

CURRENT STATUS AND CHALLENGES FOR CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY



© PRINCIPAL
SREE NARAYANA COLLEGE KOLLAM
Kollam- 691001 KERALA
www.snckollam.ac.in
E-mail: snckollam@gmail.com

Editors
S. SHEEBA
N. RATHEESH

**CURRENT STATUS AND CHALLENGES FOR
CONSERVATION AND SUSTAINABLE
USE OF BIODIVERSITY**

S.SHEEBA

N.RATHEESH

**CURRENT STATUS AND CHALLENGES FOR
CONSERVATION AND SUSTAINABLE
USE OF BIODIVERSITY**

S. SHEEBA

N. RATHEESH

Published by

**Principal, Sree Narayana College
Kollam - 691001, Kerala, India**

2020

© Principal
Sree Narayana College
Kollam 691001, Kerala, India

Editors
S. Sheeba.
N. Ratheesh

ISBN 978-93-5396-871-7

All rights reserved. No part of this publication may be reproduced or copied in any material from (including photocopying or storing it in any medium in form of graphics, electronic or mechanical means and whether or not transient or incidental to some other use of this publication) without written permission of the copyright owner. Any breach of this will entail legal action and prosecution without further notice.

Type setting: Mr.Jineshkumar S.

Publisher and Print by
Principal, Sree Narayana College, Kollam – 691001, Kerala, India

Editorial Board

Dr. B.T.Sulekha
Dr. B.Hari
Dr. S.Jisha
Mrs. Nisha.V.S
Dr. Divya T Dharan
Dr. Salini.M.P
Dr. Meera.D
Mrs. Munisha Murali.S

PREFACE

As the human population increases, so does the pressure on ecosystems, since we draw ever more resources from them. Our ecological footprint on the planet is unsustainable and will become unbearable unless we change our consumption patterns and our behavior in general. Use of biological diversity in a sustainable manner means to use of natural resources at a rate that the Earth can renew them. It's a way to ensure that we meet the needs of both present and future generations.

Today our only option is to manage productivity and resources in a sustainable manner, reducing waste wherever possible, using the principles of adaptive management, and taking into account of traditional knowledge which contributes to the maintenance of ecosystem services. Sustainable activities can also be applied in many sectors, including organic farming, environmental impact assessments, certification and eco-labelling, management of protected areas, productivity, etc.

The management and conservation of biodiversity has gained serious social concern during the past few decades both nationally and internationally. Educating youngsters is one of the major steps for conservation as they have to protect nature. In this context an international seminar was organized to highlight the importance of appropriate planning for solutions in some of the burning environmental problems which we face in the century.

This book presents unique information on various aspects of Environmental science, Environment and society, Biodiversity, Entomology, Fishery science, Toxicology, Molecular biology, etc. We sincerely hope that it will be of great asset to researchers, field scientists, policy makers, etc. in the conservation and biodiversity.

Editors

Dr.S. Sheeba.

Dr. N. Ratheesh.

CONTENTS

Environmental Science

1. Environmental Impact Assessment of River sand mining from Bharathapuzha river, Kerala, India
Santhosh V and Padmalal D 1-10
2. Origin, Geochronology and Depositional Environments of Quaternary Clay Sediments of Central Kerala, South India
Santhosh V 11-18
3. Analysis Of Fipronil Residues and Physico-Chemical Properties of Cardamom Plantation Soils, Idukki District, Kerala
Keerthi A T and Salom Gnana Thanga V 19-26
4. Temporal Distribution of Microbial Communities in the water system of Sasthamkotta Lake in Southern Kerala, India
Munisha Murali S and Sheeba S 27-36
5. Texture and Geochemistry of the Tile and Brick Clay Sediments of Chalakudy and Periyar river Basins, Central Kerala
Santhosh V and Padmalal D 37-42
6. Hydrochemistry of surface water Sources in Chalakudy and Periyar River Basins, Central Kerala
Santhosh V 43-48
7. Assessment of Water Quality Variations in Kunnamangalam Block, Kozhikode, Northern Kerala
Pramod A K and Santhosh V 49-54
8. Appraisal of Bacterial communities in the cradle of Sasthamkotta Lake in Southern Kerala, India
Munisha Murali S and Sheeba S 55-60

9.	Analysis of Physico-chemical and Biological properties of Soils at Ayiravilli Sacred Grove in Kollam, Kerala	
	Aruna Mohan and Ratheesh N.....	61-66
10.	Hydrochemical analysis of Water sources in a Semi-Critical Block of Kozhikode District, Northern Kerala, India	
	Santhosh V, Aswathy E K and IrfanaMumthas.....	67-72
11.	Impact of Human intervention on the Topography and Ecology at Kalarikunnu, Chelannur, Kozhikode, Kerala, South India	
	Ratheesh N and Lesitha K R.....	73-80
12.	Monitoring of Bacterial Pollution in Pampa River during the Pilgrimage Season	
	Rakhi R.....	81-86
13.	Physico-chemical Characterization of Water samples collected from different sources of Kollam District, Kerala, India	
	Latha Sadanandan and Reemraj.....	87-90
14.	Pollution of Tropical Estuarine systems: Heavy Metal contamination in the Sediments of Estuarine systems around Thiruvananthapuram, Southern Kerala	
	Arunkumar K S.....	91-98
15.	Solid Waste Management Technique for Sustainable Environment	
	Dhanalekshmy T G.....	99-102
16.	Analysis of Water quality and Application of Water purification methods in selected ward of Thekkekara Panchayath, Kerala	
	Rugma Rajeev and Reeja Jose.....	103-108
17.	An Income-wise Carbon Footprint of three Households in Kollam District, Kerala, India	
	Jisha S M, Sulekha B T and Letty Titus.....	109-114

18. Commercial value of Locally available Plants with potential for use as a Natural Dye Sonia John and Santhosh S	115-120
19. Phytochemical screening of selected Mangrove Plant leaf extracts from Ayiramthengu Mangrove in Kollam Dist, Kerala, India Jisha S and Sreeja J	121-126
20. Ayurvedic concept of Drug substitution: A Sustainable option for Medicinal Plant Conservation Shanti Vasudevan C N and I'ma Neerakkal	127-134

Environment and Society

21. Kandalkadukal Sreeja N	135-142
22. A Matter of Survival: The Necessity of Environmental Education Aswathy Mohan	143-146
23. British Forest Policy in India Jissa S	147-152
24. Environmental Movements in Kerala: Cause and Course Suja Karappath	153-160
25. Sustainable Development: Public Participation in Environmental Decision Making Namitha K L	161-164
26. Climate Change, Natural Disasters and Biodiversity: Reflections on Uninitiated Archa Arun	165-174

Biodiversity

27. Status and Future of Millipede Taxonomy in Kerala
Aswathy M D, Usha Bhageerathan and Sudhikumar A V.....175-180
28. Effect of Rainfall Fluctuations on Spider mediated Ecosystem Process
Kashmeera N A and Sudhikumar A V181-188
29. Mysid Fauna (Mysida: Peracarida) in the Andaman and Lakshadweep Waters of India
Biju A and Sreejai R.....189-192
30. Ecology and Morphometrics of an Invasive slug, *Laevicaulis Alte* in Kerala
Aleena Elizabeth Cyril and Gigi K Joseph.....193-196
31. Comparative Study on the Diversity of Brachyuran Crabs in Mangrove Ecosystems of Dharmadam and Valapattanam, Kannur District, Kerala
Arathi Raveendran and Bindu O197-206
32. A Study on the Abundance and Diversity of Plankton, Benthic Fauna And Fishery Resources in Kole Paddy Fields of Maranchery Kole Wetland, Kerala, India
Nimisha P and Shirin T V207-212
33. Ecology and Diversity of Brachionidae in Enamakkal Lake in Thrissur District, Kerala.
Meharban M P and Vimala K John213-218
34. Seasonal Diversity of Soil Microarthropods in Rubber Plantation, Panachivila, Anchal
Shyamily S, Nimmy Jose, Shambu S, Sincy Amala Prasad and Nisha Thomas.....219-222
35. Study on Phylloplane Micro Fungi in some plants at Ayiravalli Sacred Grove, Paravoor, Kerala
Athira Vijayan and Ratheesh N.....223-228

36. Diversity and Distribution of Vegetation at Ayiravilli Sacred Grove, Paravoor, Kollam, Kerala
Harsha D and Ratheesh N..... 229-234
37. A Preliminary Assessment on the Diversity of Genus *Ficus* L. (Moraceae) in Kerala
Sreehari S Nair and Amitha Bachan K H..... 235-242
38. Short-Term Temporal Variation in Coastal Phytoplankton of Saurashtra Coast: Influence of Dissolved Nutrients
Ambili Nath and Suresh Balakrishnan..... 243-250
39. Analysis of Morphological variability in two different varieties of *Carica papaya* (L.)
Remya R and Nisha A P..... 251-256
40. Biosystematics of *Sida acuta*, Burm.f
Chithra Vijayan, Amina S and Sreeja S..... 257-274

Entomology

41. A Comprehend in to the Wing Scales of Butterfly ‘*Acraea terpsicore*’
Amina Thaj, MunishaMurali S and Sheeba S..... 275-283
42. A Preview on the Wing Scales of *Danaus chrysippus* using Light Microscopy
Amina Thaj, MunishaMurali.S and Sheeba S..... 284-294
43. An exploration on the Wing Scale pattern of *Euploea core*
Amina Thaj, Munisha Murali S and Sheeba S..... 295-304
44. A Look in to the Tiny flat plates Sheathing the Flimsy Wings of *Amata Passalis* using Light Microscopy
Nidhi Soman, Surya A and Sheeba S..... 305-310
45. ‘Scales’ The Colourful Powdery stuff responsible for the Boggling Pattern and Colouration in *Graphium agamemnon*
Surya A, Nidhi Soman and Sheeba S..... 311-316

46. A swot up on the Fur-Like Scales shrouding the Gossamery Wings of *Olepa ricini* using Light Microscopy
Nidhi Soman, Surya A and Sheeba S317-324
47. A Glance to Aquatic Entomofauna of Sasthamkotta Lake in Southern Kerala
Munisha Murali S, Sheeba S and Lichu Thampi325-328
48. Juvenile Hormone mimic from Medicinal plant *Andrographis paniculata* (Burm F.)
Bindu O and Muraleedharan D329-336
49. Screening of various plant extracts as Biopesticides against *Rhynchophorus ferrugineus* and its Enzymatic alterations
Chandana J S and Ajitha V S337-344

Fishery Science

50. Physiological response of Freshwater and Salinity - Acclimated Perch (*Anabas testudineus* Bloch) to Water - Borne Nitrate
Vijayasree A S and Oommen V Oommen345-352
51. Effects of addition of Carbohydrate sources on Fish waste fermentation and Efficacy Evaluation of Fermented products as Bio-Fertilizer for the Cultivation of Okra, *Abelmoschus esculentus* (L.) Moench
Hari B, Jisha S and Noufiyath N353-360
52. Differential Regulation of Na⁺, K⁺-Atpase by *In Vitro* Thyroid Hormones in Perch (*Anabas testudineus*) Gills and Kidneys: Evidence for Direct and rapid actions
Leji J361-368
53. Length eeight analysis of *Stolephorus indicus* of Kerala Coast
Divya T Dharan and Sreedevi369-374

Health Science

54. Regulatory role of Curcumin in overcoming Chemoresistance to 5-Fu In Breast Cancer cells via Cyclin D1 and BCL2
Vinod B S Haritha H Nair and Ruby John Anto 375-378

Molecular Biology

55. Current status of Molecular Phylogeny of Wolf Spiders
Abhijith R S, Sheeba P and Sudhikumar A V 379-384
56. Molecular identification and Optimization of Amylase producing *Bacillus gingshengiis* NB12 using Response surface Methodology
Divya Balakrishnan, Shilpa Shaji V S and Anu Krishna K R 385-398

Toxicology

57. Metabolic effects of Bisphenols on a Freshwater fish, *Oreochromis mossambicus*
Anjali V R and Aruna Devi C 399-406
58. Hepatotoxicity of Azo Dye Tartrazine in Indian Major Carp, *Labeo rohita*
Athira N and Jaya D S 407-414
59. Effect of 4 -Nonylphenol on Mitochondrial and Intermediary Metabolism in a Fresh water Fish, *Labeo rohita*
Remya V S and Aruna Devi C 415-422
60. Biomarkers as Tools to characterize the Contaminated Ecosystem
Sulekha B T and Anna Mercy T V 423-428
61. Hepatotoxic effects of 4-Nonylphenol on Oxidative stress and Antioxidant Responses in the Indian Major Carp, *Labeo rohita*
Reshmi S and Aruna Devi C 429-438

62. Trace Metal analysis of Zooplankton from Cochin Estuary
Bettina P Alex, Biju A and Jyothirmaye Mohan 439-444
63. Oxidative Stress Responses of a Freshwater Fish, *Labeo Rohita*, to an Endocrine Disruptor, Bisphenol S
Shehna Mahim S and Aruna Devi C 445-457
64. Trace Metal Concentrations in Sediments and Commercially important Penaeid shrimp, *Metapenaeus dobsoni* (Miers, 1878) collected from Cochin Backwaters
Jyothirmaye Mohan, Biju A And Bettina P Alex 458-465
65. Biochemical and Histopathological changes in the Tissues of *Cyprinus carpio* treated with Iron oxide and Cerium oxide Nanoparticles
Usha. S 466-471
66. Impact of Green synthesized Gold nanoparticle fortified diet on Liver Histology of *Oreochromis mossambicus*
Shine F, Akhila Thomas, Shibu Joseph S T and Dhanya Raj 472-477
67. In Vitro Antioxidant and Cytotoxic Activity Of *Carica Papaya*
Nitha Anand and Gayathri B 478-483

CHAPTER 24

ENVIRONMENTAL MOVEMENTS IN KERALA: CAUSE AND COURSE

Suja Karappath

Department of Political Science,
Sree Narayana College, Kollam, Kerala
Correspondence E-mail: suja.karappath@gmail.com

ABSTRACT

Environmental or ecological movements are part of social movement. An environment movement may be called as tribal movement, women's movement, fisher folk movement etc. Social movement as a deliberate collective endeavor to promote change in any direction and by any means, not excluding violence, illegitimacy, revolution or withdrawal into 'utopian' community. The history of the environmental movement in Kerala started since the period of sixties. The determining factors of environmental movement are the nature of political system, resource mobilization of participants and counterparts, relative deprivation, the class elements and liberal ideology are proved again here. During the period of compensation issue against Coca Cola company, the discussion revolves around the negative image of the industrial climate and its outcome at the future of the economic development of Kerala. The concept of sustainable development should be the matter of debate here. The superficial movement against climate change, south north conflict regarding the environmental degradation are the stumbling block for the macro analysis of it.

Key words: Environmental movements, Silent Valley, Chaliyar river, Anti endosulphan, Plachimada

Introduction

The United Nations Interagency Framework Team for Preventive Action guidance in 2012 reported that Over the past 60 years, 40 percent of civil wars can be associated with natural resources; since 1990 there have been at least 18 violent conflicts fuelled or financed by natural resources and The United Nation Environment Programme in 1999 reported that the vast majority of environmentally related conflicts occur in developing regions. There are more environmental conflicts in India than any other country, and more clashes are over water (27%) than any other cause, according to the recently released Global

Environmental Justice Atlas (EJAtlas). India is experiencing very late environmentalism when we compare with the western environmentalism. It's with the chipko Movement in Utharakhand region during Seventies against government allocation of trees to business group. But at the same time when the state occupied the commanding heights of the economy, and India was close to the Soviet Union, the activists of Chipko and other such movements were dismissed by their critics as agents of Western imperialism. They had, it was alleged, been funded and promoted by foreigners who hoped to keep India backward. Anyhow the trickledown theories of development or liberal notion are abandoned basic need

approach and many especially Gandhians were concerned about the appropriateness of technological choices.

Conceptualizing Environmental Movement

Environmental or ecological movement are part of social movement. The rigid phrase or categorization of environmental movement is never a problematisation. An environmental movement may be called as tribal movement, women's movement, fisher folk movement etc. For example Chipko movement started when the government policies to allow the Simon company to cut trees in Garhwal region. The region comprises mainly tribal settlement and it affects tribal way of life. The tribal participation makes it as sense calling tribal movement. Moreover the movement may be called as women's movement. The reason is that male people are migrated from the region for employment opportunities and the remaining male people are supported the Symond company and the company makes them as ally by means of giving alcohol. Hence the major participants are women and it as women's movement.

According to Paul Wilkinson Social movement as a deliberate collective endeavor to promote change in any direction and by any means, not excluding violence, illegitimacy, revolution or withdrawal into 'utopian' community. It is important to note, however, that such tendencies and trends, and the influence of the unconscious or irrational factors in human behaviors may be of crucial importance in illuminating the problems of interpreting and explaining social movement. Idney Tarrow defines the collective challenges based on the common purposes and social solidarities in sustained interactions with elites, opponents and authorities. According to Doug McAdam, social movement are those organized efforts, on the part of excluded groups to promote or resist changes in the structure of society that

involve recourse to non institutional forms of political participation. Unlike in the West, the Indian environmental movement it involved the women, the poor, and disadvantaged masses who have been directly affected by or are victims of environmental degradation. Patrick Moore opined that in west, greenness is the ultimate luxury of consumer society.

Environmental Movements in Kerala

Crosby proposes colonization was not only a form of cultural and political tyranny; it was also a form of environmental terrorism. The colonial intervention in the ecology of Kerala paved the way for transformation in the tenure relationships in forest and other non-arable land, the introduction of plantations the construction of roads, canals and opening of land to the money lenders, traders and revenue farmers. Even though the history of the environmental movement in Kerala started since the period of sixties.

Movement against pollution in river Chaliyar

Birla's Grasim Industries(GI) unit at mavor(20km east of the Calicut city) besides the Chaliyar river established in 1958 to produce rayon grade pulp and viscose staple fibre. Basic raw materials for pulp manufacture are bamboo and eucalyptus. Government offered to provide at Rs1 per ton when bamboo stood at Rs 80 per ton in the open market. Every year 2500- 3000 acres of natural forests were sought to be turned into eucalyptus jungle. Being the discharge effluents to sea through pipes, the protest in the 1960's and 70's against air and water pollution aroused.GI pipeline to chungapalli was not working effective and it utilizes 98, 500 cubic meters of water every day. To sum up all these were lead to the depletion of oxygen, higher level of chemicals which in turn cancer and chest related diseases, depletion of river resources etc.

The petition of Pollution Control Board, various study reports of University of Calicut, three nearby Panchayats, Ministry of Environment and Forest were occurring along with the peoples protest made a blow. At the same period, Gwalior Rayons Organization of Workers (GROW) formed inside of the company in 1983 when the affiliated trade unions were disinterested to solve labour issues Later it joined the forefront of the people struggle. Peoples organization like Chaliyar Water Air Purification Committee and Committee for Prevention of Pollution, Chaliyar Samara Ekopana Samithi, Kerala Sastra Sahithya Parishad (KSSP) and unity of all trade unions during the late nineties were characterized it as movement. The Management maintained the pipeline only in the 1981 was the first positive step of the company. The series of protest related to anti labour policy with people's movement led the closing of the company in 2001 without paying compensation for the damage. E.M.S Namboodiripad himself later admitted that he faced several criticism from the party due to the anti labour content of agreements into the management. The Kerala Government did not take effective action even in Mavoor gas tragedy in 1995, and in suggestions of some committee.

The save Silent Valley Movement

The Silent valley is undisturbed rain forest of having the age of 50 million years of evolution and arboreal fauna. The Silent Valley Hydro-Electric Project (SVHEP), over the Kunthipuzha River flowing through the Palakkad and Mallapuram districts was planned by Kerala State Electricity Board in 1976, intended to submerge 8.3 sq km of forest land, when Prime Minister Indira Gandhi gave consent in 1978. Romulus Whitaker, founder of Madras Snake Park and Crocodile Bank is the first person to draw public attention through article in the Journal

of Bombay Natural History Society when the cutting trees in 1974-75. In Course, National Council for Environmental Planning and Conservation said about the withdrawal of project, however Kerala government adversarial it. In this context, KSSP raised the issue (a non-governmental organization for Peoples Science Movement) which comprises scientists; educated lower middle class raised the issue in 1977. In the wake of emergencies CPI(M) members took membership to work in the restrictive political context, and it became left affiliated civil society to some extent. Kerala Forest Research Institute, Kerala Natural History Society, International Union for the Conservation of Nature and Natural Resources, Newspapers like The Hindu, the Prakrithi Samrakshana Samithi (Association for the Protection of Nature), an eco-social organization led by the writers of Kerala, artists, poet shave been organizing seminars, debates, processions, publication of poems etc were strong in these period against the inundating the forest area, economic insignificance, illusory irrigation, the indigenous peoples right etc. The writ petition filed in the High Court against cutting of trees and favorable judgment for the movement was a successful step. Even though HC lifted the ban, but then the Prime Minister requested Government of Kerala to stop further works. It was actually in the wake of the MGK Menon report, PM abandoned the Project and declared as National Park in 1980.

Anti Endosulfan Movement

The aerial spraying of endosulfan over the cashew plantations in Kasaragod district in Kerala, was started in 1978. This was done 3 times a year over an area covering 15 Grama Panchayats. There were many warning signals about its impact from the beginning, including the mass deaths of bees, fishes, frogs, birds, foxes and also congenital

deformities in domestic animals like cows . Since 1979 there had been local outcry from farmers and media concerning the health effects of the pesticide spraying. Despite public awareness and high literacy levels in Kerala, no serious action was taken except in a piecemeal fashion and lip-service sympathy paid. Perhaps Plantation Corporation of Kerala (PCK) thought that income generated from the cashew (including export) was more important than the environment. Individual studies and expert committee reports have shown that several people especially those below 25 years of age in Padre, suffer from various abnormalities. PCK, however, ignored these warnings and continued with aerial spraying of pesticides although the Central Insecticides Board did not give permission either to the government or to a private agency for spraying of hazardous chemicals including endosulfan. The Insecticide Act of 1958 cannot cancel the registration (already given by the Pesticide Registration Committee) to a substance, specified in the act, even if the same substance is found later to be hazardous to health and the environment by a scientific study. Several national and international groups conducted health and toxicological studies between 1998 and 2002; and arrived at the conclusion that the abnormal health problems at Kasaragod were due to the spraying of endosulfan. A local doctor, Dr. Mohankumar revealed that there was a rising incidence of cases of mental illness and congenital anomalies in Kasaragod and published an article in Indian Medical Association in 1994 after understanding the cause of genetic problem of children since he noticed in 1982. The Endosulfan Spray Protest Action Committee formed in 2000 following the panchayat complaint on the probe of the reason of the issue. During these period only doctors understood the reason. Later they acquired stay order, even though contempt of court practicing in spraying.

Pesticides Manufacturers and Formulated Association of India (PMFA) exerted influence seems to delay the rehabilitation process and positive reports by veracious institutions. Government stopped aerial spraying in 2002 and The Supreme Court pulls up Kerala for denying relief to Endosulfan victims. The struggle continues in various forms of peaceful protests. The shocking incident of endosulfan is kids and animals are born with genetic disorder

Movement against Eloor Edamalayar industrial belt

The 450-acre Eloor-Edayar region is the largest industrial belt was established in 1962 falls under the Kadungalloor panchayat. Two years later, the displaced families were rehabilitated to Thandirickal colony, near the Edayattu Chal (canal), which had been the most-preferred waste dumping yard of the companies over the years. Greenpeace in 1999, later various government dept like Cochin University of Science and Technology , Dept. of Health, Dept of Forest and Environment, Supreme Court Monitoring Committee, Periyar Malineekarana Virudha Samiti (PMVS), Thanal reported on the effluent into the river, depletion of fish, health problems like chronic diseases, air pollution related diseases, ground water contamination, lowering water level etc. some companies like CMRL and Merchem play a hide-and-seek game with the authorities, stopping effluent discharges temporarily when faced with legal troubles, but starting off again when the issues have cooled off. The trade Unions have filed cases against those who opponents of the company as maoist. With rivers coming under several departments including irrigation forest, mining, revenue, pollution control board, KSEB, and Science and Technology Council, the water bodies have no single protector and hence there is a lot of abuse of water. The Association of

Environment Protection Aluva, PMVS continuously doing processions, meetings etc. against river pollution. The recent order of National Green Tribunal (January 2019) of seeking for zero discharge of industrial sludge on the river Periyar and to clean Kuzhikandam Thodu, Panachithodu, Pallipuramchal and Unthithodu, which are small streams meeting the river Periyar. But the continuing struggle shows inactivity regarding of it.

Plachimada Struggle

Plachimada village is in Chittur Taluk of Palakkad district is well known for paddy cultivation and tribal inhabitants. They depended on water mainly on ground water because of gently undulating terrain of the region. In 2002, Coca Cola set up their plant in 32 acres for manufacturing soft drinking water following the government permission without studying the ecological impact and not specifying the level of water to extract per day. KBCB permitted 5 61, 000 liters of soft drink per day. Their activities effects depletion of ground water, ground water pollution, diseases, effecting crops etc as per the reports of Centre for Science and Environment, (CSE) District Officers.

Pollution Control Board (2004), Central Ground Water Board(2004), independent studies etc. The protest started in 2002 under Coca Cola Virudha Samiti for closure of the company. Initially Political Parties and Trade unions against the movement for the sake of employment creation. Agitation furied with the participation of many civil rights movements, Coca Cola Virudha. Later the CPI(M) supported the movement and the popular media, Adivasi Gothra Maha Sabha made it as the successful movement. In 2003, Panchayat cancelled the license on the issue of environmental degradation even though they gained permission in the High Court and subsequently in Supreme Court also. The movement is well known as womens

movement due to their participation and the leadership role of Mayilamma. In 2005, Thepanchayat, Struggle committee, and PCB were strong against the company which lead to the Company talks about compensation and government of Kerala decision to close the company and the compensation. But the Centre rejected states compensation bill even though the state assured the reconsidering the issue.

Movement for western Ghat Protection

The first phase of the movement with the Save Western Ghat Movement in 1987 across western ghat area due to the climate change issue and chipko movement. Activists, scientists, tribal people, doctors, trekkers, litterateurs were participated against anti forest policies and making awareness through padyatra and bulletin. But the movement failed due to its lack of follow up programme. The second phase of the movement began with the publication of Western Ghats Ecology Expert Panel (WGEEP), also known as the Gadgil Commission under the Government of India in 2011. It is viewed as the government effort to acquire the international status for the conservation of western Ghat. But it become public document only after the private request for Right to Information Act in 2012. The report describes the area of western Ghat, its relevance and recommendations to protect the area. It classified as 142 taluks into ecologically sensitive zones as ESZ1, ESZ2, ESZ 3 and restricts the environmental hazardous activities in this region and suggested bottom to top approach. But the huge movement against protection by the business magnets, left political parties, Christian missionaries especially in Kerala and false propagation to local people contributed to the formation of anti-environmental struggle in the history of Kerala. Hence the govt. formulated another report called high-level working group

(HLWG), headed by Kasturirangan. He prepares report based on remote sensing for zonal demarcation. The Kasthoorirangan Report covers only 37 percent area as Ecologically Sensitive Area(ESA). Many environmental hazardous activities like rubber plantation are included in ESA and many areas are opted out. Loopholes for mining, quarrying activities etc are major criticism of the environmentalists across the nation. The struggle got struck down and Kerala government is slow down to prepare the action.

Save Allapad Movement

As per the lithographic maps prepared in 1955, Alappad had covered an area of 89.5 square kilometers area, but the total area has shrunk to just 8. Km now. Over the past 63 years, 80 sq.km has been eaten up by ever rising tides and now out of sea under 50 meters of water since the sand mining activities in 1965. The major black sand mining sites are of Indian Rare Earth, a public sector endeavor and Kerala Minerals and metals Ltd. The coastal erosion, erosion of paddy field and coconut field, depletion of fish stocks in backwaters due to salivation of water into ground water, displacement of 5000 led to the movement 'Save Allapad and Stop Mining'. It has gained traction on social media with several film stars joining it. The residents of Alappad, located 10 km north of Kollam, assemble at a makeshift protest venue near the village office every day to carry out a relay hunger strike started by 'Karimanal Khanavirudha Janakeeya Samarasamithi' on November 2018 against mining has received attention on social media, with many organizations and prominent personalities extending support. Various studies conducted by the Centre for Earth Science Studies, National Institute of Interdisciplinary Science and Technology, T M Mahadevan Committee, Trivikramji Committee to vindicate the villagers' stand.

According to them, the company has violated National Mineral Policy, Mines & Minerals (Development & Regulation) Act, The Mineral Conservation and Development Rules, Coastal Regulation Zone, The Environment (Protection) Act, The Kerala Conservation of Paddy Land and Wet Land Act, 2008. National Confederation of human rights Organisation, Kerala Catholic Youth are supported the peaceful struggle Save Alappad Action Council.

The participants of the movement criticized the inaction and eyelash appeasement of the keralagovt in each meetings.

Kathikudam struggle

Kathikudam is a small village in chalakkudy Taluk in Thrissur district of Kerala state. It comes under Kadukutty Panchayath. The area can be described as one of high vegetation region. The Kerala Chemicals and Proteins Limited (KCPL) started working in 1979 at Kathikudam which belongs to Kadukutty village which is located on the banks of Chalakkudy River. The company has started by the Japan based Multi-National Giant Nitta-Gelatin together with the Kerala State Industrial Development Corporation (KSIDC). Then another Japan corporate giant, Mitsubishi Corporation has bought some amount of its shares and hence the Government shares has come down .In 2008. So the company is renamed as Nitta Gelatin India Limited(NGIL). The company makes use of 1.2 lakh litres of water from the Chalakkudy River for its whole processing and then they use to dump the waste water and waste material with highly dangerous chemical content into the same river. Solid waste (sludge) of the company is heaped in the company compound, and later used for filling up inside the company compound. Consequently the soil, surface water, ground water tables all got contaminated which effects socio economic healthy life of people. The Effluents have been discharged to

Chalakkudy River without proper treatment. The sporadic struggle continued due to the severe pollution on the part of company in 2008 with the formation of Action Council of slogan go back NGIL. Various civil rights activists, women, childrens, solidarity movement in various parts of the state are the important course of the struggle. All the institutions of state like Ministry of Environment & Forest, District Collector, State Pollution Control Board, High Court(sometimes), police except Kadukutty grama Pachayat. They opined that they use financial resource to influence some bench of Supreme Court with the support of Kerala Pollution Control Board.

Conclusion

The determining factors of environmental movement are the nature of political system, resource mobilization of participants and counterparts, relative deprivation, the class elements and liberal ideology are proved again here. During the period of compensation issue against Coca Cola company, the discussion revolves around the negative image of the industrial climate and its outcome at the future of the economic development of Kerala. The concept of sustainable development should be the matter of debate here. The superficial movement against climate change, south north conflict regarding the environmental degradation are the stumbling block for the macro analysis of it.

References

Bijoy, C. R. 2006. Kerala's Plachimada Struggle: A Narrative on Water and Governance Rights, Economic and Political Weekly, 41(41): 4332-4339. (Oct. 14-20, 2006).
<https://caravanmagazine.in/communities/coca-cola-plachimada>

<http://economictimes.indiatimes.com/nitta-gelatin-india-ltd/>

<http://shodhganga.inflibnet.ac.in/bitstream/10603/37068/8/chapter%203.pdf>

http://timesofindia.indiatimes.com/articleshow/10776395.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

<http://www.onefivenine.com/india/villages/Thrissur/Chalakkudy/Kathikudam>

<https://english.manoramaonline.com/districts/kollam/2018/11/07/kerala-village-alappad-sea-erosion.html>

<https://shodhganga.inflibnet.ac.in/bitstream/10603/37068/8/chapter%203.pdf>

<https://shodhganga.inflibnet.ac.in/bitstream/10603/37068/8/chapter%203.pdf>

https://shodhganga.inflibnet.ac.in/bitstream/10603/4242/6/06_chapter%201.pdf

<https://www.cseindia.org/endsulfan-industrys-dirty-war-a-chronology-of-events--1927>

<https://www.downtoearth.org.in/coverage/children-of-endsulfan-15838>

<https://www.downtoearth.org.in/coverage/endsulfan-conspiracy-38732>

<https://www.thehindu.com/news/national/kerala/supreme-court-pulls-up-kerala-for-denying-relief-to-endsulfan-victims/article28306516.ece>

<https://www.thenewsminute.com/article/periyaar-dying-how-south-keralas-lifeline-has-become-industrial-sewage-drain-65169>

Jananeethi Report, Kathikudam to Kalakudam, apipeline distance to disaster, Thrissur, 2010

Nirmala, V.U., 2010. Political Left and New Social Movements in Civil Society, The

- Indian Journal of Political Science, VOL LXXI No 1, Jan-Mar, 2010, pp 2244-50
- Official handbook, SWG Movement, 1987-88
- Parameswaran, M.P., 1979. Significance of Silent Valley, Economic and Political Weekly, July 7, 1979, p-1117, 18
- Rajendran, S. 2002. Pesticide Spraying in Kerala: Human Cost and Environmental Loss, Economic and Political Weekly, Vol. 37, No. 23, Jun. 8-14, 2002, pp. 2206-2207
- Ram Mohan, K. T. and Ravi Raman, K. 1988. Kerala worker rises against Indian big capital-report on Rayons workers struggle, Economic and Political Weekly, July 2, 1988, p-1359
- Ramachandra Guha, 2013. The past and present of Indian environmentalism, The Hindu, March 27, 2013, P 4
- Ravi Raman, K. 2005. Corporate Violence, Legal Nuances and Political Ecology: Cola War in Plachimada, Economic and Political Weekly, 40(25):2481-2483 (Jun. 18-24, 2005).
- Report of High Level Working Group, 2013
- Report of the Fact Finding Commission on the police Action, Undermining Democracy in Kathikudam, Thrissur, 2013
- Report of Western Ghats Ecology Expert Panel (WGEEP). 2011
- Seethi, K. M. 2000. Cleaning Chaliyar River: Pollution Control or Jobs?, Economic and Political Weekly, Vol. 35, No. 3 (Jan. 15-21, 2000), pp. 97-99
- Sudheesh, K. M. 2009. Resistance from Below, An Assessment of The Struggle against Coca Cola Company in Plachimada, Kerala, The Indian Journal of Political Science, 70(3):839-852 (July-September, 2009).
- Suresh, M. 2012. The State Versus Indigenous People: A Study On Plachimada Struggle, Proceedings of the Indian History Congress, 73:1329-1335
- The new Indian Express, 20 January, 2019.
- The times of India, 10 November 2014, p2
- Vinodan Navath, 2012. Politics of environment in a colony and after: the Kerala case-proceedings of Indian History Congress, vol73, p1315
- Virgin, M. 2016. Historicizing Plachimada Movement, Proceedings of the Indian History Congress, Vol. 77, p1110