CHAPTER IV

THREATS TO WETLANDS OF KOLLAM

The major problem that affects any ecological system is the increase in population and accompanied changes in land use pattern. The increase in population and the change of perception towards environment and the occupation change also are the major driving force that acts behind the shrinkage in wetland area. The increase in urbanization also affects the shrinkage of wetlands as urban expansion requires more wetland area to be converted resulting to ecosystem changes and biodiversity loss. The increase in household waste especially solid waste, large scale reclamation, unprecedented increase of sand and clay mining, last but not least haphazard development of tourism also plays major roles in the depletion of the quantity and quality of wetlands.

4.1 Major Threats That Faced by Wetlands of Kollam

4.1.1 Wetland Reclamation for Housing

The large scale increase in population especially household population has excreted pressure on the more houses. The human settlements were traditionally concentrated around the wetland system. According to the census data (1991), the household population of Kollam was 489774 it reached 593314 in 2001 and the total percentage change of household population is 8.2%. This increase in house hold in the last decade affects the utilization of wetlands (fig 4.1)

Fig 4-1: Wetlands Reclaimed for Constructing Houses
4.1.2 Industrial and Infrastructural Development

Many small, medium and large modern industries emerged on the banks of the backwaters and rivers and they dump their wastes into the waterbed in an attempt to save the costs of pollution abatement. A good number of large, small and cottage industries are now located near the wetlands and drainage basins of Kerala.

![Figure 4-2: KMML Chavara](image)

The major industries adjacent to the wetlands include various, paper, aluminum, refinery, ceramic, spinning mills, match factories, cashew processing, milk pasteurization, clay factories, etc. Coir units are mainly concentrated in the coastal belt. In addition to these there are units like fish processing, food processing, motor and welding workshops, etc., functioning adjacent to many of the wetlands.

In the case of Kollam the industrial development especially the establishment of cashew factories changed the working population dynamics a large number of agricultural labours were absorbed by the cashew factories. That affected a number agricultures especially the paddy cultivation. After this boom of cashew factories there is a huge decrease in the paddy area of Kollam district.

The construction more and more roads, bridges, dams, railway lines, harbors and ports, fish landing centers for water transport, commercial and residential buildings etc. The
Construction activities are the need of the day, but what is lacking is proper development planning and environmental monitoring in almost all the cases. Most of the activities create some kind of interventions in the system causing degradation.

4.1.3. Changing Pattern of Agriculture and Aquaculture

Agriculture expansion accompanied by intensive use of agrochemicals has become a major driving force for wetlands causing encroachment, reclamation, pollution, eutrophication, and biodiversity loss. Paddy cultivation is prevalent in the low land areas. Mixed cultivation with coconut as main crop is also predominant in many wetland areas.

Figure 4-3: Wetland Reclaimed for Rubber, Coconut and Vegetables
4.1.4 Retting of Coconut Husk

Coconut husk retting, a widespread activity causing organic pollution of the wetlands of Kollam, results in release of large quantities of organic substances and tannin into the water by the activity of bacteria and fungi. The decomposition of these results in the production of hydrogen sulphide - the basis of the nauseating smell in and around retting zones. High organic content (6-13%), high BOD (5.137 mg/l), low oxygen (0.05 ml/l) and high sulphide (4.97 mg/l) characteristic of retting zones are found to be devastating for the bottom fauna. (figure 3-6)

![Figure 4-4: Coconut Husk Retting in Ashtamudi area](image)

4.1.5 Waste Disposal

Municipal solid waste and sewage are the major pollutants of almost all wetlands in the State, and are the main sources of pathogens in the system. There is no sewerage system in Kollam municipality most of the municipal effluents reach the Ashtamudi estuary. The urban wastes include hospital wastes, market and slaughter house wastes and sewage and wastes generated from other commercial and residential areas including overflow from latrines. (KSCSTE, 2007) The people living near the wetlands in the rural stretches are also depositing the household wastes into the system. Hanging latrines (figure 3-7) (with outlet directly to water body) are common scene in the banks Ashtamudi. According to an estimate the latrines of about 60 per cent of houses near to the wetland areas and canals are directly or indirectly
opening into the wetlands. There is no proper slaughter house waste management practices in most of the cities and rural areas. The present practice is to dump the wastes in the sides of wetlands or rivers during night. The infrastructure development activities in the State along the sides of the wetlands generate a huge quantity of debris which consists of organic and inorganic materials and toxic compounds like cement, clay, wood, oil grease, paints, insect repellent substances, etc. A good quantity of these, are dumping directly into the wetlands. The tourism activities in the wetlands generate large amount of wastes both in the land and water. The wastes generated in the houseboats are directly reaching into the system. (KSCSTE, 2007)

Figure 4-5: Make Shift Latrine Constructed Inside the Ashtamudi Kayal

The wetland ecosystem in Kerala is also threatened by petroleum hydrocarbon (PHC) pollution. Numerous oil tankers and other vessels plying through the waters are major sources of pollution. The input of PHC to the aquatic system is purely of anthropogenic nature. It is found mostly in the form of unburned fuel and oil and the tarry nature of these residues adheres to the respiratory system of aquatic organisms. Oil and grease spills from the boats used for water transport, fishing and tourism are other sources for PHC pollution. Wash out from the motor workshops, bus stands, boat building yards, etc., situated on the outer reaches of the wetlands and the construction wastes are also sources of PHC pollution. The KSRTC Depot of Kollam situated close to Ashtamudi estuary the chemical waste of the depot reaches the estuary. (KSCSTE, 2007)
4.1.6 Land Use Changes

The wetlands are currently subjected to acute pressure of rapid developmental activities. Most of the government sponsored projects especially in urban areas are finding space in wetland areas for which large scale reclamation is going on. Unauthorized encroachment of wetland areas for non-wetland purposes are still continuing in the State especially areas adjacent to low land paddy fields, mangrove areas and other backwater areas. Initially most of the encroachments are for agriculture purposes; later these areas were reclaimed and used for various other purposes. The unscientific land use and agricultural practices along with forest clearing in uplands and in wetland areas exert major pressure on wetlands leading to soil erosion. This causes siltation leading to vertical shrinkage and related problems like salinity intrusion, ecosystem change and biodiversity loss. The eroded soil contain large amount of nutrients which causes eutrophication. Utilization of low lands for purposes other than the originally envisaged, like paddy lands for vegetable cultivation, aquaculture, etc., are common practice in many places, which lead to the change in the ecosystem Reclamation of the private owned low land areas for construction purposes, for industries, etc., are common activities in many places. In addition to this, some areas are excavated for clay and soil for making country bricks. The wetland loss due to various anthropogenic activities has been responsible for bringing to the verge of extinction of countless species of medicinal and economically important plants and animals(KSCSTE, 2007)
4.1.7 Hydraulic Interventions
Most of the hydraulic interventions in the rivers and wetlands are for providing the basic needs of the people like drinking water, electricity and for providing suitable condition for agriculture and fisheries. These create changes in ecosystem and related issues. The construction of Kallada dam reduces the water availability in the low land areas. (Lee et al., 2006).

![Bund Created Across Ashtamudi Kayal Near KSRTC Kollam for Road Construction](image)

4.1.8 Overexploitation of Resources
The unsustainable commercial exploitation of wetland resources exerts major pressure on the system. The present practices in the fisheries sector have adverse effect to the system like blocking the migratory pathways of fish and other organisms, destruction of fish larvae, poisoning wetlands during capturing, etc. Even small sized fishes were also caught for using as cattle feed. Sand mining and mining of other resources like lime shell are carried out without any studies or taking in to consideration the sustainability aspects. In addition to the licensed mining, there are a lot of people engaged in illegal sand mining activities in the wetlands and rivers. (Padmalal et al., 2004) (figure 3-10)
4.1.9. Weed Infestation

Increased trade and commercial activity has brought with it, a large number of aquatic weeds, into this area. The excessive growth of weeds like *Salvinia molesta*, *Eichhornia crassipes* and *Damasonium flavum*, etc., exerts great pressure on the biodiversity of wetlands. The alien weeds have found great competitive advantage over the native aquatics. (KSCSTE, 2007; Martin, 1954 ). The weed problems of small inland wetland like ponds are in dire state except some holy pond near the temples most of the ponds are in the verge of destruction by weed infestation. (Figure 3-4, 3-5)

Figure 4-8: Laterite Mining and Sand Mining Near Sasthamkotta *Kayal*

Figure 4-9: Weed Infested Part of Chatuuvva *Kayal* Near Sasthamkotta
In short the problems faced by wetlands of Kerala can be visualized with the help of the figure 4-11.
4.2 Agents of Change
Based on the above discussion it is evident that the wetland problems of Kollam district are mainly driven by certain agents. The major agents that lead to the change in the status of wetlands are Globalization, Demographic change, Tourism and real estate boom.

4.2.1 Globalization
Has driven complete economic change in the country that is apparent in Kollam also. According to ministry of agriculture government of India (2009), Kollam is one of the least performing states in agriculture in whole of India. This is mainly due to the large scale migration of semiskilled labours from rural areas to the gulf countries. This leads to the shortage of agriculture labours, which eventually turned the traditional paddy growing area into tapioca fields and other cash crops growing areas.

4.2.2 Demographic Change
The change in the characteristics of working population especially, reduction in the number of agriculture labours attributed to the reduction in paddy field. Money from mono crop cultivation also attributed to the loss of traditional wet paddy cultivation.

4.2.3 Increased real estate boom and Tourism
Not only the real estate the combination of tourism, real estate, and gulf migration resulted in the dry up of paddy field or abandoning of the paddy fields. It also decreased the quality of estuary and backwaters (Ramasubbu, 2007). The recent boom in real-estate business must have been the reason for an increase urban foot print. However such an increase is not noticeable from the fluctuations in the wetland area. The construction of Kallada dam and thereby the reduction of inflow from uplands may have compensated for this probable increased surface flow due to increase in urban foot print. Construction of this dam structure is also said to have increased the brackishness of the estuary.
4.3. Problems Faced by Two Ramsar Wetlands of Kollam

4.3.1. Problems Faced by Ashtamudi Kayal

Pollution from oil spills from thousands of fishing boats.

Pollution from industries such as paper mills; aluminum industries and ceramics.

Pollution from coconut husk retting.

Disposal of huge quantities of untreated sewage from Kollam city, direct disposal of human excreta from hanging latrines.

Natural habitat faces serious degradation including reclamation of the estuary.

The aluminum, ceramic industries, paper, match, spinning mills, and cashew factories functioning in the Kallda River basin and back water area releases large quantity of effluents into the wetland system. Such as small scale industries and other livelihood earning activities like fish processing units, boat building yards, slaughter houses. The effluents from such units contribute heavily to the organic pollution load of the open water bodies. Waste from house boats and resorts are also contributing to the degradation of ecosystem. Fishing boats with outboard engines release large quantity of hydrocarbon in to the wetland. Legal and illegal encroachment and reclamation of wetlands for creating infrastructure facilities to the rising urban population are on the rise in many areas. Such actions cause shrinking of the wetlands and destruction of biodiversity. The Asramom area of Kollam was once abundant with rich mangrove ecosystem and dependent animal species. The woody trees like Hooligharma arnottina, Syzigium travencorium etc are still present in the site but are very few.

Land use changes and deforestation in the drainage basin as well as the increase in the withdrawal of surface and ground water from the river basin for irrigation, domestic, industrial and other uses have also put forth pressure on the system through stream flow changes. Hydrological interventions, like the Kallada Dam also exert pressure on the system. Natural process like floods, erosion, sedimentation and natural disasters do exert pressure in
the area. The hydro period of the wetland has changed due to the seasonal variations in the fresh water inflow into the wetland.

Ground water pollution in many areas is considerable and leading to scarcity of potable water. Increase in organic content in the soil resulted in heavy weed growth, which is creating problems to agriculture, fishing, and water transport.

4.3.2. Problems faced by Sasthamkotta Kayal

Filling up of parts of lake for cultivation

Agricultural and domestic wastes from surrounding areas entering the lake

Reclamation of the land for agriculture along the banks and adjacent areas causing soil erosion

Domestic Sewage Disposal

The major problems that the Sasthamkotta environment facing are related to agriculture (especially in the banks of the lake), fisheries, services like water supply, sanitation, etc., households and human settlements, pilgrimage, locally specific activities like washing of clothes (dhobis) etc. Residents usually cultivate tapioca, paddy and plantain on the slopes. The unscientific agricultural practices force soil erosion. Residues of fertilizers and other chemicals used in the agricultural fields are draining into the lake. A good amount of sewage and garbage from the homesteads in the catchment area is also reaching the lake. The hut-dwellers soak dry leaves of coconut palm before matting which used for thatching huts. Water is polluted by soaps and detergents used for washing clothes and bathing.

The water of Sasthamkotta Lake is used for supply of drinking water by Kerala Water Authority to Kollam Municipality and suburbs. The lake serves as a major source of water, sink for various pollutants and transformer in the cycling of nutrients, chiefly carbon,
nitrogen, sulphur and phosphorus. It also serves as an ideal habitat for diverse flora and fauna. The lake offers considerable scope for fresh water aquaculture.

Population growth will put added pressure on resources because of the rising demand for land for housing and other developments, demands on living resources for food, recreation and fresh water. The increasing human settlements in the catchment area of the lake also increases various types of stresses in the ecosystem in terms of pollution due to solid waste, sewage, fertilizer residues and other chemicals, aesthetic issues, etc.

**Other Major Problems**

(i) Reclamation of the land for agriculture along the banks and adjacent areas, unscientific cultivation practices such as tapioca cultivation in hill slopes causing soil erosion

(ii) Entry of agricultural and domestic waste including sewage from surrounding area of the lake,

(iii) Pollution caused by the professional washer men (dhobis),

(iv) Land use change - encroachment into the wetland creating various environmental pressures on the landscape and habitat transformation and reduction in biodiversity.

The natives say that the area surrounding the lake supported greater number of trees in the past and that it is now denudated. The number of residences on the banks of the lake is on the increase recently. There occurs pollution from local tourists who visit the area.

A study conducted by Centre for Earth Sciences Studies, Thiruvananthapuram shows that the dissolved oxygen is usually 4.49 mg/l and 3.33 mg/l (standard dissolved oxygen should be >6). Magnesium content, which contributes to the hardness of water, is very meager. The faecal Streptococci count is also within the limits. The slight variation in acidity / alkalinity may be attributed to the fact that a lot of detergents are getting added to the water body from 'bathing ghats' located by the side of temple along the northern shore. (KSCSTE, 2007)