ടറി.
2. ശ്രീമതി കെ.ബി. വത്സല കുമാരി ഐ.എ.എസ്. (റിട്ട.)
3. ഡോ. വീണ എൻ. മാധവൻ ഐ.എ.എസ്. ഡയറക്ടർ, പരിസ്ഥിതിയും കാലാവസ്ഥാ വ്യതിയാനവും വകുപ്പ്.
4. ഡോ. കെ.ജി. പത്മകുമാർ, ഡയറക്ടർ, International Research & Training Centre for Below Sea Level Farming.
5. ഡോ. ജോയ് ഇളമൺ, ഡയറക്ടർ, കില.
6. ഡോ. ഇന്ദു പി.എസ്. പ്രൊഫ. ആന്റ് ഹെഡ്, കമ്മ്യൂണിറ്റി മെഡിസിൻ, തിരു. മെഡിക്കൽ കോളേജ്
7. ശ്രീ. ജോയി എൻ.ആർ., ചീഫ്. (ഐ.ആന്റ് ഐ.) സംസ്ഥാന ആസൂത്രണ ബോർഡ്.
8. ഡോ. ഷീല എ.എം., സീനിയർ എൺവിയോൺമെന്റൽ എഞ്ചിനീയർ, സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്.
9. ഡോ. സാബു ജോസഫ്. പ്രൊഫ. ആന്റ് ഹെഡ്. ഡിപ്പാർട്ട്മെന്റ് ഓഫ് എൺവിയോൺമെന്റൽ സയൻസ്, കേരള യൂണിവേഴ്സിറ്റി.
10. ഡോ. ആർ. അജയകുമാർ വർമ്മ, എക്സിക്യൂട്ടീവ് ഡയറക്ടർ, ശുചിത്വമിഷൻ.
11. ഡോ. പി.കെ സനി കുമാർ, ഡയറക്ടർ, (കുടിവെള്ളം) ശുചിത്വമിഷൻ.
12. ശ്രീമതി ഏലിയാമ്മ വിജയൻ, സെക്രട്ടറി, സഖി റിസോഴ്സ് സെന്റർ.
13. ഡോ. ബി. ജി. ശ്രീദേവി, ചീഫ് സയന്റിസ്റ്റ്, നാറ്റ്പാക്.
14. ശ്രീ. കെ.എം. ധരേശൻ ഉണ്ണിത്താൻ, ഡയറക്ടർ, എനർജി മാനേജ്മെന്റ് സെന്റർ.
15. ശ്രീ. വിത്സൺ കെ.സി. സയന്റിസ്റ്റ്, നാറ്റ്പാക്.
16. ഡോ. ലക്ഷ്മി പി.എം., എൺവിയോൺമെന്റൽ സയന്റിസ്റ്റ്, പരിസ്ഥിതിയും കാലാവസ്ഥാ വ്യതിയാനവും വകുപ്പ്.

17. ശ്രീമതി മരിയാമ്മ സാനു ജോർജ്ജ് (നിർമ്മല) ടീം ലീഡർ,  
DFID, Climate change Innovation Programme.
18. ശ്രീ. പി.ബി. സാജൻ, കോസ്റ്റ് ഫോർഡ്
19. ശ്രീ. ജെയ്ൻ മിത്ര, സയന്റിസ്റ്റ്, Kerala State Remote Sensing & Environment Centre
20. ശ്രീ. പി. സുരേഷ്, സയന്റിസ്റ്റ്, Kerala State Remote Sensing & Environment Centre
21. ശ്രീ. ജി. ശങ്കർ, ആർക്കിടെക്ട് ആന്റ് പ്ലാനർ, ഹാബിറ്റേറ്റ് ടെക്നോളജി ഗ്രൂപ്പ്.
22. ശ്രീമതി സിസു ചെറിയാൻ, ഡയറക്ടർ, AYALA Water & Ecology
23. ശ്രീ. വിഷ്ണു മോഹൻ, ഓപ്പറേഷൻ ആന്റ് പ്രോജക്ട് മാനേജ്മെന്റ്  
Firefly Life Sciences pvt. Ltd. Bengaluru.

മെമ്പർ സെക്രട്ടറി ശ്രീമതി ഷീല തോമസ് സ്വാഗതം ആശംസിച്ചു. കേരളത്തിൽ സമീപകാലത്തുണ്ടായ അസാധാരണമായ പ്രളയത്തിന്റെയും കാലാവസ്ഥാ വ്യതിയാനങ്ങളുടേയും പശ്ചാത്തലത്തിൽ, അതിനുമുമ്പ് തന്നെ കമ്മീഷൻ തുടങ്ങിവെച്ചിരുന്ന ‘സുസ്ഥിര വികസനം - ഭരണപരമായ പ്രശ്നങ്ങൾ’ എന്ന വിഷയത്തിന്മേലുള്ള പഠനം ഏറെ പ്രസക്തമായിരിക്കുകയാണെന്നും ഇപ്പോഴത്തെ പ്രത്യേക സാഹചര്യം പരിഗണിച്ച് ഈ വിഷയത്തിൽ അടിയന്തിര പ്രാധാന്യമുള്ള ശുപാർശകൾ സർക്കാരിന് സമർപ്പിക്കണമെന്നും അതിനായി വിവിധ മേഖലകളിൽ പ്രവർത്തിക്കുന്ന വിദഗ്ദരുടെ അഭിപ്രായ ഏകോപനം സാധ്യമാക്കണമെന്ന് കമ്മീഷൻ തീരുമാനിച്ചിട്ടുണ്ടെന്നും ഇതിന്റെ അടിസ്ഥാനത്തിലാണ് യോഗം വിളിച്ചിരിക്കുന്നതെന്നും ശ്രീമതി ഷീല തോമസ് അറിയിച്ചു.

കഴിഞ്ഞ കാലങ്ങളിൽ വികസനം എന്ന മുദ്രാവാക്യം സുസ്ഥിര വികസനം എന്ന സങ്കല്പത്തിന് പോരാൽ ഏല്പിച്ചെന്നും പലപ്പോഴും വികസന മുന്നേറ്റത്തിൽ രക്തസാക്ഷിയായത് പരിസ്ഥിതിയാണെന്നും ബഹു. ചെയർമാൻ ശ്രീ. വി.എസ്. അച്യുതാനന്ദൻ തന്റെ അദ്ധ്യക്ഷ പ്രസംഗത്തിൽ പറഞ്ഞു. പൂർവ്വകാല ചെയ്തികളിലെ മടയത്തരങ്ങൾ തിരിച്ചറിയാൻ ഒരു പ്രളയം വേണ്ടിവന്നുവെന്നും ഇനിയും പിഴവുകൾ ആവർത്തിച്ചുകൂടാതെ തിരുമാനിക്കണമെന്നും ഭരണ പരിഷ്കാര കമ്മീഷൻ ഈ കാര്യത്തിൽ വിശദമായ പഠനം നടത്തി സർക്കാരിന് ശുപാർശകൾ സമർപ്പിക്കാൻ തീരുമാനിച്ചതെന്നും ചെയർമാൻ വിശദീകരിച്ചു.

നിലവിൽ പരിസ്ഥിതി സംരക്ഷണം സംബന്ധിച്ച് ആവശ്യമായ നിയമങ്ങളുണ്ടെന്നും അടിസ്ഥാനപരമായി അതു നടപ്പിലാക്കുന്നതിനുള്ള ആത്മാർത്ഥതയും ഇച്ഛാശക്തിയും ലക്ഷ്യബോധ്യവുമാണ് നമുക്കു വേണ്ടതെന്നും കമ്മീഷൻ അംഗം ശ്രീ. സി.പി. നായർ അഭിപ്രായപ്പെട്ടു.

Constructed Wetland എന്ന സാങ്കേതികവിദ്യയെ സംബന്ധിച്ച് ബംഗ്ളൂരു ആസ്ഥാനമായി പ്രവർത്തിക്കുന്ന AYALA Water & Ecology ഒരു പവർ പോയിന്റ് പ്രസന്റേഷൻ അവതരിപ്പിച്ചു.

തുടർന്ന് പാർപ്പിടം, ജലം, ആരോഗ്യം, കൃഷി, പരിസ്ഥിതി, റോഡ് വികസനം, ആസൂത്രണം, മലിനീകരണ നിയന്ത്രണം, തദ്ദേശ വികസനം, കാലാവസ്ഥാ വ്യതിയാനം, ഊർജ്ജ സംരക്ഷണം, തീരമേഖലാ സംരക്ഷണം തുടങ്ങിയ മേഖലകളിൽ നിന്നും ക്ഷണിക്കപ്പെട്ട വിദഗ്ദരുമായി സജീവ ചർച്ച നടന്നു.



പ്രധാന നിർദ്ദേശങ്ങളും അഭിപ്രായങ്ങളും :

- വിദഗ്ദ്ധർ, പൊതുജനങ്ങൾ എന്നിവരെ ഉൾപ്പെടുത്തിയുള്ള ജനകീയ കമ്മീഷനുകളുടെ രൂപീകരണം.
- സി.ഡി.എസ്. നടത്തുന്ന സാമ്പത്തിക പ്രത്യാഘാത പഠനംപോലെ മറ്റു പ്രധാന മേഖലകളിലെ പഠനങ്ങൾ നടത്തേണ്ടതിന്റെ ആവശ്യകത.
- പങ്കാളിത്ത പഠന പ്രവർത്തന രീതി (Participatory Learning & Action) ഉപയോഗിച്ചുള്ള തദ്ദേശ ഡോക്യുമെന്റേഷൻ പരിപാടികൾ.
- നിലവിലുള്ള നിയമങ്ങളുടെ നവീകരണവും ഫലപ്രദമായ നടത്തിപ്പും.
- കുടുംബശ്രീ മുഖേന പൗരബോധവൽക്കരണം.
- Habitat literacyയുടെ ആവശ്യകത.
- സർക്കാർ പരിശീലന സ്ഥാപനങ്ങളിലെ ദുരന്ത നിവാരണ പരിശീലനങ്ങൾക്ക് മുൻഗണന.
- വിവിധ വകുപ്പുകളുടെ വിവരങ്ങളുടെ ക്രോഡീകരണവും, പ്രസിദ്ധപ്പെടുത്തലും.
- പദ്ധതികൾ നടപ്പിലാക്കുന്നതിന് മുന്നോടിയായി നടത്തേണ്ട പാരിസ്ഥിതിക പ്രത്യാഘാത പഠനങ്ങൾ.
- മേഖലാ അടിസ്ഥാനത്തിലുള്ള ഡിസൈൻ ക്രൈറ്റീരിയം.
- കട്ടനാട് പോലുള്ള പ്രദേശങ്ങൾക്കായി നൂതന സാങ്കേതിക വിദ്യകളുടെ ആവിഷ്കരണവും ജൈവ വൈവിധ്യങ്ങളുടെ സംരക്ഷണവും.
- ചെലവ് കുറഞ്ഞതും, പരിസ്ഥിതി സൗഹൃദവും ജനകേന്ദ്രീകൃതവുമായ വാസ്തുവിദ്യകൾ സംയോജിപ്പിക്കേണ്ടതിന്റെ ആവശ്യകത.
- ഭൂവിനിയോഗത്തിൽ വ്യക്തമായ ഉത്തരവ്.
- ദുരന്ത പ്രതിരോധത്തിന് വ്യക്തമായ ആസൂത്രണവും, സമയോചിതമായ ഇടപെടലും.
- വൈകല്യവും ലിംഗപരവുമായ പ്രശ്നങ്ങൾ അഭിമുഖീകരിക്കുന്നതിനായിട്ടുള്ള design intervention
- ഓർഗാനിക് ആർക്കിട്ടെക്ചറിന്റെ പ്രാധാന്യം.
- മുഖ്യമന്ത്രിക്ക് നേരിട്ട് ഉപയോഗിക്കാനുള്ള തത്സമയ തീരുമാന പോർട്ടൽ സംവിധാനം.
- Retrofitting നുള്ള പ്രാധാന്യം.
- പ്രാദേശിക സർക്കാരുകളുടെ നേതൃത്വത്തിൽ ഒരു നിർമ്മാണത്തിന് നിരവധി മാസ്റ്റർ പ്ലാനുകൾക്ക് പകരം ഒരു മാസ്റ്റർ പ്ലാൻ എന്ന രീതിയിലുള്ള രൂപീകരണം.
- ജലനയം, പരിസ്ഥിതിനയം, ഖരമാലിന്യ സംസ്കരണം (Solid waste management) നിയമങ്ങളുടെ ഫലപ്രദമായ നടത്തിപ്പിൽ തദ്ദേശ സ്വയംഭരണ സ്ഥാപനങ്ങൾക്കുള്ള പങ്ക്.
- മാലിന്യജല സംസ്കരണത്തിന്റെ പ്രാധാന്യം.
- നിർമ്മാണാധിഷ്ഠിതമായ ആസൂത്രണം.

- കെട്ടിട നിർമ്മാണ ചട്ടങ്ങളിൽ വരുത്തേണ്ട മാറ്റങ്ങൾ.
- പുതിയ കെട്ടിടങ്ങൾക്കുള്ള പരിസ്ഥിതി സൗഹൃദ നടപടികൾ.
- പ്ലാസ്റ്റിക് പുനരുല്പാദനം.
- ദേശീയ-സംസ്ഥാന ഏജൻസികൾ തമ്മിലുള്ള ഏകോപനം.
- രക്ഷാദൗത്യ പദ്ധതി തയ്യാറാക്കുന്നതിനായി കുടുംബ വിവരങ്ങൾ ജി.പി.എസുമായി ബന്ധിപ്പിക്കുന്നതിനുള്ള സംവിധാനം.
- തീരദേശ പരിപാലനത്തിന് പ്രാധാന്യം കൊടുത്തുകൊണ്ടുള്ള വികസന പ്രവർത്തനങ്ങൾ.
- മലയോര പ്രദേശങ്ങളിലെ റോഡ് വികസനം.
- കാലാവസ്ഥാ വ്യതിയാന സെല്ലിന്റെ സജീവമായ പ്രവർത്തനം.
- പഞ്ചായത്ത് തലത്തിൽ ദുരന്ത നിവാരണ സേനയുടെ രൂപീകരണം.
- അണക്കെട്ടുകളിൽ അടിഞ്ഞു കൂടിയ എക്ക മണ്ണ് നിർമാർജ്ജനം.
- ഊർജ്ജ സംരക്ഷണം - സൗരോർജ്ജത്തിന്റെ പ്രാധാന്യം.

അംഗങ്ങൾ അവരുടെ കൂടുതൽ അഭിപ്രായങ്ങളും നിർദ്ദേശങ്ങളും എത്രയും പെട്ടെന്ന് കമ്മീഷൻ നൽകണമെന്ന് മെമ്പർ സെക്രട്ടറി ശ്രീമതി ഷീല തോമസ് അഭ്യർത്ഥിക്കുകയും എല്ലാ അംഗങ്ങൾക്കും കൃതജ്ഞത രേഖപ്പെടുത്തുകയും ചെയ്തു.

യോഗം 1.00 മണിക്ക് അവസാനിച്ചു.

Appendix IV

**കൂട്ടനാടിന്റെ സുസ്ഥിര വികസനം : ഭരണപരമായ പ്രശ്നങ്ങൾ എന്ന വിഷയത്തിൽ ഭരണപരിഷ്കാര കമ്മീഷൻ നടത്തിയ സെമിനാറിന്റെ മിനിറ്റ്സ്.**

'സുസ്ഥിര വികസനം : ഭരണപരമായ പ്രശ്നങ്ങൾ' എന്ന വിഷയത്തിൽ ഭരണപരിഷ്കാര കമ്മീഷൻ നടത്തിവരുന്ന പഠനത്തിന്റെ ഭാഗമായി 2019 ജൂലൈ 10 ന് മങ്കൊമ്പ് നെല്ല് ഗവേഷണ കേന്ദ്രത്തിൽ 'കൂട്ടനാടിന്റെ സുസ്ഥിര വികസനം - ഭരണപരമായ പ്രശ്നങ്ങൾ' എന്ന വിഷയത്തിൽ ഏകദിന സെമിനാർ നടന്നു. രാവിലെ 10.30ന് പരിപാടികൾ ആരംഭിച്ചു. ഭരണപരിഷ്കാര കമ്മീഷൻ മെമ്പർ സെക്രട്ടറി ശ്രീമതി. ഷീല തോമസ് സ്വാഗതം ആശംസിച്ചു. കൂട്ടനാടിന്റെ വികസനത്തിലെ ഭരണപരമായ പ്രശ്നങ്ങൾ കണ്ടെത്തുകയാണ് സെമിനാറിന്റെ ഉദ്ദേശ്യലക്ഷ്യമെന്നു മെമ്പർ സെക്രട്ടറി വിശദീകരിച്ചു. തുടർന്ന് അദ്ധ്യക്ഷ പ്രസംഗത്തിനായി ഭരണപരിഷ്കാര കമ്മീഷൻ ചെയർമാൻ ശ്രീ. വി.എസ്. അച്യുതാനന്ദനെ ക്ഷണിച്ചു. അദ്ദേഹം കൂട്ടനാടിന്റെ വിവിധ സവിശേഷതകളെപ്പറ്റി സംസാരിക്കുകയും കഴിഞ്ഞ വർഷമുണ്ടായ മഹാപ്രളയത്തിന്റെ ആഘാതം വർദ്ധിപ്പിച്ചതിൽ കൂട്ടനാടിൽ നടന്ന വികസന പ്രവർത്തനങ്ങൾക്കും ചെറുതല്ലാത്ത പങ്കുണ്ടെന്ന് പ്രതിപാദിക്കുകയും ചെയ്തു. മുൻകാലങ്ങളിൽ നടന്ന വികസന പ്രവർത്തനങ്ങൾ സുസ്ഥിരവും ആസൂത്രിതവുമായിരുന്നോ എന്ന് പരിശോധിക്കണമെന്നും പറഞ്ഞു. കൂട്ടനാടിന് സമഗ്രമായ ഒരു മാസ്റ്റർ പ്ലാൻ തയ്യാറാക്കുകയാണ് ഈ പഠനത്തിന്റെ ലക്ഷ്യം എന്നും അദ്ധ്യക്ഷപ്രസംഗത്തിൽ അദ്ദേഹം പറഞ്ഞു. സദസിനെ അഭിസംബോധന ചെയ്തു കൊണ്ട് മുൻ എം.എൽ.എ. ശ്രീ. സി.കെ. സദാശിവൻ സംസാരിച്ചു. പണ്ടു കാലത്ത് നിലനിന്നിരുന്ന കൃഷി രീതികളെയും അവയ്ക്കു കാലക്രമേണ സംഭവിച്ച മാറ്റങ്ങളെയും അദ്ദേഹം പരാമർശിച്ചു. കൂട്ടനാടിന്റെ വികസന പ്രവർത്തനങ്ങൾക്കായി കാലങ്ങളായി അനുവദിക്കപ്പെടുന്ന തുക ഫലപ്രദമായി വിനിയോഗിക്കാൻ സാധിച്ചിട്ടുണ്ടോ എന്നത് ഭരണ പരിഷ്കാര കമ്മീഷൻ സർക്കാരിന്റെ ശ്രദ്ധയിൽപ്പെടുത്തണമെന്നും അദ്ദേഹം പറഞ്ഞു. തുടർന്ന് ഡോ. കെ. ജി. പദ്മകുമാർ (ഡയറക്ടർ, ഇന്റർനാഷണൽ റിസർച്ച് & ട്രെയിനിംഗ് സെന്റർ ഫോർ ബിലോ സിലൈവൽ ഫാർമിംഗ്, കൂട്ടനാട്) സെമിനാറിൽ ഉൾപ്പെടുത്തിയിട്ടുള്ള ചർച്ചാ വിഷയങ്ങൾ വിശദീകരിച്ചു. 12 വിഷയങ്ങളിലാണ് ചർച്ച നടക്കുന്നതെന്ന് അദ്ദേഹം സദസിനെ അറിയിച്ചു. കൂട്ടനാട് നേരിടുന്ന പ്രശ്നങ്ങൾക്കു താത്കാലികമായ പരിഹാരങ്ങളല്ല സ്ഥിരമായ പരിഹാരങ്ങളാണ് വേണ്ടതെന്നും പരിസ്ഥിതിയെ പരിഗണിച്ചു കൊണ്ടുള്ള വികസനമാണ് കൂട്ടനാടിന് അനുയോജ്യമെന്നും അദ്ദേഹം കൂട്ടിച്ചേർത്തു.

തുടർന്ന് വിഷയാവതരണ ചർച്ച ആരംഭിച്ചു. 29 പേർ ചർച്ചയിൽ പങ്കെടുത്ത സംസാരിച്ചു. കൂട്ടനാടിന്റെ സുസ്ഥിരവികസനത്തിനായി ഭരണപരിഷ്കാര കമ്മീഷൻ സ്വീകരിക്കേണ്ട നടപടികൾ ചർച്ചയിൽ ഉരുത്തിരിയുകയുണ്ടായി.

1. കൂട്ടനാടിന്റെ വികസനത്തിനായി നിലവിൽ വന്നിട്ടുള്ള വിവിധ പദ്ധതികളുടെ പുരോഗതി കമ്മീഷൻ പരിശോധിക്കണം.
2. വിവിധ പദ്ധതികൾക്കായി അനുവദിച്ച തുക കാര്യക്ഷമമായി വിനിയോഗിച്ചിട്ടുണ്ടോ എന്നും വിലയിരുത്തണം.

3. കട്ടനാട് നേരിടുന്ന പ്രധാന പ്രശ്നങ്ങളിൽ ഒന്നായ ശുദ്ധജല ലഭ്യതക്കുറവ് പരിഹരിക്കുന്നതിനായി കാലങ്ങളായി വിവിധ പദ്ധതികൾ ആവിഷ്കരിച്ചിട്ടുണ്ടെങ്കിലും, നിലവിൽ അതിരൂക്ഷമായ കുടിവെള്ള ക്ഷാമമാണ് കട്ടനാട്ടുകാർ നേരിടുന്നത്. 35 വർഷം പഴക്കമുള്ള കുടിവെള്ള വിതരണ സംവിധാനത്തെയാണ് ഇന്നാട്ടുകാർ ഇപ്പോഴും ആശ്രയിക്കുന്നതെന്നും, അതിന്റെ നവീകരണത്തിനായി വേണ്ട നടപടികൾ സ്വീകരിക്കണമെന്ന ആവശ്യവും ഉന്നയിക്കപ്പെട്ടു .
4. കട്ടനാടിന്റെ ഹൃദയഭാഗത്തു കൂടി ഒഴുകുന്ന എസി കനാലിൽ പ്രളയത്തിന്റെ ഫലമായി അടിഞ്ഞ എക്കൽ നീക്കം ചെയ്തു വൃത്തിയാക്കുകയും പള്ളാത്തുരുത്തി വരെ തുറക്കുകയും ചെയ്യുക
5. കട്ടനാട്ടിലെ പ്രളയത്തിന്റെ ഒരു പ്രധാനകാരണം, ജലനിർഗമനം സുഗമമല്ലാത്തതായിരുന്നു. ജലസ്രോതസുകളിലെ പോളയും മറ്റും നീക്കം ചെയ്ത് ജലനിർഗമനം സുഗമമാക്കുക .
6. തോട്ടപ്പള്ളി സ്പിൽവേ ആഴവും വീതിയും കൂട്ടുക. പടിഞ്ഞാറ് ഭാഗത്ത് അടിഞ്ഞിരിക്കുന്ന മാലിന്യം നീക്കം ചെയ്യുക
7. തണ്ണീർമുക്കം ബണ്ടിന്റെ ആഴം വർദ്ധിപ്പിക്കുകയും, മൂന്നു വർഷത്തിലൊരിക്കൽ ഒരുവർഷം മുഴുവൻബണ്ട് തുറന്നിടുകയും ചെയ്യുക.
8. ടൂറിസ്റ്റ് ബോട്ടുകളിൽ നിന്നും കായലോര വീടുകളിൽ നിന്നും ഒക്കെ പുറന്തള്ളുന്ന മാലിന്യങ്ങൾ കൊണ്ട് മലീമസമായിരിക്കുന്നു വേമ്പനാട്ടു കായൽ. കൂടാതെ പുഴകൾ വഹിച്ചു കൊണ്ടുവരുന്ന എക്കൽമണ്ണ് കായലിന്റെ ആഴത്തിന് ഗണ്യമായ കുറവുണ്ടാക്കി. കട്ടനാടിന്റെ പ്രധാന ജലസ്രോതസ്സായ വേമ്പനാട്ട് കായലിലെ പ്രശ്നങ്ങൾ പരിഹരിക്കണം
9. വേമ്പനാട്ടു കായലിലെ ചെളി വാരുനതിൽ സർക്കാർ ഏർപ്പെടുത്തിയിട്ടുള്ള നിയന്ത്രണങ്ങൾ പിൻവലിക്കുക
10. രാസവളത്തിന്റെ അശാസ്ത്രീയവും അമിതവുമായ ഉപയോഗം കാരണം കട്ടനാട്ടിൽ കാൻസർ പോലുള്ള രോഗങ്ങൾ വർദ്ധിച്ചു വരുന്നു. കർഷകരിൽ ഇതിനുള്ള ബോധവൽക്കരണം നടത്തണം.
11. കട്ടനാടിന്റെയും അപ്പർകട്ടനാടിന്റെയും പ്രത്യേകതകൾ പരിഗണിച്ചു കൊണ്ടുള്ള കാർഷിക കലണ്ടർ നിർമ്മിക്കണം. അതനുസരിച്ചാണ് കർഷകർ കൃഷി ചെയ്യുന്നതെന്ന് ഉറപ്പു വരുത്തണം
12. ഒരു വിളയെ മാത്രം ആശ്രയിക്കാതെ 'ഒരു നെല്പും ഒരു മീനും' പദ്ധതി പ്രായോഗികമായി നടപ്പിലാക്കുക.

- 13. പ്രളയത്തിൽ തകർന്ന റോഡുകൾ ഉടൻ പുനർനിർമ്മിക്കുകയും ട്രക്ക് റോഡുകൾ നിർമ്മിക്കുകയും ചെയ്യുക.
- 14. പരാജയമായിരുന്ന ഒന്നാം കുട്ടനാട് പാക്കേജിലെ അപാകതകൾ പരിഹരിച്ചുകൊണ്ട് മാത്രമേ രണ്ടാം കുട്ടനാട് പാക്കേജ് നടപ്പിലാക്കുവാൻ പാടുള്ളൂ

ഇവ കൂടാതെ പാടങ്ങളിൽ സോളാർ സംവിധാനം വേണമെന്നും കായൽ മേഖലക്കായി മാത്രം വൈദ്യുതി സബ് സ്റ്റേഷൻ വേണമെന്നുമുള്ള ആവശ്യങ്ങൾ ചർച്ചയിൽ ഉന്നയിക്കപ്പെടുകയുണ്ടായി.

ചർച്ചയ്ക്കു ശേഷം ആലപ്പുഴ അഡിഷണൽ ജില്ലാ മജിസ്ട്രേറ്റ് ശ്രീ. അബ്ദുൾ സലാം കൃതജ്ഞത അറിയിച്ചതോടു കൂടി പരിപാടിക്ക് സമാപനമായി.



## Annexures

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## Annexure I

## KERALA RANKING AND SDGs

Kerala : 70 points Rank I

HP: 69 points Rank II

AP, Telangana, Tamil Nadu: 67 points, Rank III

Karnataka : 66 points, Rank IV

| SDG                              | Kerala overall marks and rank | Best State Marks | Indicator(s)   | Kerala performance                 | BS perf on indicator   |
|----------------------------------|-------------------------------|------------------|--|------------------------------------|--|
| 1.<br>No Poverty                 | 64 Rank 7                     | Tamil Nadu -72   | 1 % coverage of family member under health scheme/insurance<br>2. % of eligible population getting maternity benefits  | 47.7<br>20.4                       | AP - 74.6<br>Odisha -72.6                                    |
| 2.<br>Zero hunger                | 74 Rank 3                     | Goa -76          | Ratio coverage under PDS to poor households  | 74                                 | Bihar -120   |
| 3.<br>Good Health and well being | 82 Rank 1                     | Kerala           |  |                                    |  |
| 4.<br>Quality Education          | 74 Rank 2                     | HP - 81          | 1.Secondary school drop out (8th position)<br>2.Gross enrolment in higher education<br>3.Proportion of trained teacher | 12.77<br>37<br>43.79               | HP<br>7.03<br>Sikkim<br>53<br>TN<br>49<br>Karnataka<br>99.66 |
| 5.<br>Gender Equality            | 51 Rank 3                     | J&K -53          |  |                                    |  |
| 6.<br>Clean water and sanitation | 77 Rank 23                    | AP - 96          | 1.% of HH with improved water source<br>2.% of urban HH with indl toilets  | 56.7 (0 marks)<br>47.52 (47 marks) | Punjab, TN -100<br>AP, MP, Bih, Jhr, Guj>120 (100 marks)     |
| 7.<br>Affordable, clean energy   | 70 Rank 15                    | Sikkim-97        | HH using clean cooking fuel  | 58.9 (39 marks)                    | Sikkim, Goa, Telangana>90% (100 marks)                       |

| SDG  | Kerala overall marks and rank | Best State Marks        | Indicator(s)   | Kerala performance                | BS perf on indicator                                  |
|--|-------------------------------|-------------------------|--|-----------------------------------|---|
| 8.<br>Decent work,<br>economic growth                | 61 Rank 22                    | Telangana -82           | 1.ease of doing business<br>2. banking outlets/1lakh popn                                    | 44.82<br>18.95                    | AP, Telangana -98.3<br>Goa -34.72,<br>Telangana-25.47 |
| 9.<br>Industry<br>Innovation and<br>Infrastructure   | 88 Rank 1                     | Gujarat - 88            |  |                                   |   |
| 10.<br>Reduced<br>Inequalities                       | 75Rank 5                      | Telangana - 94          | 1. Gini coefficient<br>HH Rural<br>2.Gini coefficient<br>HH urban                            | 0.363<br>0.414 (0<br>marks)       | Bihar 45 marks-R<br>Manipur -50 U                     |
| 11.<br>Sustainable cities<br>and communities         | 51 Rank 11                    | Goa, HP -79             | 1.% of waste<br>processed<br>2. % of installed<br>sewage capacity                            | 32marks<br>6 marks                | MP - 84marks<br>HP -100 marks                         |
| 12<br>Sustainable Con-<br>sumption and<br>Production | 57 Rank 17                    | Nagaland -100           | 1.per capita<br>hazard waste<br>2. hazard waste<br>processed<br>3.municipal waste<br>treated | 100 marks<br>13 marks<br>29 marks | Kerala -100<br>Nagaland -100<br>Telangana -60         |
| 13<br>Climate action                                 | 56 Rank 10                    | Karnataka -71           | 1.LED per 1000<br>popn<br>2.Installed solar<br>power   | 44.47 (25)<br>6.19 (11)           | HP-72, Odisha -75<br>Telangana -98                    |
| 14<br>Life below water                               | -                             |                         |  |                                   |   |
| 15<br>Life on land                                   | 98 Rank 7                     | Sikkim, Manipur<br>-100 |  |                                   |   |
| 16<br>Peace, just<br>ice and strong<br>institutions  | 77 Rank 9                     | AP -86                  | Estimated<br>courts/10 lakh<br>people  | 23 marks                          | Goa -100<br>AP - 92                                   |
| 17<br>Partnerships                                   |                               |                         |  |                                   |   |

## Annexure II

**ACTS / RULES / POLICIES / ORDERS GOVERNING AGRICULTURAL SECTOR  
AT NATIONAL AND STATE LEVELS**

**National Level:**

- The State/UT Agricultural Produce & Livestock Contract Farming and Services (Promotion & Facilitation) Act, 2018
- Model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017
- Model Agricultural Produce Market Committee Act, 2003
- Model Agricultural Produce Market Committee Rules, 2007
- Agriculture Produce (Grading and Marking) Act, 1937
- General Grading & Marking Rules, 1988
- Organic Agricultural Produce Grading and Marking Rules, 2009, amended in 2011
- National Cooperative Development Corporation (NCDC) Act, 1962
- Essential Commodity Act, 1955
- Fertiliser Control Order, 1985
- Seeds Act, 1966 and Seeds Control Order, 1983
- The Information Technology Act, 2000
- Central Wetland Act, 2010
- Central Wetland Rules, 2017
- Insecticide Act, 1968
- Insecticide Rules, 1971
- Multi-State Cooperative Societies Act, 2002
- Multi-State Cooperative Societies Rules, 2002

**State Level:**

- Kerala Agriculture Development Policy, 2015
- Kerala Irrigation and Water Conservation Act, 2003, amended in 2006 and 2018
- Kerala Farmers' Debt Relief Commission Act, 2006
- The Protection of Plant Varieties and Farmers' Rights Act, 2001
- The Kerala Land Utilization Order, 1967
- The Kerala Conservation of Paddy Land and Wetland Act, 2008 amended in 2018
- Kerala Land Reforms Act, 1963, amended in 2005
- Kerala Land Utilization Order, 1967
- Kerala Minor Mineral Concession Rules, 1967, amended in 2015
- Kerala State Organic Farming Policy, 2013
- Kerala Biodiversity Rules, 2008



## Annexure III

**ENACTMENTS IN FORCE IN THE STATE IN THE FISHERIES SECTOR**

- Kerala Marine Fishing Regulation Act, 1980
- Kerala Marine Fishing Regulation Rules, 2018
- The Kerala Fishermen Welfare Fund Act, 1981
- The Kerala Fishermen Welfare Societies Act, 1980
- The Kerala Fishermen Welfare Societies Rules, 1980
- The Kerala Monsoon Fishery (Pelagic) Protection Act, 2017
- The Kerala Debt Relief Act, 2006
- The Kerala Co-operative Societies Act, 1969
- The Kerala Fishermen and allied Workers Welfare Cess Act, 2007
- The Kerala Fisheries Debt Relief Act, Commission Act, 2008
- The Kerala Inland Fisheries and Aquaculture Act, 2010
- The Kerala Inland Fisheries and Aquaculture Rules, 2010
- The Kerala Fish Seed Act, 2014
- The Kerala Fish Seed Rules, 2018
- Coastal Zones Regulation Rules, 1991 amended in 2005, 2011 and 2019.
- The Coastal Aquaculture Authorities Act, 2005



## Annexure IV

**LEGAL FRAMEWORK FOR PROTECTION OF BIODIVERSITY  
AT NATIONAL AND STATE LEVELS**

**National:**

- The Biological Diversity Act, 2002
- Biological Diversity Rules, 2004, amended in 2008
- Biodiversity Act, 2003
- Convention on Biological Diversity (1992)
- TRIPS Agreement
- Indian National Biodiversity Action Plan
- The National Green Tribunal Act, 2010

**The following regulations and government orders have also been issued at the national level:**

- GS R 827 dated 21/11/2014- Guidelines on Access to biological resources and associated knowledge and benefit sharing regulations 2014
- SO 997 (E) dated 15/04/2009- Species of plants and animals on the verge of extinction in Kerala
- SO 2708(E) dated 17/11/2008- Officers authorized to file complaints Sect 61 (a) 2008
- SO 120 (E) dated 07/01/2009- Officers authorized to file complaints Sect 61 (a) 2008
- SO 1633 (E) dated 10/06/2015- Officers authorized to file complaints Sect 61 (a) 2008
- SO 1352 (E) dated 07/04/2016 and SO 3533 (E) dated 07/11/2017- Biological resources notified as normally traded commodities
- SO 3232 (E) dated 17/12/2014- Exemption of crops listed in the Annexure I of International treaty on plant genetic resources for food and agricultural for seeking approval of the NBA under section 3 and 4 of the Biological Diversity Act
- No 26-15/2007 CSC dated 28/08/2008, 12/09/2012, 08/07/2013- Designation of repositories under the Biological Diversity Act, 2002
- SO 1911 (E) dated 08/11/2006- Guidelines for International collaboration research projects involving transfer or exchange of biological resources

**State :**

- Kerala Biodiversity Strategy and Action Plan
- Kerala Environment Policy, 2009
- Kerala Biological Diversity Rules, 2008

**The following orders are also issued at the State level:**

- GO (MS) 01/2005/STED dated 28/02/2005- Constitution of Kerala State Biodiversity Board
- GO (MS) 86/08/LSGD dated 18/03/2008- Constitution of Biodiversity Management Committee.
- GO(MO) 618/2010/LSGD dated 24/02/2010- Peoples Biodiversity register preparation- Allocation of fund by Panchayats and Corporations.
- GO (Rt) 2088/2011/LSGD dated 05/09/2011- Constitution of Biodiversity Management Committee.
- GO (MS) 03/12/Envt dated 24/02/2012- Constitution of Kerala State Biodiversity Fund
- GO (P) 04/13/Envt dated 13/05/2013- Biodiversity Management Committee empowered to prevent local environmental depletion.
- GO (Rt) No. 2945/2013/LSGD dated 30/11/2013- Preparation of Peoples Biodiversity Register- Enhancement of funds allotted for Local Self Government Institutions.
- GO (Rt) 2462/2018/LSGD dated 19/09/2018- Constitution of the 13th Working Group for Biodiversity, Climate Change, Environment and Disaster Management.
- GO (Rt) 19/2019/F&WLD dated 16/01/2019- Authorizing designated Range Forest Officers in the State to enforce the regulatory provisions of the Biological Diversity Act 2002.



## Annexure V

**ENACTMENTS RELATED TO FORESTS****National level :**

- Indian Forest Act, 1865 & 1878
- The Forest Policy of 1894
- National Forest Policy, 1952 amended in 1988
- Forest (Conservation) Act, 1980 amended in 1988 and 1992
- Forest Conservation Rules, 2003
- Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
- Environmental Protection Act, 1986
- Air (Prevention and Control) Act, 1981
- Biological Diversity Act, 2002
- National Green Tribunal Act, 2010
- Noise Pollution Rule, 2000
- Water (Prevention and Control of Pollution) Act, 1974
- Prevention of Cruelty to Animals Act, 1960
- Paddy and Wetland Act, 2008
- Wildlife (Protection) Act, 1972
- Wildlife (Protection) Licensing (Additional Matters for Consideration) Rules, 1983
- Declaration of Wildlife Stock Rules, 2003
- National Board for Wildlife Rules, 2003
- Recognition of Zoo Rules, 1992
- Wildlife (Protection) Rules, 1995
- Wildlife (Specified Plant Conditions for Possession by Licensee) Rules, 1995

**State level:**

- The Kerala Forest Act, 1961, amended in 2010
- The Forest Settlement Rules, 1965
- Kerala Forest (Collection of Drift and Stranded Timber) Rules, 1965

- The Kerala Forest Produce Transit Rules, 1975
- The Kerala Vested Forests (Management of Reserved Areas) Rules, 1980
- Forest Conservation Rules, 1981
- Kerala Forest (Grazing) Rules, 1985
- Kerala Forest Development Fund Rules, 1989
- Kerala Forest (Regulation of Sawmills and other Wood Based Industrial Units) Rules, 2012
- Kerala Captive Elephants (Management and Maintenance) Rules, 2003
- Kerala Rules for Payment of Compensation to Victims of Attack by Wild Animals, 1980
- The Kerala Private Forests (Vesting and Assignment) Act, 1971
- The Kerala Private Forests (Vesting and Assignment) Rules, 1974
- Kerala Private Forests (Vesting and Assignment) Appeal Rules, 1977
- Kerala Private Forests (Tribunal) Rules, 1972
- The Kerala Forest (Vesting and Management of Ecologically Fragile Lands) Rules, 2009
- The Kerala Forest (Vesting and Management of Ecologically Fragile Lands) Act, 2003
- The Kerala Forest (Vesting and Management of Ecologically Fragile Lands) Rules, 2009
- The Kerala Forest Produce (Fixation of Selling Price) Act, 1978
- The Kerala Forest Produce (Fixation of Selling Price) Rules, 1978
- The Kerala Preservation of Trees Act, 1986
- The Kerala Forest Rights Act, 2006
- The Kerala Forest (Vesting and Management of Ecologically Fragile Lands) Act, 2003, amended in 2009
- The Kerala Restriction on Cutting and Destruction of Valuable Trees Act, 1974
- The Kerala Restriction on Cutting and Destruction of Valuable Trees Rules, 1974
- Kerala Cattle Trespass Act, 1961
- Kerala Cattle Trespass Rules, 1962
- Kerala Biological Diversity Rules, 2008

## Annexure VI

**ACTS, RULES AND POLICIES RELATED TO  
WASTE MANAGEMENT, POLLUTION, HEALTH & SANITATION, AIR**

**National level :**

- Air (Prevention and Control of Pollution) Act, 1981, amended in 1987
- Air (Prevention and Control of Pollution) Rules, 1982, amended in 1984
- Air (Prevention and Control of Pollution) Appellate Authority Rules, 1999

**WATER****National level:**

- The Water (Prevention and Control of Pollution) Act, 1974, amended in 1998
- The Water (Prevention and Control of Pollution) Cess Act, 1977, amended in 1991 and 2000
- The Water (Prevention and Control of Pollution) Cess Rules, 1978
- Environment (Protection) Act, 1986
- Environment (Protection) Rules, 1986
- Statement on Environment and Development, 1992
- The Hazardous Waste (Management and Handling) Rules, 1989
- The Municipal Solid Waste (Management and Handling) Rules, 2000
- National Environment Policy, 2006
- Wetlands (Conservation and Management) Rules, 2010, Revised in 2017
- The National Green Tribunal Act, 2010
- National Water Policy, 2012
- National Conservation Strategy and Policy
- Coastal Regulation Zone Notification, 1991, 2011 and 2019
- The Environmental Impact Assessment Notification, 2006

**State level:**

- Kerala Water (Prevention and Control of Pollution) Rules, 1975 Amended in 1976
- Kerala Water (Prevention and Control of Pollution) Appellate Authority Rules, 1977
- Kerala Municipality Building Rules, 2004- Rainwater Harvesting
- The Kerala Groundwater (Control and Regulation) Act, 2002
- The Kerala Irrigation and Water Conservation Act, 2003, amended in 2006

- Kerala Water Policy, 2008
- The Kerala Conservation of Paddy and Wetland Act, 2008
- Kerala River Bank Protection and Sand Mining Regulation Act. 2001
- Kerala Water Sewage Act, 1986
- Kerala Environment Policy, 2009
- Kerala Protection of River Banks and regulation of removal of Sand Act, 2001
- Kerala Inland Fisheries and Aquaculture Act, 2010

## **WASTE AND POLLUTION**

### **National level:**

- Water (Prevention and Control of Pollution) Act, 1974
- Air (Prevention and Control of Pollution) Act, 1981
- Environment (Protection) Act, 1986
- Liquid Waste Management Rules, 1974
- Environment (Protection) Rules, 1986
- Hazardous Waste (Management and Handling) Rules, 1989, amended in 1996, 1997, 1999, 2000, 2001 and 2003
- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
- Manufacture, use, import, export and storage of hazardous microorganisms, genetically engineered organisms or cells Rules, 1989, amended in 1993
- The Chemical Accidents (Emergency, Planning, Preparedness and Response) Rules, 1996
- The Bio-medical Waste (Management and Handling) Rules, 1998, amended in 2000, 2003 and 2016
- Ozone Depleting Substances (Regulation and Control) Rules, 2000
- The Batteries (Management and Handling) Rules, 2001
- Recycled Plastics Manufacture and Usage Rules, 1999
- The Noise Pollution (Regulation and Control) Rules, 2000, amended in 2002
- The Municipal Solid Waste (Management and Handling) Rules, 2000
- e-waste (Management and Handling) Rules, 2011
- Solid Waste Management Rules, 2016
- Construction and Demolition Waste Management Rules, 2016
- e-waste Management Rules, 2016

- Recycled Plastics (Manufacture and Usage) Rules, 1999, amended in 2003
- Plastic Waste Management Rules, 2016, amended in 2018
- National Environment Policy, 2006
- Notification on “Prohibition on the handling of azodyes”, 1997
- Notification on “Prohibition of open burning of waste oil throughout India”, 1997
- Coastal Regulation Zone Notification, 1991, amended in 2005, 2011 and 2019
- Notification on Environmental Auditing, 1992
- Notification on Environmental Impact Assessment, 1994, amended in 1997, 2000, 2001, 2002, 2004, 2006, 2009 and 2011
- Notification on Dumping and Disposal of Fly Ash, 1999

#### **State level:**

- Kerala Municipality Act, 1994 on Waste Disposal and Sanitation
- Kerala Panchayat Raj Act on Waste Disposal and Sanitation
- Kerala Environment Policy, 2009

## **HEALTH**

#### **National level:**

- Epidemic Diseases Act, 1897

#### **State level :**

- Madras Public Health Act, 1939
- Travancore Cochin Public Health Act, 1955

## **FOOD SAFETY**

#### **National level:**

- Prevention of Food Adulteration Act, 1954
- Food Safety & Standards Act, 2006
- Food Security Act, 2009
- Essential commodities Act, 1955
- Consumer Protection Act, 2019
- Food Safety & Standards Rules, 2011
- Food Safety & Standards Regulations, 2011



## Annexure VII

**THE POLLUTION CONTROL BOARD ADMINISTERS THE FOLLOWING STATUTES****The Water (Prevention & Control of Pollution) Act, 1974 (amended in 1988)**

- The Water (Prevention and Control of Pollution) Act was introduced on 23rd March 1974 for maintaining and restoring the wholesomeness of water through the prevention and control of water pollution. Duties and responsibilities of the State PCBs under the act are:
- Advise the State government, plan comprehensive programmes, disseminate information, conduct investigations, research and training, establish or recognize laboratories, inspect installations, lay down standards, evolve methods for treatment, utilisation and disposal of effluents, advise on locating industries and perform functions entrusted by Central PCB with respect to prevention, control or abatement of discharge of waste or effluent to streams, wells or land, obtain information on sewage or trade effluents or on establishments producing or proposing to produce effluents based on stipulated procedures.
- The Act provides for prohibition of disposal of polluting matter to streams or wells, restriction on new outlets and discharges, acting on existing discharge of sewage and trade effluents, refusing or withdrawing consent and entertains appeal of aggrieved. It mandates LSGIs discharging sewage and sullage from their jurisdiction into various water bodies shall take consent from the State PCB and to draw up and implement programmes for collection and treatment of sewage.

**The Water (Prevention & Control of Pollution) Cess Act, 1977 (amended in 1991)**

- The Water (Prevention and Control of Water Pollution) Cess Act was introduced on 7th December 1977 to augment the resources of the Central and State Pollution Control Boards and to encourage industries and local bodies to reduce consumption by imposing charge on water consumed for various purposes.

**The Air (Prevention & Control of Pollution) Act, 1981**

- The Act provides for the prevention, control, and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith

**The Environment (Protection) Act, 1986.**

- Government of India introduced a comprehensive law on environment "The Environment (Protection) Act, 1986' on 23rd May 1986. The Act empowers Government of India to take measures to protect and improve the environment including prevention of hazards to human beings, other living creatures, plants and property and to issue notifications/ formulate rules for conservation and protection of the environment.

**Bio-Medical Wastes (Management and Handling) Rules, 1998**

- The Bio Medical Wastes (Management and Handling) Rules were introduced by Government of India on 20th July 1998 under section 5, 8 and 25 of the Environment (Protection) Act, 1986 to regulate management and handling of Bio- medical waste. The rules apply to all persons who generate, collect, receive, store, transport, treat, dispose /handle biomedical waste (BMW) in any form.

**Other statutes implemented by Kerala PCB include:**

- Hazardous Wastes (Management, Handling and Transboundary Movement) Rules,
- Manufacture, Storage and Import of Hazardous Chemical Rules
- Manufacture, Use, Import, Export and Storage of Hazardous Microorganisms, Genetically Engineered Organisms or Cells
- Chemical Accidents (Emergency Planning, Preparedness and Response) Rules
- Biomedical Waste (Management and Handling) Rules Plastics Manufacture, Sale and Usage Rules
- Municipal Solid Wastes (Management and Handling) Rules
- Noise Pollution (Regulation and Control) Rules
- Batteries (Management and Handling) Rules
- EIA notification
- Public Liability Insurance Act, 1991



## Annexure VIII

**ENACTMENTS RELATED TO ENERGY, INDUSTRIES, INFRASTRUCTURE AND TOURISM****State level :**

- Electricity Act 2003 (Act 36 of 2003)
- Energy Conservation Act 2001
- National Electricity Policy, 2005
- Central Electricity Authority Regulations, 2010
- CRZ Notification, 1991
- Environment (Protection) Act, 1986
- Mines and Minerals (Development and Regulation) Act, 1957
- Atomic Mineral Concession Rules, 2016
- Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2016
- Mineral Conservation and Development Rules, 2017
- Mineral (Auction) Rules, 2015
- Minerals (Evidence of Mineral Content) Rules, 2015
- National Mineral Exploration Trust Rules, 2015
- Mines and Minerals (Contribution to District Mineral Foundation) Rules, 2015
- Mines Act, 1952
- Metalliferous Mines Regulation, 1961
- Environmental (Protection) Rules, 1986
- Environmental Impact Assessment Notification, 2006
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Noise Pollution (Regulation and Control) Rules, 2000
- The Explosives Act, 1984
- The Explosives Rules, 2008
- The Explosive Substance Act, 1908
- Indian Registration Act, 1908
- Industries (Development and Regulation) Act, 1951

**State level :**

- Kerala Small Hydro Power Policy, 2012
- Kerala Solar Policy, 2013

- Electric Vehicle Policy
- The Kerala Electricity Duty Act, 1963
- The Kerala Electricity Duty Rules, 1963
- Kerala Cinemas (Regulation) Act, 1958
- Kerala Cinemas (Regulation) Rules, 1988
- Kerala State Electricity Licensing Board Rules, 1973
- The Electrical Wires, Cables, Appliances and Protection Devices and Accessories (Quality Control) Order, 2003
- Regulations by the State Electricity Regulatory Commission
- Electricity Amendment Bill, 2018
- Energy Conservation Building Code (ECBC) dated 11th April, 2017
- Kerala Electricity Supply Code, 2014
- Mandatory Energy Audit vide GO 2/2011/PD dated 01/01/2011
- Energy Conservation (Energy Consumption Standards for Equipments and Appliances) Directions vide GO 21/2015/PD dated 11/05/2015
- Kerala State Electricity Regulatory Commission (Grid Interactive distributed solar energy systems) Regulation, 2014
- Mandatory procurement of star labeled /energy efficient Agriculture pumps vide GO (P) No. 21/2015/PD dated 11/05/2015
- Public Lighting vide GO (P) No. 21/2015/PD dated 11/05/2015
- Draft Kerala Power Policy, 2019
- Town and Country Planning Act, 2016
- Kerala Municipality Act, 1994
- Kerala Municipality Building Rules, 2019
- Kerala Panchayat Raj Act, 2011
- Kerala Panchayat Raj (Issue of License to Industries, Factories, Trades, Entrepreneurship activities and other services) Rules, 1996
- Kerala Land Acquisition Act, 1961
- Kerala Conservation of Paddy Land and Wetland Act, 2008
- Kerala Minor Mineral Concession Rules, 2015
- Kerala Mineral (Prevention of illegal mining, storage and transportation) Rules, 2015
- Kerala River Bank Protection and Regulation of Sand Mining Act, 2001
- Kerala River Bank Protection and Regulation of Sand Mining Rules, 2002

## Annexure IX

**ENACTMENTS APPLICABLE IN THE WATER SECTOR****National level:**

- The Water (Prevention and Control of Pollution) Act, 1974, amended in 1998
- The Water (Prevention and Control of Pollution) Cess Act, 1977, amended in 1991 and 2000
- The Water (Prevention and Control of Pollution) Cess Rules, 1978
- Environment (Protection) Act, 1986
- Environment (Protection) Rules, 1986
- Statement on Environment and Development, 1992
- The Hazardous Waste (Management and Handling) Rules, 1989
- The Municipal Solid Waste (Management and Handling) Rules, 2000
- National Environment Policy, 2006
- Wetlands (Conservation and Management) Rules, 2010, Revised in 2017
- The National Green Tribunal Act, 2010
- National Water Policy, 2012
- National Conservation Strategy and Policy
- Coastal Regulation Zone Notification, 1991, 2011 and 2019
- The Environmental Impact Assessment Notification, 2006
- Wildlife (Protection) Act, 1972
- Territorial Water, Continental Shelf, Exclusive Economic Zone and other Marine Zones Act, 1976
- Forest (Conservation) Act, 1980
- Maritime Zone of India (Regulation and fishing by foreign vessels) Act, 1980
- Air (Prevention and Control of Pollution) Act, 1981
- Environmental (Protection) Act, 1986
- Water (Prevention and Control of Pollution) Cess (Amendment) Act, 1991
- Biological Diversity Act, 2002 and Biodiversity Rules, 2004
- Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003
- Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

**State level:**

- Kerala Water (Prevention and Control of Pollution) Rules, 1975, amended in 1976
- Kerala Water (Prevention and Control of Pollution) Appellate Authority Rules, 1977
- Kerala Municipality Building Rules, 2004- Rainwater Harvesting
- The Kerala Groundwater (Control and Regulation) Act, 2002
- The Kerala Irrigation and Water Conservation Act, 2003, amended in 2006
- Kerala Water Policy, 2008
- The Kerala Conservation of Paddy and Wetland Act, 2008
- Kerala Riverbank Protection and Sand Mining Regulation Act. 2001
- Kerala Water Supply and Sewerage Act, 1986
- Kerala Environment Policy, 2009
- Kerala Protection of Riverbanks and regulation of removal of Sand Act, 2001
- Kerala Inland Fisheries and Aquaculture Act, 2010

## Annexure X

**ENACTMENTS RELATED TO CLIMATE CHANGE AND DISASTER MANAGEMENT****National level:**

- The Environment Protection Act, 1986
- The Environment (Protection) Rules, 1986
- The Disaster Management Act, 2005
- National Environment Policy, 2006

**State level:**

- The Kerala Conservation of Paddy land and Wetland Act, 2008
- The Wetlands (Conservation and Management) Rules, 2017
- The Coastal Regulation Zone Notifications, 2011 and 2019
- The State Environment Policy, 2009
- Environment Impact Assessment Notification, 2011 & 2019
- State Action Plan on Climate Change (SAPCC)
- The Kerala State Disaster Management Policy, 2010
- The Kerala State Disaster Management Act, 2005
- The Kerala State Disaster Management Rules, 2007
- Kerala Factories (Major Accident Hazard Control) Rules, 2005





**GOVERNMENT OF KERALA**

**Abstract**

Personnel and Administrative Reforms Department – Administrative Reforms Commission – constituted – Orders issued

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**PERSONNEL & ADMINISTRATIVE REFORMS (AR -12) DEPARTMENT**  
**G.O.(Ms) No.16/2016/P&ARD. Dated, Thiruvananthapuram, 06/08/2016**

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**ORDER**

Government hereby order constitution of Administrative Reforms Commission with a view to improve the efficiency of the State Administrative System. The composition of the Administrative Reforms Commission is as follows:

Shri. V.S. Achuthanandan, MLA,  
Ex.Chief Minister,  
Velikkakath,  
Punnapra North P.O,  
Alappuzha.

Chairman

Shri. C.P.Nair  
Chief Secretary (Retd.)  
'Seasons', PPD,  
Kuravankonam, P.O,  
Thiruvananthapuram.

Member

Smt. Neela Gangadharan,  
Chief Secretary (Retd.),  
No.528/Type VI, CPW Quarters,  
27th Main Road, HSR Lay out,  
Bengaluru -560 102

Member

Principal Secretary  
Personal and Administrative Reforms Department

Member Secretary

The Chairman of the Administrative Reforms Commission will have the rank and status of Cabinet Minister and the members will have the rank and status of Chief Secretary to Government

The Terms of Reference of the Commission will be issued separately.

(By Order of the Governor)

**S.M. VIJAYANAND**  
Chief Secretary to Government

To

Shri. V.S. Achuthanandan,  
MLA, Chairman, Administrative Reforms Commission.  
(Velikkakath, Punnapra North. P.O, Alappuzha).

Shri. C.P.Nair, Chief Secretary (Retd.),  
[‘Seasons’,PPD, Kuruvankonam. P.O, Thiruvananthapuram].

Smt.Neela Gangadharan, Chief Secretary (Retd.)  
[No.528/Type VI,CPW Quarters, 27th Main Road, HSR Lay out, Bengalure – 560 102]

The Principal Accountant General (Audit), Kerala, Thiruvananthapuram  
The Accountant General (A&E), Kerala, Thiruvananthapuram.  
The Director, Information & Public Relations Department.  
The General Administration (SC) Department [Vide Item No. OA -16], Dated, 03.08.2016]  
The District Treasury Officer, Thiruvananthapuram.  
The Sub Treasury Officer, Secretariat Sub Treasury  
Thiruvananthapuram.

Copy to:

Information and Public Relations (Web&Media) Department  
for uploading in the official web site of Government of Kerala.  
Additional Secretary to Chief Secretary  
PA to Principal Secretary, P&ARD.  
Stock File /Office Copy.

Forwarded/By Order,

(Sd/-)  
Section Officer





**GOVERNMENT OF KERALA**

**Abstract**

IAS- Posting Smt. Sheela Thomas IAS (Rtd.) as Member Secretary, Administrative Reforms Commission on re-employment basis-Orders issued.

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**GENERAL ADMINISTRATION (SPECIAL-A) DEPARTMENT**

**G.O.(Rt) No.2528/2017/GAD.**

**Dated, Thiruvananthapuram, 22/04/2017**

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**ORDER**

Smt. Sheela Thomas IAS (Rtd.) is appointed as Member Secretary, Administrative Reforms Commission on re-employment basis.

2.The above appointment will be subject to the usual terms and conditions of re-employment.

(By Order of the Governor)

**NALINI NETTO**

Chief Secretary to Government

To

Smt. Sheela Thomas IAS (Rtd.)  
The Principal Accountant General (A&E)/(Audit),Kerala,Thiruvananthapuram  
The Secretary, Ministry of Personnel, Public Grievance & Pensions, Department of Personnel & Training, Government of India, New Delhi.  
The Member Secretary, Administrative Reforms Commission,Thiruvananthapuram  
The Personnel and Administrative Reforms Department  
The General Administration (SC) Department  
The Information and Public Relations Department  
The Web and New Media.

Copy to:

The Secretary to Chief Minister.  
The Private Secretary to Chief Minister.  
The Additional Secretary to Chief Secretary-  
PA to the Additional Secretary General Administration (Special A&C) Departments  
Stock File/Office copy.

Forwarded/By Order,

(Sd/-)

Section Officer.



## **ADMINISTRATIVE REFORMS COMMISSION**

### **TERMS OF REFERENCE**

GO(MS) No. 21/2016/P&ARD Dated 30/08/2016

1. To review the structure and functioning of the administrative machinery of the State and suggest measures for improving its responsiveness, efficiency and effectiveness as is required in a welfare State.
2. To revisit and redefine the roles of department and important agencies in Government.
3. To suggest measures for co – ordinated and joined – up functioning of Government departments and agencies to enhance positive outcomes.
4. To suggest measures to eliminate delays, corruption, favouritism and nepotism and to make administration result – oriented.
5. To suggest steps for enhancing delegation of powers to increase efficiency and citizen satisfaction.
6. To suggest modern management methods and Information Technology system and tools, which can be adapted in Government.
7. To review the policies relating to recruitment, placement and promotion and suggest measures for improvement of the performance of civil servants.
8. To suggest methods for democratization of different organs of Government at various levels and increase participation of the people in governance.
9. To assess the delivery of key public services and suggest measures for increasing their efficiency.
10. To suggest measures to make Government more open and accountable.
11. To suggest measures to refine/ operationalize Gender Budgeting, Child
12. Budgeting.
13. To recommend modern fiscal planning tools like output and outcome – based budgeting.
14. To assess the capacity building system in Government and suggest
15. measures to make it more effective.
16. To make any other recommendation arising from the above matters or incidental to them or considered necessary or appropriate by the Commission.

