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Enhancing Sustainable Livelihoods – A Case Study from Wanathavilluwa, Sri Lanka

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Contents

Tables & Diagrams

Acronyms

CBO	Community Based Organizations
CCD	Coast Conservation Department
DCS	Department of Census & Statistics
DEO	Divisional Environmental Officer
DS	Divisional Secretary
DSD	District Secretariat Division
GN	Grama Niladhari
HDI	Human Development Index
HH	Household
HPA	High Priority Area
ICZM	Integrated Coastal Zone Management
LDO	Land Development Ordinance
NGO	Non Governmental Organisation
PRA	Participatory Rural Appraisal
SLR	Sri Lankan Rupee
TA	Technical Assistance
WDSD	Wanathawilluwa Divisional Secretariat Division

1. Summary

The Project "Regional Technical Assistance (RTA) for Coastal and Marine Resources Management and Poverty Reduction in South Asia (ADB RETA 5974)" funded by the Asian Development Bank (ADB), attempts to promote regional co-operation among the participating countries in strengthening the management of environmentally sensitive coastal and marine resources using Integrated Coastal Zone Management (ICZM) approaches. One of the studies under the RTA was the Poverty and Environment Nexus Study, which attempted to analyze the inherent linkages between poverty and environmental degradation and their impact on different socio-economic groups.

Rationale

In spite of the fact that Sri Lanka has a relatively high Human Development Index (HDI) overall, the majority of families living in coastal areas fall into the poorest category. The fishing communities in general lack decent housing, as well as basic supporting social infrastructure, and do not have access to common amenities. Their economic problems are compounded by seasonal variations of household income, which is primarily gained from fishing in coastal and lagoon areas. The declining household income of the communities in the coastal areas has been attributed to the depletion of resources, competition for resource use and inadequate opportunities for alternative income generating activities. There is increasing pressure on the resource base and the problems are acute in areas where coral reefs are mined, mangrove areas are converted into aquaculture enterprises, and where fishing is more mechanized and destructive.

Objectives

The Poverty Environment Nexus study was intended to assess the main causal mechanism at work in poverty and environmental degradation. Having determined the underlying causal mechanisms exacerbating poverty, an attempt was made to determine, based on quantitatively driven empirical analysis, which groups (gender, ethnic or economic) are hardest hit by environmental degradation. The study focused on the nine (09) Grama Niladari Units (the smallest administrative units, each headed by a village Headman) around Puttlam Lagoon on the Northwest Coast of Sri Lanka. Sample communities were selected from four villages. The major output of the study was in the form of policy recommendations towards "Enhancing Sustainable Livelihoods".

What is the "Poverty and Environment Nexus?"

The "poverty and environment nexus" is the set of causal links between poverty and environmental degradation. Causal links between poverty and environment are rarely discussed at length in the available literature. While it is clear that widespread poverty is due to social and economic deprivation, there is a lack of solid evidence to substantiate that poverty

alone can cause environmental degradation. However it can be reasonably argued that poverty contributes to resource degradation, but poverty alone does not cause this degradation.

How can the nexus be developed?

The main causal mechanisms at work in poverty can be analyzed by studying the resource allocation capacities of the poor in their livelihoods. The households start with a set of household-level food, security and livelihood objectives. In realizing these livelihood objectives, poor households have access to a set of resources, including natural resources, human capital, and on-farm and off-farm physical and financial capital. An attempt has been made in this study to ascertain the food security and livelihood objectives of the communities living adjacent to the lagoon environment and how their access to natural resources has impacted the natural resources base in the lagoon.

In general, poor communities suffer from lack of economic capacities, due to systemic inequities in resource distribution, inaccessibility to markets, increased indebtedness and the marginalisation of the poor from the development mainstream. Poor fishing communities are no exception to this, and therefore these factors also need to be carefully analysed before establishing inferences as to what extent the poor have contributed to resource degradation.

Objectives of Regional Technical Assistance (RTA)

The project "Regional Technical Assistance (RTA) for Coastal and Marine Resources Management and Poverty Reduction in South Asia" attempts to promote regional co-operation among the participating countries (India, Maldives, Pakistan and Sri Lanka) in strengthening the management of environmentally sensitive coastal and marine resources using Integrated Coastal Zone Management (ICZM) approaches.

In each participating country the RTA aims to:

- Promote co-operation among the participating countries in strengthening the management of environmentally sensitive coastal and marine resources;
- Help formulate strategies for regional co-operation in ICZM development planning, capacity building and information exchange;
- Identify ecologically sensitive geographical areas, which require priority investment support;
- Develop appropriate ICZM strategies for development and management of ecologically sensitive areas with arrangements for collaborative implementation;
- Develop site-specific ICZM plans for pilot sites, as replicable models, in selected marine and coastal eco-systems of national and regional significance.

Expected outputs of the RTA are:

- A Regional Strategic Plan for sustainable management of coastal resources in South Asia.
- A compendium of High Priority Areas (HPAs) of highest environmental and ecological significance and sensitivity, within the participating countries.
- An analysis of policy, institutional, regulatory and other constraints to effective and efficient collaborative approaches to ICZM and opportunities to address such constraints.
- A strategy for the application of ICZM approaches in the HPAs, which addresses constraints and makes use of opportunities.
- Pilot testing of site-specific ICZM plans for selected HPAs to develop replicable models.
- Estimates of the investments needed for implementing ICZM strategies in HPAs.
- Improved systems for exchanging information; establishing databases and formulating capacity building plan with the assistance of institutions of excellence within the region.
- An updated network of coastal managers and technical and scientific personnel;

The TA also provides for a '*Poverty and Environment Nexus Study'*, which attempts to analyze the inherent linkages between poverty and environmental degradation and their impact on different socio-economic groups.

Scope of the Poverty/Environmental Nexus study

This study seeks to determine the main causal mechanisms that bring about poverty and environmental degradation and then proceed to identify, from the quantitatively driven empirical analysis, the groups (gender, ethnic or economic) that are hardest hit by environmental degradation. Policy recommendations will constitute the most important output of the study.

Methodology

The main causal mechanisms at work in poverty can be analyzed by studying the resource allocation capacities of the poor in their livelihoods. The households start with a set of household food security and livelihood objectives. In realizing their livelihood objectives, poor households access the available natural resources, human capital, and on-farm and off-farm physical and financial capital. This study attempts to ascertain the food security and livelihood objectives of the communities living along the lagoon environment and their impact on the natural resources base in the lagoon.

The study is based on:

- Secondary information collected from the Wanathawilluwa Divisional Secretariat and other published and unpublished reports.

- A household survey conducted to determine the wealth and social status of the families of the sampled four villages
- Community consultations in Serrakkuliya, Karathive, Pubudugama and Gangewadiya villages through participatory rural appraisals (PRAs) and group discussions.
- The proceedings of consultative meetings with Grama Niladharis (GNs,the smallest administrative units, each headed by a village Headman), representatives of Non Governmental Organisations (NGOs), Community Based Organisations (CBOs), the fisheries extension staff in the district, and other key stakeholders, including the Divisional Secretary (DS).

Based on a stratified sampling method, household data was collected from nearly 80 families selected from the poor social groups of the communities in Serrakuliya, Pubudugama, Karthive and Gangewadiya. Data pertaining to family size, literacy and education level, housing, access to potable water, sanitation, livelihood activities, ownership of assets, indebtedness, and membership in social organizations were collected, tabulated and analyzed.

Study Findings

Due to the absence of adequate alternative livelihood opportunities, the natural resources (especially fish populations, seagrass beds and mangroves in the Puttlam lagoon) are overexploited by the community. These resources are exploited by a number of target beneficiaries, namely:

- Refugees from conflict-affected areas who temporarily reside in and around the lagoon;
- Fishermen whose ability to migrate to other fishing areas during lean fishing seasons in the lagoon have been restricted due to national security reasons;
- Poor fishing communities, who use inefficient and destructive fishing gear, such as push nets and drag nets;
- Youth (including school children), who resort to fishing as a stop-gap livelihood strategy until suitable employment opportunities are found;
- Fishermen who use inappropriate technology, such as monofilament purse seines or encircling nets
- Prawn farmers, whose actions result in large-scale conversion of mangroves and salt marshes into prawn culture ponds

Types of resource degradation observed in the study:

- Increased pressure on lagoon fishery resources, which severely limits the natural regeneration of lagoon resources;
- Severe destruction of sea-grass beds, prawn and fish breeding grounds, due to inefficient use of fishing gear;

- Frequent occurrence of fish juveniles being caught and discarded;
- Destruction of fishing resources, including finfish and shellfish of low commercial value (mostly below harvestable size);
- Water pollution in the lagoon and in the estuary, due to the large number of motorboats, waste disposal and chemical runoff;
- Large-scale lagoon sedimentation.

Conclusion

Coastal communities are well aware of the impacts of unsustainable resource use practices. Lack of alternatives, paucity of funds, use of inefficient gear, and loss of opportunities for marketing have made fishing a sought-after source of subsistence income. Households clinging on to subsistence living are vulnerable to the slightest change in the environment and socio-economic conditions. The more vulnerable they become, the more destructive and more harmful will be their livelihood strategies. When livelihood strategies are not efficient they damage the resource base. Therefore, it can be argued that reducing poverty will help lead to resource stabilization (but will not be able to completely arrest resource degradation).

Poverty reduction can be achieved through diversifying livelihood strategies. More livelihood options need to be made available, so that the situation of those with single-source based livelihoods can be improved. Poverty reduction programmes should therefore target pro-poor policies, ensuring that:

- Poor communities will be able to generate sufficient assets through moblisation of savings and through access to formal credit. Present credit schemes should accommodate the poor fisher-folk who are unable to provide collateral. Provision of fishery subsidies should be targeted at fishing communities whose practices do not contribute to resources degradation.
- Poor communities have access to an equitable share of resources. Regulatory mechanisms should be introduced to discourage organised fishermen from encroaching on the existing fishing territories of others.
- In a bid to diversify the coping mechanisms of the poor fishing communities, the youth need to be provided with vocational and artisan training. There should be mechanisms within vocational training programmes to enroll them as special targeted groups.
- Pro-poor policies that are directed to providing housing to various groups in society should be extended to those communities living along lagoons, as well;
- Poor communities should be able to influence the decision-making. The proposed “Totupola Sanvidanaya” (Landing Site Fishery Cooperative Society) Act should be reviewed to ensure that lagoon fishery communities also benefit from such organisations.

2. Introduction

Poverty is defined as being without the essentials for subsistence. This simple definition raises the question as to how we identify the means of subsistence and who lacks them? Poverty, in any given society, is measured using different criteria and methods, such as a calorific index, a poverty line, or an analysis of basic needs, etc. Much work has been done by social scientists and development institutions to define and analyze poverty, mostly focusing on a variety of social and economic aspects that cause poverty. Poverty has been analyzed by dividing it into two relative sub-dimensions: *absolute poverty and relative poverty*. It has been defined by poverty analysts that a person or household that does not have the means for basic subsistence is at the level of absolute poverty. Those households with an income less than the average of their counterparts in society are defined as being in a state of relative poverty.

Linking poverty to environmental degradation is a complex task. Although literature is available on the subject of poverty analysis, causal links between poverty and environment are rarely discussed at length. Very often the well being of the rural communities is measured in terms of household income, land use practices and their capacity to invest in livelihood activities. But there is no solid evidence to substantiate that poverty alone can cause environmental degradation. It can be reasonably argued that poverty may contribute to resource degradation, although poverty alone does not cause environmental degradation. Clarifying the causal links between poverty and environmental degradation therefore demands not only the identification livelihood strategies and coping mechanisms of the poor but also the externalities such as market forces, extension services, social organisations that influence the livelihoods of the poor.

Sri Lanka has a relatively high Human Development Index (HDI). Nevertheless the majority of families living in coastal areas fall into the poorest category of the population. The average household family belonging to a fishing community along the coastal areas is deprived of decent housing, sanitation facilities, drinking water, and educational facilities for the children. Social problems encountered by the fisher folk are compounded by natural calamities as well as natural phenomena such as seasonal weather patterns, which restrict year-round livelihoods and result in drastic fluctuations in their income levels. The net result is that there is increasing pressure on the resource base and the problems are acute in some areas, such as where coral reefs are mined, mangrove areas are destroyed and fishing is mostly over-mechanized and harmful.

Technology has brought about a growing inequity in the resource distribution among the fisher folk. Markets are dominated by the organised middlemen, leading to increased indebtedness among poor fishing communities. In short, the level of income of the poor fisher folk is determined by the middlemen and moneylenders, local political leadership and large scale fishing operators. This study intends to explore these links further.

3. Coastal Resources in Sri Lanka

Sri Lanka has a 1,770 km long coastline and the coastal zone is vital to the nation's social, economic and environmental development. This zone comprises of about 24% of the country's land area and is the home for about 32% of the total population. The coastal fringe of Sri Lanka is comprised of estuaries, peninsulas, beaches, and offshore islands, and supports 90% of the fisheries, most of the tourism and industries, agriculture and human settlements. Some of the richest biodiversity areas of the country are in the coral reefs, mangrove forests, estuaries, lagoons, wetlands and sanctuaries in the coastal zone. Coastal fisheries account for 80% of the fish production in Sri Lanka, which in 1996 was 228,550 tons. Coastal and marine fisheries contribute a substantial proportion (over 50%) of the animal protein consumed by the population. The coastal zone, while being extremely valuable to Sri Lanka's economy, is also very fragile and highly vulnerable to many dynamic processes, which occur on land and in the sea, through both natural and man-made forces.

Coastal wetlands and mangroves also provide a steady flow of materials that support the livelihoods of those that live in the coastal zone. Natural resources undergo degradation due to the complex nature of this relationship between communities and resources. The main causes of resource degradation can be attributed to both internal and external factors, either natural or man-made phenomena. A proper assessment of resource degradation factors is therefore very important prior to bringing poverty into the equation. This requires a collaborative effort utilizing diverse expertise, including biodiversity and social assessments.

4. Overview and Setting of the Study Area

The study area is located in the Puttalam District, which is one of the 24 districts of the North Western Province (NWP), one of the nine provinces of Sri Lanka. The Puttalam District is located on the northwestern coast of the country. The District is comprised of several Divisional Secretariats (DS), including Kalpitiya, Wanathawilluawa and Anamaduwa. The district's southern border lies to the north of Negombo, 50 km north of the city of Colombo and stretches about 150 km northwards. The extent of the district, excluding inland waters is 3,013 sq. km and its coastline measures 206 km. Puttalam experiences an average annual rainfall between 1000-1250 mm and an average temperature around 27 – 30 ºC.

According to the statistics published by the Department of Census and Statistics (DCS), the population of Puttalam District is estimated at 705,342 (DCS 2001), with an average annual growth rate of 1.8%. Sinhala, Tamil and Moor constitute the majority of the population as shown in table (1)

Table 1 : Percent Distribution of Ethnicity in the Puttalam District (as per DCS Census in 2001)

	Sinhalese	Tamil	Moor	Burgher	Malay	Chetty	Other
1981	82.6	7.1	9.9	0.1	0.2	—	0.1
2001	73.8	7.2	18.7	0.1	0.1	0.1	0.1

However, the statistics indicate that over the last 20-year period, from 1981 to 2001, the Sinhalese population has decreased by 8.8% and the Sri Lanka Moors have increased by a similar percentage. Mostly due to the influx of refugees from the northern and eastern parts of the country. There is also a slight variation of the religious composition of the population in the Puttalam District. The Buddhist population and the Roman Catholic population have declined over the years when compared with 1981 and 2001 DCS figures. See table (2)

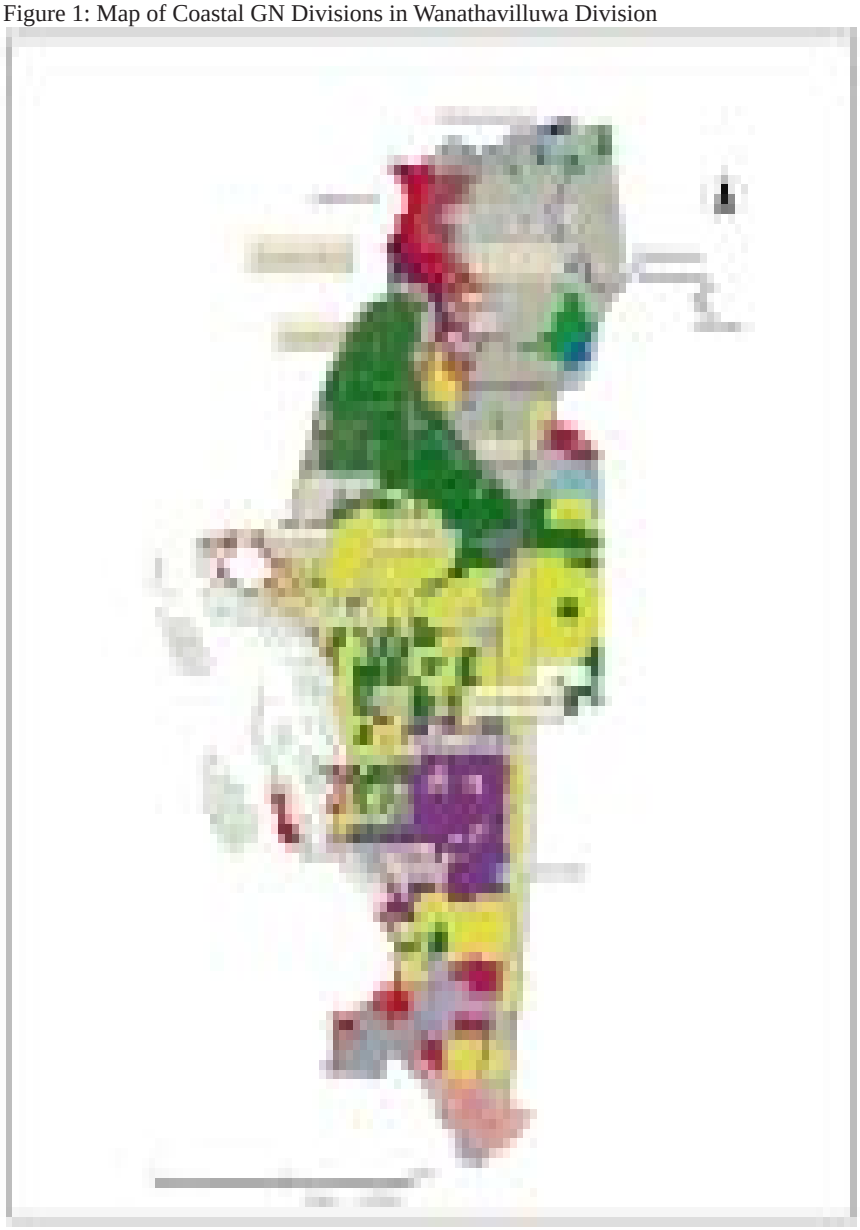
Table 2 : Percent distribution of religion in the Puttalam District (as per DCS Census in 2001)

	Buddhist	Hindu	Islam	Roman Catholic	Other Christians	Other
1981	48.1	3.9	10.2	37.5	0.4	0.1
2001	43.1	4.3	19.0	32.7	1.0	0.0

4.1 Core Study Area

The core study area falls within the Wanathawilluwa Divisional Secretariat Division (WDSD) of the Puttalam District. See Figure (1) As shown in the map, WDSD is comprised of nine coastal Grama Niladhari (GN) Divisions and eight inland GN Divisions, with a population of approximately 16,835. Desegregated by gender, 8,709 are males in 3,890 families. Please see tables (3) and (4)

Figure 1: Map of Coastal GN Divisions in Wanathavilluwa Division



Source: Resource Profile 2000 DSD Wanathawilluwa

Table 3: Population Distribution by Ethnicity in the Wanathawilluwa DS Division

Total	Sinhala	Tamil	Moor
16,835	9571	1622	5642

Table 4: Population distribution by religion in the Wanathawilluwa DS Division

Total	Buddhist	Hindu	Islam	Roman Catholic
16835	7305	705	5642	3183

Records indicate that nearly 2,424 persons are engaged in agriculture, 1,460 in fishery and another 504 in self-employment. Statistics also reveal that nearly 2,098 persons are unemployed. The WDSD is home to 48 prawn farms. Other than fisheries, livestock seems to be a significant source of family income in the division.

Poor social infrastructure for education, health, water, housing and sanitation remain pressing issues in both the political and development agenda in this area. The high influx of refugees into these areas has worsened health, sanitation and housing concerns. A sustainable solution to the wider ethnic problem that has caused conflict in Sri Lanka, and hence internal migration within the country, will certainly have a favorable impact on the social and economic well being of the population in the core study area.

While adult literacy in the Wanathawilluwa DS division is good and in keeping with the national average, the level of education of the population is far below the national average. There are 11 schools in the division with 102 teachers to serve 4,314 students. While 3,425 and 2,700 persons have completed primary and secondary education, respectively, only 341 have studied up to GCE Advanced level and only 28 persons have graduated from a university. Around 115 persons have received artisan or vocational training from technical colleges.

The statistics provided by the Puttalam District Secretariat reveal that the WDSD has 1,565 housing units with permanent roofing and 2,385 with semi-permanent roofing. Only 1,863 houses have proper sanitation facilities with toilets. As for drinking water, 837 households obtain their supply from conventional wells built in their home gardens. Others access natural waterways such as, lakes, tanks (manmade reservoirs) and dug wells. Potable water is also supplied through tube wells or from water containers operated by private suppliers.

Transportation of goods and passengers within the DS division is affected by poor road network. While there are 234 km of “E” Class rural roads within the DS division (maintained by the Pradeshiya Sabawa), there are only 40 km of “A” Class roads maintained by the Road Development Authority (RDA). The Provincial Council is responsible for maintaining the 26 km. remaining road network. Some sections of the rural road network are impassable during rains and most of the roads are gravel surfaced and in need of extensive development.

4.1.1 Land-use

The total land area of the DS division consists of 67,200 acres (26,800 hectares). Paddy, coconut, cashew and vegetable cultivations, plantation forests, prawn farms, mangroves, inland waterbeds and uncultivated land are the forms of land use generally observed. Nearly 12,167 acres of land is covered with mangroves, tanks and other inland water bodies. An extent of 11,744 acres is used for the cultivation of fruits such as cashew and another 10,039 acres are in plantation forests.

Availability of land in WDSD by land holding size is given in table (5). Based on different land allotment programmes nearly 19,080 acres of land has been distributed for settlement, fishery and agricultural purposes. Another 5,040 acres of land have been alienated in large parcels, to private ownership for plantation purposes. Nearly 5,000 acres vested in a cement factory is also an important consideration in view of large scale mining that takes place on this land.

Table 5 : Land holdings in the Wanathawilluwa DS Division

Size of the land holding	No. of lots	Total Extent (Acres)
Over 25 acres	277	6925
10- 25 acres	101	402
05 acre	619	4550
04 acre	96	384
03 $^{1}/_{2}$ acre	68	238
03 acre	105	315
02 $^{1}/_{2}$ acre	114	285
02 acre	1962	3924
01 $^{1}/_{2}$ acre	192	288
01 acre	912	912
$^{1}/_{2}$ acre	314	157
$^{1}/_{4}$ acre	368	92

Source: Resource Profile 2000 DSD Wanathawilluwa

4.1.2 Poverty

In Sri Lanka it is estimated that those receiving a monthly income between SLR 860 to 1,032 and below belong to the category of poor persons eligible to be included in the state sponsored safety net. Under the on-going Samurdhi Programme such people are entitled to receive a monthly allowance, the amount of which is defined mostly in terms of the number of household members. Therefore the number of recipients of Samurdhi funding may be considered an acceptable proxy indicator for poverty. It was found that families receiving the Samurdhi allowance are the largest group among income groups in the study area. Statistics collected recently by the District Secretariat revealed that there were 2,483 Samurdhi-recipient families whose monthly income was below SLR 1000. Table (No 6) provides a detailed account of the number and type of Samurdhi recipients.

A family of more than five members receives the full monthly allowance of SLR 600 and the amount decreases with decreasing family size. In Aluth Eluvankulama, (which includes Gangewadiya), another subsidy scheme was also in operation, under the Ministry of Rehabilitation. Under this scheme selected families are paid an allowance, similar to Samurdhi, for purchasing dry rations from the cooperative society.

4.1.3 Key natural resources management issues

Socio-economic and environmental issues have been adequately explored in a number of parallel studies undertaken under various themes such as biodiversity, fishery, socio-economics, institutions and policy, etc. Loss of mangrove vegetation and pollution of lagoon waters due to prawn farms, declining fish productivity in the lagoon and the use of destructive fishing methods are considered critical natural resource management issues and have been highlighted in such studies.

Table 6 : No of Samurdhi Recipients by GN Divisions and by Category

GN Division	Rs. 600	Rs. 350	Rs. 250	Rs. 140	Rs. 400
Mangalapura	97	22	13	290	-
Bandaranayakepura	93	32	24	29	-
Vanathawillua (North)	68	23	10	14	01
Vanathawilluwa (South)	96	19	07	27	
Wijayapura (East)	95	22	14	28	-
Wijayapura (West)	62	30	18	38	
Karadipual	59	19	12	09	
Maliankulama	89	20	15	57	
Samagipura	92	13	11	24	
Serrakkuliya	104	27	18	21	
Vattakandal	198	41	52	17	
Karative (North)	193	48	57	24	
Karative (South)	92	18	16	01	
Ralmaduwa	08	04	01	29	
Aluth Eluwankulama	15	01	02	16	
Parana Eluwankulama*	-	-	-	3	
Total	1361	339	270	366	01

Source: Samurdhi Unit Divisional Secretary- Wanathawilluwa

Box :1 : Divisional Secretary Explained Various Effects Attributable to Poverty in the Division

The poor people in the area are unable to access services provided by governmental institutions. These services hardly reach them. Machinery that provides these services has been hampered due to various reasons. Most of the government servants, including schoolteachers, have no incentive to work. They are either on punishment transfers or on their first assignment. Eight positions remain vacant in the DS Office. The position of the Divisional Environmental Officer (DEO) is one of them. Grama Niladharis (GN) have to travel long distances without proper facilities. New GNs do not have sufficient knowledge to implement their work programmes. The rehabilitation work needed as a consequence of the long drawn out war has made matters more complicated.

Basic services such as issuance of birth certificates cannot be assured to all due to lack of staff. Nearly 100 children need to be issued with birth certificates. National identity cards have not been issued to more than 50% of those who are eligible for such identity cards in the Division. Poor land entitlement is a significant issue in the area. Those who have received land under different land alienation programmes have not been issued with the titles and deeds yet. People have been anxiously waiting for years until they receive their land entitlements. It is the fervent hope of the poor in the area to see that they receive the title and deeds before they die. It is very seldom that people are able to get loans that are vital for their well being, on mortgage of their own plot of land. The Ministry in charge of Land has now taken corrective steps to address this issue but it will take some more time.

The pressure that is building on natural resources such as mangroves and the natural waterways due to large-scale prawn farms, extensive lagoon fishing and pollution of the lagoon, aggravate the already degraded coastal eco-system. It is reported that the mangroves of the Puttalam area are widely extracted for both subsistence and commercial purposes. In the mid 1980s, about 55% of the households around the Puttalam estuary used mangroves as a source of firewood (Amarasinghe, 1988). As a result of the influx of refugees to the area, the consumption of mangroves for firewood has increased considerably. Mangrove bark, particularly of *Rhizophora mucronata* is extracted from mangroves in Dutch Bay for tanning fishing nets, such as beach seines.

Prawn farms are located mostly in the coastal GN divisions, including Wattakandel and Karandipul and concentrate on the periphery of the lagoon. Prawn farms provide thousands of employment opportunities and generate high returns on investment, providing a significant contribution to the fishery sector national income. Nevertheless, they do cause several adverse environmental impacts. Environmental considerations dictate the adoption of adequate safeguards against land degradation and water pollution. Sadly, this has been neglected by the industry, leading to heavy water pollution in the lagoon, which in turn damages coastal eco-systems such as mangroves, sea grass beds and fishing. Most of these farms do not possess effluent treatment facilities and release untreated effluents into the Puttalam Lagoon. This causes extensive damage to the floodplains as well, which provide the grazing lands for livestock.

Besides environmental degradation, social conflicts have also emerged due to the proliferation of prawn farms. Social conflicts between migrant fishing communities and the traditional fishing communities in the area have become a recurrent phenomena. Social conflicts sometimes lead to violence and necessitate strict enforcement of law and order by the police to bring about settlements. Besides, large numbers of villagers living closer to mangrove areas have been compelled to make a living by providing labour to the prawn farms, thus shifting them from their traditional fishery and agricultural activities. The tradition of having independent livelihoods by these communities has thus drastically changed and their livelihoods have been transformed to reflect the characteristics of that of a captive labour force.

The fish production in the lagoon has been declining according to the Fishery Study. The current fish production seems to be in the range of 3,800 mt. per year as against 4,800 mt. in 1997 (Dayarathna *et.al.*1997). Both the deterioration of the fish habitats and increased number of motorboats may have contributed to this situation. Nearly 1,776 fishing crafts operate in the lagoon. It is reported that the water quality of the lagoon is also fast deteriorating due to the increased movement of motorboats. Social phenomena such as the influx of refugees, restricted mobility of the fishermen from one fishing area to another or from the lagoon to the sea, etc., have a strong bearing on the resource base and in turn cause resource degradation in different intensities. Table (7) is an attempt to identify significant resource use types and types of resource degradation in the lagoon as against various social interactions or interventions.

Table 7 : Resource use Practices and their Impact to Ecological Degradation

Category of Human intervention	Type of resource use	Type of Resource Degradation
Heavy influx of refugees (poor) from Mannar District seeking temporary settlements.	Temporary housing and poor sanitation. Excessive extraction of fishery resources for their subsistence.	Increased pollution of the lagoon environment and increased pressure on lagoon fishery resources.
Restricted mobility of the fishermen.	Continuous, year-round fishing, in the lagoon.	Affects natural regeneration of lagoon resources (inadequate time for natural regeneration).
Use of inefficient gear and fishing practices such as push netting and drag netting by poor communities (both men and women).	Indiscriminate, wasteful and damaging extraction of fishery resources.	Destroys seagrass beds, prawn and fish breeding grounds. Fish juveniles caught and discarded. Loss of productivity of fishing resources including finfish and shellfish.
Unhygienic sanitary and waste disposal practices of poor households.	Use of forest and mangrove areas to deposit excreta. Solid waste disposal in lagoon and mangrove areas	Water pollution in the lagoon and in the estuary. Large-scale lagoon sedimentation.
Over-fishing using inappropriate technology by boat owners (non-poor fishing communities).	Excessive use of mechanized boats. Monofilament purse seines or encircling nets operated by boat operators	Pollution of the Lagoon with diesel waste. Indiscriminate exploitation: large numbers of fish (both big and small) are caught in a single fishing operation reducing the fish yield for others with less efficient nets Large-scale waste of the small-fish population, thereby depleting fish stocks
Fishing operations by large-scale, wealthy, influential fishermen both local and foreign.	Near offshore fishing, operated by foreign vessels with valid permits issued in Sri Lanka.	Massive destruction of the reef, allowing sediment to be flushed into the lagoon and on to sea grass beds, eventually affecting the breeding grounds of fish and prawns.
Prawn farming by entrepreneurs (non-poor).	Conversion of large areas of mangroves and salt marshes into prawn culture ponds.	Destruction of mangroves and sea grass beds, depriving the aquatic organisms in the lagoon, particularly juveniles, a safe habitat. Blocking of natural waterways, resulting in a high level of water salinity.
Crop production by non-poor farmers.	Use of land resources for Chena (shifting) cultivation, intensive cultivation, mono- cropping (tobacco, etc.)	Crop production by non-poor farmers. Heavy loss of soil nutrients, water pollution due to excessive use of agro chemicals.
Influx of tourists (both local and foreign).	Tour the area primarily to appreciate the scenic beauty of the landscape	High incidence of poaching that threatens wild life resources.

4.2 Sample Sites of the Study

For purpose of carrying out the study, 88 households were drawn from four sample villages, namely Gangewadiya (located in the GN division of Aluth Eluwankulama), Serrakkuliya and Pubudugama (located within the GN Division of Samagipura), and Karative North (located in GN Division of Katrative). These four pilot sites are located in close proximity to the lagoon. A brief description of each of the sample sites is given below:

Gangewadiya

Gangewadiya, originally a fish-landing site ("vadiya" in Sinhala) for fishermen, is now an established fishing village within the GS division of Aluth Eluwankulama. Gangewadiya is an isolated village bordering the right bank of Kala Oya Estuary and is connected to the main road leading to the Cement Factory by a 5-km stretch of gravel road. Established some 30 years ago as a seasonal vadiya with temporary huts, Gangewadiya now has more permanent dwellings for the fishermen, as well as for their families. The number of housing units has increased appreciably over the last 10 years. In 1990, according to the resource profile, there were only 39 fisheries housing units (listed as "fisheries quarters" in the profile), which has now expanded to around 55. Though the houses in Gangewadiya are of a semi-permanent nature, it was revealed that more than 25 families possess a second house of more permanent nature in Eluwankulama.

Table 8 : Ethnicity and Gender breakdown of the population in the 09 GN divisions

GN Division	Total	Sinhala	Tamil	Muslim	Population	
					Male	Female
Pukulama	98 *	NA**	NA	NA	NA	NA
Parana Eluwankulama	114	05	43	66	251	239
Aluth Eluwankulama	219	118	16	85	432	394
Serrakkuliya	266	NA	NA	NA	NA	
Karadipual	152	98	52	02	267	272
Wattakand	415	54	44	317	1200	875
Vanathavillu	167	163	02	02	370	416
Samagipura South	190	169	19	02	374	365
Kalmaduwa.	134	67	31	36	246	258

Source: Resource Profile 2000 DSD Wanathawilluwa

Serrakuliya

The GS division of Serakkuliya consists of several villages, namely Serakkuliya, Sinnagowilluwa, Mahwilluwa and Perriyanagar. Serrakuliya village is situated about 12 km. north of the Wanathawilluwa DS Office and located close to the lagoon. There are 266 housing units in Serakkuliya with a population of 1,197, with the majority (881) being Sinhala. Tamil and Muslim population is 149 and 167 respectively.

Nearly 60% of the families live in semi permanent houses, some with brick walls and some with cadjan (thatch made from woven palm fronds). Almost all the families own their plots of land, ranging up from 1/8 of an acre. However, they do not possess clear titles and deeds to their property. While a few do have clear titles, most of the land holdings are still on permits issued by the District Secretariat (DSD). It was observed that 40% the housing units do not have proper toilets. In terms of health facilities, there is a primary hospital, together with a maternity clinic, close to Karative, about 2 to 3 kilometers south of Serakkuliya.

Although the community depends on lagoon fishing, they also receive monthly Samurdhi subsidies, ranging from SLR 350-600. Unlike the communities in Gangewadiya, a majority of the fishermen in Serrakkuliya are engaged in lagoon fishing. Over the last 10 years, fishing activity has expanded rapidly with a corresponding increase of the number of mechanized boats. The use of mechanised boats has increased from 50 to 150. But the problems associated with limited space for anchoring, poor storage, landing facilities, and poor marketing arrangements are evident in Serrakkuliya.

Karative (North)

Geographically, Karative North is located within a mangrove, bordering the lagoon area with a large stretch of salt marshes. Karative has a long coastline with three fishing villages, namely Serakkuliya, Odekare and Palamkare and is inhabited by a Tamil-speaking Muslim community. The population in Karative North is around 3,200. It is reported that Karative has a high population density (200 per sq. km.), as the entire Muslim population has congregated in this village, since ancient times. There are 609 households, of which 509 are Muslim and the rest Sinhala. About 60% of the families receive Samurdhi benefits.

The most significant geographical feature in Karative North is that it is located within a mangrove area and has a large stretch of salt marshes. The salt marshes have also provided employment or were a source of income to about 60 families until recently. A political dispute over the management of the salt marsh has suspended the operations of the salt works.

Most of the members in the households engage in fishing as the primary source of their livelihood (50-60% of the communities in Karative North engage in fishing as the primary means of livelihood). Around 75-100 fishery families possess outboard motorboats, and another 50 families have conventional modes of fishing gear, such as a “Theppam” or cast nets. It is also noted that around 20% of the households engage in paddy cultivation in the adjoining “Eluwankulama” area.

Pubudugama

Pubudugama is located within the Samagipura GN division on the south of Wanathawilluwa. This is a fishery village with a population of about 260, in approximately 70 families, all of whom receive Samurdhi subsidies. Around 95% of villagers are engaged in fishing and use Karandipual as their fish-landing site. The St. Sebastian Fishery Cooperative Society draws its

members from both Pubudugama and Karadipual. Nearly 40 families have their land on Land Development Ordinance (LDO) permits, 20 with Jayaboomi deeds and the rest without any land permits. More than 60% of the houses in Pubudugama lack proper toilets and access to water. A limited quantity of potable water is accessible through two tube wells. However, the situation is expected to improve as the village is due to benefit from the on-going ADB water supply project. One significant feature is that, unlike other coastal villages, electricity has been provided to several houses in Pubudugama.

5. Status of Poverty in the Four Sample Study Sites

From information generated through the household survey and from the secondary data sources, it was attempted to determine the level of poverty existing in the four villages. The level of poverty was analysed in terms of the quality of housing and sanitation, ownership of assets and primary livelihood practices, social organisations and extension services, etc., that are supportive elements of the social and economic improvements of any community. The following is a brief analysis under each of these components:

5.1 Housing, Health and Sanitation

Housing

In a village economy, the types of houses, their amenities, and ownership of some selected durables generally reflect the living standards of the community. The extent of the livable floor area, type of floor, materials used for walls and roof, number of rooms, as well as availability of amenities such as water, latrines and electricity, indicate the wealth and social status of the average rural household.

Housing (in the context of a fishery community) is generally not a satisfactory indicator of poverty, as sub-standard housing is very common in the coastal belt. This is due to lack of ownership of the land on which houses are built. Also, very often semi-permanent construction is deliberate, as houses are vulnerable to natural calamities like gales and high tide (sea erosion), etc. In order to assist the fishing communities, the government has, on several occasions, introduced housing schemes, the most recent being the “Visara” and “Diyawara” housing programmes.

Nevertheless during the household survey carried out under this study, housing was considered a qualitative indicator to measure the level of poverty. Information relating to the floor area of the houses and the number of occupants in a given house was used to determine the degree of over-crowding and the level of household sanitation in the sample group. None of the pilot villages had benefited from fishery community housing programmes in the recent past. Almost all the houses in the villages studied are semi-permanent with an average floor area of around 250 square feet. Exceptionally, the total floor area of an average house in Gangewadiya is in the range of (barely) 100 sq. ft. (Table 9)

Under normal circumstances, the dwelling rooms and drawing rooms constitute the living area of a housing unit and enclosed verandas and kitchen areas are considered dining areas. This distinction is used when determining whether the houses are over-crowded or not. In terms of the average room space required for a family of four, most of the housing in the fishing community can be categorized as over-crowded and poor in sanitation. In the survey it was found that only 40% of the houses in all the pilot villages have a floor area of less than 200 sq ft. Most of the houses in the study area, which fall within the first three categories in Table 9,

were one-unit houses, in which drawing, living and dining spaces are all together. Given that the average family has 4-5 members, these houses may be considered as overcrowded. The housing situation in Gangewadiya and Karative is much worse than that of the rest of the sample study sites, with most houses having a floor area well below 200 sq. ft., which is considered the minimum for basic housing. Houses without kitchens, toilets and adequate ventilation holes are very common in the study area. It was also noted that except for two or three, all the houses are of a temporary nature with wattle and daub walls and cadjan-thatched roofs.

Table 9 : Floor area of houses in the pilot villages

Floor area in sq. feet	Gangewadiya	Karative	Serakkuliya	Pubudugama	% houses in each floor area category
100-200	12	05	06	08	40%
201-300	03	04	06	06	24%
301-400	02	02	04	02	13%
401-500	-	02	-	03	6%
501-600	02	01	-	02	6%
601 above		03	04	01	11%

Source: Household survey

On the other hand, there are several houses (11% of the houses in the sample) which are relatively large in size, with a floor area of 600 sq. ft. or more. The floors of only two or three houses were found to have been cemented and few houses were permanently constructed with materials such as brick walls and galvanized sheet roofing. It should be noted that the standard of housing does not necessarily reflect the true socio-economic status of the occupants living in Gangewadiya. This is due to the fact that according to the Grama Niladhari, at least 50% of the occupants in Gangewadiya possess a second and more permanent house in the nearby Eluwankulama village.

Health & Sanitation

The environmental sanitation of the houses in the study area is far below acceptable levels. Of the 80 houses surveyed, only 19 were found to have toilets (pit toilets). However five public toilets were found in Gangewadiya, which were constructed under the Fisheries Development Programme of the Fisheries Ministry of the North Western Provincial Council. Some of the NGOs and several special projects sponsored by churches have supported the construction of latrines, particularly in Karthive and Serrakuliya, but there remains a great need, in all four study areas, for more toilets and for sewerage disposal.

Table 10 : Housing amenities in the pilot villages

	Gangewadiya	Karative	Serakkuliya	Pubudugama	
No. of houses with Toilets*	Nil **	06	09	04	24%
No. of houses with electricity	Nil	Nil	Nil	Nil	0%
No. of permanent houses #	04	12	10	20	57%
No. of semi permanent houses ##	19	05	07	03	43%

** Four public toilettes are available
# Wattle and daub (plastered) or Brick walls with cadjan, sheets or tiles as roofing materials
Wattle and daub or cadjan for walls and cadjan as roofing materials

Water

Paucity of potable water continues to pose a significant social, health and economic problem for all the households in the study area. The Kala Oya River serves as the main source of fresh water for villagers in Gangewadiya. The villagers have to trek 2-3 km. inland along the river to collect drinking water. Mostly, villagers in Serrakuliya have no access to fresh water, and need to pay for it. There are several suppliers who transport containers (tanker trucks) full of water to these villages, from where the villagers say they collect 2-3 containers of 35-gallon cans per day. Dug wells (ookkuwa) is the main source of water in Karthive. Instant wells dug on the sandy soil provide a source of drinking water which is drawn using a spoon-type of device called “ookkuwa”. In Pubudugama, villagers have sufficient water from their own wells. Tube wells are also a common source of water for people in Pubudugama. Pipe-borne water is yet a luxury in spite of the implementation of ADB funded community water supply projects in the district.

5.2 Ownership of Assets

Land

The household survey revealed that the size of the individual land holding in all areas, except Pubudugama, is in the range of 10 to 40 perches. Given the fact that the area is located in the dry zone in which the soils contain low fertility with very limited rain fall, the small allotments of land can be of little support to the livelihoods of the community other than for housing purpose. In Pubudugama, the households hold relatively large parcels of land (extending up to two acres) with coconut and cashew in the home gardens providing opportunities and scope for developing alternative livelihoods.

Land ownership on the part of most of the villagers was also found to be not legally conveyed to the villagers. Though houses are constructed on crown lands, action has not been taken by the Divisional Secretariat to regularise or convey such land to the villagers, although several land allotment programmes have taken place within the Division. Land Ledger (LL) permits that have been issued to the community members years ago have never been renewed. The occupants claim ownership of land on the grounds of their long occupation, but the DS is of the view that this could not be handled at the DS level because of staff shortage. This has

resulted not only in the construction of sub-standard housing, but the villagers have been deprived of obtaining much needed credit from the formal lending institutions for up-front investments in the education of children, housing and their livelihoods. The formal banking institutions seek at least the title and deeds of the land as collateral for credit.

Table 11 : Breakdown of the size of landholdings in the pilot villages

	1-2 acres	**1 ½ - 1 acre**	**¼ - ½ acre**	**20 – 40 Perches**	**10 - 20 Perches**	**Less than 10 perches**
Gangewadiya	-	-	04	02	09	08
Karative	-	-	08	06	03	-
Serakkuliya	-	01	-	13	06	-
Pubudugama	14	02	03	-	03	-

Home Gardens

The soil in almost all the home gardens is sandy, infertile and highly saline. Consequently, there is no productive crop to be found in any of the home gardens. The agro-biodiversity study reported “it is very difficult to cultivate productive home gardens in the areas adjacent to the beach, especially those ones such as Serrakkuliya and Gangewadiya. A large extent of soil adjacent to the beach was cut in order to provide a better view of approaching vessels along the beach strip. Therefore the topsoil has been removed, leaving a salty under layer. This is especially true in Gangewadiya and Serrakkuliya. Those grown inland, further away from the beach tend to have better soil and there’s a good selection of various types of perennials and annuals, including fruits and vegetables”.

Ownership of Fishing Gear

Those engaged in fishing as a primary livelihood need several types of fishing gear if they are to successfully cope with the income fluctuations during different fishing seasons. The primary requirement of those engaged in lagoon fishing is a set of appropriate nets and a boat (fiber, motorised or wooden “Theppama” that are inexpensive and long lasting). However, they can better cope during any lean periods of fishing in the lagoon if they also own necessary fishing gear equipped to sea fishing such as multi-day-use mechanized boats and suitable nets. The household survey revealed that the majority of those engaged in fishing own only nets suitable for lagoon fishing limited to only trammel and cast nets. However, it was found that about 64% in the sample owned fishing craft, mostly wooden “Theppama” suitable for moving around in the lagoon for fishing. Very few people possess motorised or mechanised boats. The data on the types of fishing gear they possess is presented in Table 12.

Table 12 : Statistics on fishing gear owned by the communities in the pilot villages

Type of fishing gear	Gangewadiya		Serrakkuliya		Karative		Pubudugama	
	No.	**As % of the sample**	**No.**	**As % of the sample**	**No.**	**As % of the sample**	**No.**	**As % of the sample**
Mechanised Boat	Nil	0	02	9%	03	17%	01	4%
Teppam/Oru	18	67%	04	17%	03	17%	10	45%
Tramel / Cast Nets	22	88%	11	48%	06	35%	16	72%
Push nets	Nil	%	10	43%	09	52%	01	4%

The type of fishing gear one possesses reflects his/her ability to sustain a livelihood based on fishery and the level of vulnerability during difficult times. Those who possess mechanized boats, which are of multiple uses, secure their ability to in-migrate to other fishing areas during difficult or slack times and are considered to be socially recognised as affluent. Besides, they can access the benefits of fishery resources both in the lagoon and in the sea more efficiently than their counterparts using less efficient and conventional fishing gear.

Fishing with the use of push nets is considered detrimental to the resource base and looked down upon by the society as an illegal activity. Nevertheless a sizable number of families depend on fishing with push nets. It enables a subsistence income for the household, although the damage to the resource base is high. Though use of push nets is banned and socially unacceptable, there is a widespread sympathy towards those who use push nets, in view of the level of poverty that exists amongst the users. It was learnt that push nets are locally made at an average cost of SLR 500. Their operation is extremely strenuous to the user, and unconfirmed statements have indicated that operation of push nets is detrimental to health.

Several of the families posses neither a mechanized boat nor a push net, but make their living by borrowing the nets of friends and relatives, whereas some of the poor families engage themselves in clearing of trammel nets. Very often this is an activity quite popular among the women and the children. Fish for consumption is basically the reward for this type of activity.

It is evident from Table 12 that only very few of the poor households (sample was only from among the households engaged in fishing) are in possession of good, multiple use fishing crafts. Almost all those living in Gangewadiya possess at least a cast net and the majority own a “Theppan” or a Plastic Boat or an “Oru” (wooden boat). The most significant feature is that fishermen in Gangewadiya and Pubudugama do not possess push nets or chain nets, which are considered harmful to the fishery resources, unlike their counterparts in Karative and Serakkuliya.

Savings

Savings can be considered to be a strong indicator of the economic stability of a household. Savings are particularly important to fisher communities, as they need investment capital at least every year, to replace their fishing gear, such as nets. On average, each fisher family

needs SLR 15,000 to 30,000 per year to replace their nets and to repair their boats. The fishing community, in general, does not deposit their savings in banks. Replacement of nets destroyed by motor boats or damaged by crabs are financed from several sources, such as own savings (cheettu), bank loans, loans through informal credit and through selling of livestock. Cheettu is the informal source of savings that is popular among community members. Since the fishery organisations or the fishery cooperative societies are not functioning, there is no formal source through which the data pertaining to the savings of the fishermen in the area could be collected. However, it was evident that a well-functioning informal credit mechanism is in effect within the society, led by organised fish buyers.

5.3 Unemployment, Under-employment and Education

Unemployment and under-employment are serious social issues in all the four sample study sites.. Most of the youth who are engaged in fishing expressed the view that they embarked on fishing as a livelihood only because they did not have other livelihood options. Young boys who have just finished their secondary education (17-23 years) have joined their elders helping in fishing. Very often females and the children help in other ancillary activities, such as net cleaning. Although most children help their parents in fishing, the number of children receiving primary and secondary education is significantly high. Almost all the children between 5-16 years receive education in the government school in Eluwan Kulama. It is clear that the next generation will be more educated, and social unrest among this educated youth is likely if sufficient alternatives to fishing are not available.

Warnakulasuriya Sunil Gamini of Gangewadiya is a 38-year-old fisherman and a father of three children. His 12-year-old daughter and 14-year old son are still attending school. His 17-year-old eldest son has dropped out after completing secondary education. Now both the father and the son go prawn fishing in the estuary in their craft (theppama). Sunil says that if the son can find an alternative income-earning source, he will never allow the son to join him in fishing as a source of livelihood!

5.4 Extension Services

Fishery Extension

Extension services constitute a strong safety net for rural villagers, especially to those whose household income is marginal and at the edge of subsistence levels. Assistance to obtain fisheries permits, insurance for their craft, subsidized craft and gear, market linkages, training, relief during the off season in the form of dry rations, and housing and sanitation are some of the primary extension services that have been in operation through state institutions. In addition, the veterinary surgeon and the agricultural instructor also provide extension services to strengthen the alternative means of livelihood of the coastal communities.

During the survey, it was revealed that some years (18-20) ago, the fishing communities in the sample sites received subsidised fishing craft and gear. It appears that the distribution of these services was extremely politicized over the years. Fisheries cooperative societies were influenced by the local political leadership. Even though the fishing communities in all four villages belong to a fishery cooperative society, these are mostly defunct in terms of meeting the fishery sector needs of the community. The Fisheries Inspector reported that training in fisheries was not carried out during the last few years. The Department of Fisheries, through its extension arm in the area, has sponsored training of artisans, but none have been trained from these four villages

Though it is mandatory that boat owners obtain permits for crafts and insurance cover for their boats, the Fisheries Department has not been able to encourage the fishing community to comply with these requirements. Site visits by the Fisheries Inspector has been constrained by a number of issues, such as lack of official transport, funds and staff. Extension services provided by other government and non-governmental institutions also have not been readily accessible to the communities of these villages, in spite of the fact that there is a large number of functional NGOs in the area. NGOs (except World Vision and RDF) do not provide any services to the community in Gangewadiya, due to it being located far from the main cluster of villages. World Vision, which has a large development programme in Wanathawilluwa, has provided credit services, pre-school services, and water and sanitation facilities to a number of villages, including Karative and Serrakkuliya.

5.5 Livelihoods

Fishery related livelihoods

Fishing in the estuary is the main livelihood among the communities. As discussed above, there are several common fishing practices prevalent among the fishing communities depending on several factors such as their ability to invest in the fishing gear, their involvement with organised fishing communities and their acceptance within the social order, etc. Table 13 presents the types of common fishing practiced by the poor as well as the affluent fishermen in the lagoon, and how such practices impact the resource base.

Fishing is a livelihood involving family labour for the poor families. Women, men and children (immediately after attending school) collectively contribute to earning a subsistence income from fishing. Prawn fishing is the most lucrative enterprise for those who use non-mechanized methods, but it is highly seasonal. During the prawn season, the lagoon provides a sizable catch for the poor, but the activity cannot last for more than three to four months of the year. However, it appears that the poor fisher folk have no option but to catch prawns, fish and crabs throughout the year in order to make a daily income for survival. The livelihood of the poor is at stake when organized fishermen operate intensively in the lagoon, using mechanized boats. Fishing in the lagoon is in full gear during the monsoon when there is a high tide in the sea.

Table 13 : Details on types of fishing prevalent in the field sites

Type of fishing	Segment of fisher folk involved	Fishing equipment used	Extent of Resource degradation
Catching Prawns	Women & Men	Collection pots	No evidence of resource degradation
Cast netting	Men	Cast nets and Collection pots	No evidence of resource degradation
Push netting	Women & Men	Push nets and collection pots	Resource degradation due to bottom scraping
Sangili netting (More synonymous with drag netting)	Men	Sangili nets, Theppama and collection pots (Madiya)	Resource degradation due to by-catch and bottom scraping
Trammel netting	Men	Theppan and nets	No resource degradation
Fish shoaling	Men	Motorized boats	Resource degradation due to by-catch

Source: Household Survey

Photo Credit: Anil Kumararatne

Catching fish in the Oya is a popular practice not only among males but also among the majority of the females

Household income from livelihoods

As discussed, fishing is a livelihood at a subsistence level for some and at a sustainable income level for others. Records maintained by fish buyers show that prawns are bought at prices ranging from SLR 200 to 250 per kg., depending on their size. Though Grades Nos. 10 and 15 fetch higher prices, prawns of these sizes have not been purchased for quite some time, especially from those using cast nets, push nets or other similar methods.

Table 14 : Prices of shellfish at the fish landing centers of the pilot sites

Variety /Grade	Price per kg in Rs.
Prawns	
Grade No.10 (50 grams or more)	700.00
No. 15 (20 – 50 grams)	500.00
No. 20 (15 - 20 grams)	250.00
Mixed (less than 15 grams)	170.00
Crabs	
Jumbo (more than 500 grams)	560.00
Large (350-500 grams)	360.00
Medium (300–350 grams)	240.00
Low quality	100.00

Source : Socio-economic Study

Amounts of fish bought during four days randomly selected from the note book maintained by a prawn buyer visiting Gangewadiya revealed that 20 fishermen sold only 100 to 500 grams of prawns, per fisherman, and another 17 sold only 600 to 900 grams each. The number of fishermen who sold 1- 1 ½ kg was only 10, and 1 ½ - 2 kg was only 2. (Table 15).

Table 15 : Average quantity of prawns sold by fishermen in the pilot villages during the season

Volume of catch per fisherman	No. of fishermen
100-500 g	20
600-900 g	17
1-1 ½ kg	10
1 ½-2 kg	02

Source: Household Survey

5.6 Infrastructure and Marketing

Marketing is the business activity associated with the flow of goods and services from production to consumption. The most important marketing channel available to the households in the survey has been the organized buyers, either from their own villages or those visiting from nearby Kalpitiya area (where there is a well-organized fishing industry). In Gangewadiya, there are 4-5 regular buyers (middlemen working on behalf of larger companies) visiting the village every day. They specialize in buying different types of sea fish. One or two buyers deal with the prawn fishermen, whereas others look for crabs and other types of sea fish.

There is no formal marketing place such as a “pola” (fair) or a fish landing auction center in any of the pilot villages. Fisherman in the area do not have sufficient anchorage, storage, or marketing centers. The most serious deficiency is the lack of common cold storage facilities, which compels the fishermen to dispose of their catch as quickly as possible. The buyers stock

the fish in boxes and hand them over to transporters. Another key issue faced by the boat owners is the lack of proper anchorage facilities for their boats. The buyers often determine the price and the varieties that they purchase.

Marketing is further hampered by the poor road infrastructure and transport facilities. Gangewadiya is located far away from the main road, and is isolated. The need for renovating the road leading to the main road was a key demand of the community. However, this has to be assessed in terms of the expected economic benefits.

5.7 Indebtedness

Indebtedness is a common social phenomenon among the fishing communities, although it is not perceived as a pressing economic issue to the individual household. Community members are in debt due to several reasons. Most importantly, they depend heavily on informal credit, which provides collateral-free quick money to purchase necessary fishing gear. This informal credit mechanism also provides them with regular buy-back systems.

Indebtedness is not perceived as a common economic concern, due to the fact that the fishermen very often depend on middlemen to provide much-needed cash for buying nets and fishing gear. Middlemen lend money either in the form of cash or cheques (drawn to third party), for the purchase of equipment and other daily needs. Nevertheless, the owners of most of the motorized boats in Karathive and Serrakkuliya (outboard) complained that marketing of fish catch is eventually tied up with credit provided to purchase boats and nets. Obviously the terms of trade become extremely unfavorable to the boatman or the fisherman in such arrangements. The fishermen (the boat owners) are expected to sell the catch to those intermediaries at a price determined by them. This relationship is informal but allows the intermediary to maintain a monopoly over collection, storage & marketing of fish.

Box : 2

The fishermen in Gangewadiya start fishing around 5.00 a.m. and finish around 7.30 a.m. Then the estuary is open for the cast net fishermen. About 20-30 such cast net fishermen come from nearby Eluwankulama on their bicycles and keep on fishing until 2.00 p.m. using their cast nets. This type of rotational fishing is harmoniously practiced by the communities in Gangewadiya and Eluwankulama and this practice dates back to the 1980s.

5.8 Social Conflicts

Social conflicts over fisheries are very common in the study area. The police reported that these conflicts, at times, were so intense that there were instances of homicides over fishing territories. Fisheries societies in the area are either ineffective or highly polarised on political grounds and are unable to curb such situations. Some of the fishery co-operatives are defunct

bodies and are unable to provide protection to meet the social needs of their membership. The Fishery Cooperative Societies in Serakkuliya and Karative are divided on political lines.

While there are conflicts due to encroachment on fishing territories between communities in different villages (as in the case of Gangewadiya and Serrakkuliya), there are also examples of a strong understanding and sharing of fishery resources amongst some communities (particularly in Gangewadiya and Eluwankulama) (See Box 2).

5.9 Poor Households in the Study Area

Based on the above socio-economic indicators, the populations within the four sample study sites qualifying as poor were identified using the following criteria**:**

- The national poverty line used to qualify for Samurdhi allowances (monthly household income less than SLR 1,000);
- Lack of housing (living on someone else's property);
- State of housing (semi-permanent housing with wattle and daub walls, no cement floor, less than 300 square feet of floor area);
- Community perceptions;
- Fishing in the ode (the fishing area adjoining the lagoon) with substandard fishing gear or without any fishing gear (fishing by hand, using push nets, or using old Theppam not suitable for lagoon;
- Lack of productive assets such as having one's own nets, own Theppama or any other permanent fishing gear (those who hire others' fishing gear, do net clearing, or share fishing gear and harvest with others);
- Number of dependents and sick persons in the family;
- Those having very few alternatives (no homestead for livestock rearing);

Accordingly, it was found that Kartheive North consists of a proportionately high poor population relative to its large number of households. (See Table 16). Of the 609 families, it was observed that nearly 60% fall into very poor category based on the above criteria,

Table 16 : Number of Poor Households in the Study Area

Village	No. of HHs	Population	% poor in the population
Karative (North)	609	3200	60%
Serrakkuliya	266	1197	70%
Gangewadiya	55	225	50%
Pubudugama	70	260	95%

Source: Household Survey

6. The Role of Natural Resources in the Livelihoods of the Poor

The survey revealed that resources in the lagoon have been a primary source of livelihood amongst a large number of households for people living around the lagoon. However, it was also evident that, for the youth, fishing in the lagoon has been only a stopgap measure until they find alternative employment elsewhere. The lagoon is also a source of supplementary income for women and children, while for the average poor, utilization of resources from the lagoon provides a coping mechanism at all times.

The primary resources associated with the lagoon environment are fish stocks, sea grass beds and mangroves. It is reported that fish productivity has been decreased in terms of fish yield (from 4,800 mt to 3,800 mt within the last 10 years.) Sea grass beds have been extensively destroyed, and fish habitats are no longer sustainable, due to various reasons given by the communities. Shrimp, being the most profitable resource, are harvested with little management. Clearing of mangroves and the use of harmful fishing gear has very often had a strong bearing on their low productivity. Conflicts over fishing rights have an adverse social impact, which can be reflected in the productivity of the shrimp harvests in the lagoon. Key resource management issues stemming from the different types of resource use practices have been identified as follows:

6.1 Exploitation of Juvenile Prawns in the Estuary

As discussed in the previous sections, fishing becomes a coping mechanism amongst the poorest of the poor, year-round, irrespective of whether it is the fishing season or not. This practice hinders resource regeneration. Secondly, it was also revealed that the fishermen in Gangewadiya catch most of the prawns in their juvenile stage, before they migrate to the lagoon and to offshore waters. Scientific studies have established that the juvenile prawns migrate from the estuary to the lagoon and then offshore to complete their maturation. If they are fished in shallow waters, before their maturity, the economic loss is significantly high. The downstream fishing communities, whose economy depends on lagoon fisheries, complain that the abundance levels of large prawns in the lagoon is fast dwindling. It is estimated that a catch of 100 kg. of prawns in their breeding grounds is equivalent to a of yield 400 kg. if they had been allowed to escape into the lagoon and to mature.

6.2 Damage to Fishery Resources

All the studies carried out highlight that destructive fishing practices play a major role in resource degradation in the lagoon. But destructive fishing practices are poverty-neutral and are carried out by both the rich and the poor. Well-to-do people have organized destructive fishing practices such as fish shoaling and the use of monofilament nets. The poor fisher communities also adopt certain fishing methods (related to their investment capacity), which

are considered ecologically harmful. One of the most frequently practiced undesirable methods of fishing (by the poor) is the use of push nets, (known locally as “thallu del”) and chain nets (known as “sangili nets”). Both types of nets are used very often and by women as well.

Photo Credit: Anil Kumararatne

Push nets are widely used by the poor fisher folk

These methods allow the women and children to engage in fishing with little knowledge of the art of fishing. A small net fitted to a wooden frame that can be dragged on the lagoon bed and bunds, in the knee deep shallow areas, provide a substantial catch of small fish and prawns to provide for their daily subsistence. This practice, which was at first used during high tide (warakan), when generally there is little or no fishing, is now employed throughout the year due to poverty, especially among the refugee families. Even though this method has been banned, the fisheries authorities do not strictly enforce it, in view of the extreme poverty among those who use push nets to catch fish and prawns.

This fishing method is harmful in that it destroys the natural fish-breeding habitat. Further, due to the small net size, even the very small fish, prawns and crabs are entangled in the nets. Fishermen who use push nets very often discard the dead fish and other waste materials (including sea grass) after collecting the large-sized prawns and fish. Both the Fisheries Report, as well as the Economic Valuation Report, estimated the approximate economic value of the natural resources (fish and mangroves) damaged and wasted in the course of harmful fishing practices. The Fishery Report estimates the loss of natural resources from the use of 250 push nets for a period of four months at approximately SLR 12.5 million, whereas the economic valuation study puts the loss at SLR 5.4 million. (Reference Economic evaluation report)

6.3 Destruction of Mangroves

In view of the fact that mangroves did not have a visible impact on the livelihood of the poor, this was not surveyed at length in the study. It was noted that the large-scale prawn farm operators destroy large areas of mangroves. Mangroves have been cleared to establish prawn farms, especially in Pubudugama. In the other areas, the community has taken steps to preserve mangroves, as they are aware that mangroves are the breeding grounds for prawns. Nevertheless during the discussion with the community it was revealed that they use mangroves for their own purposes, such as for firewood and for house construction.

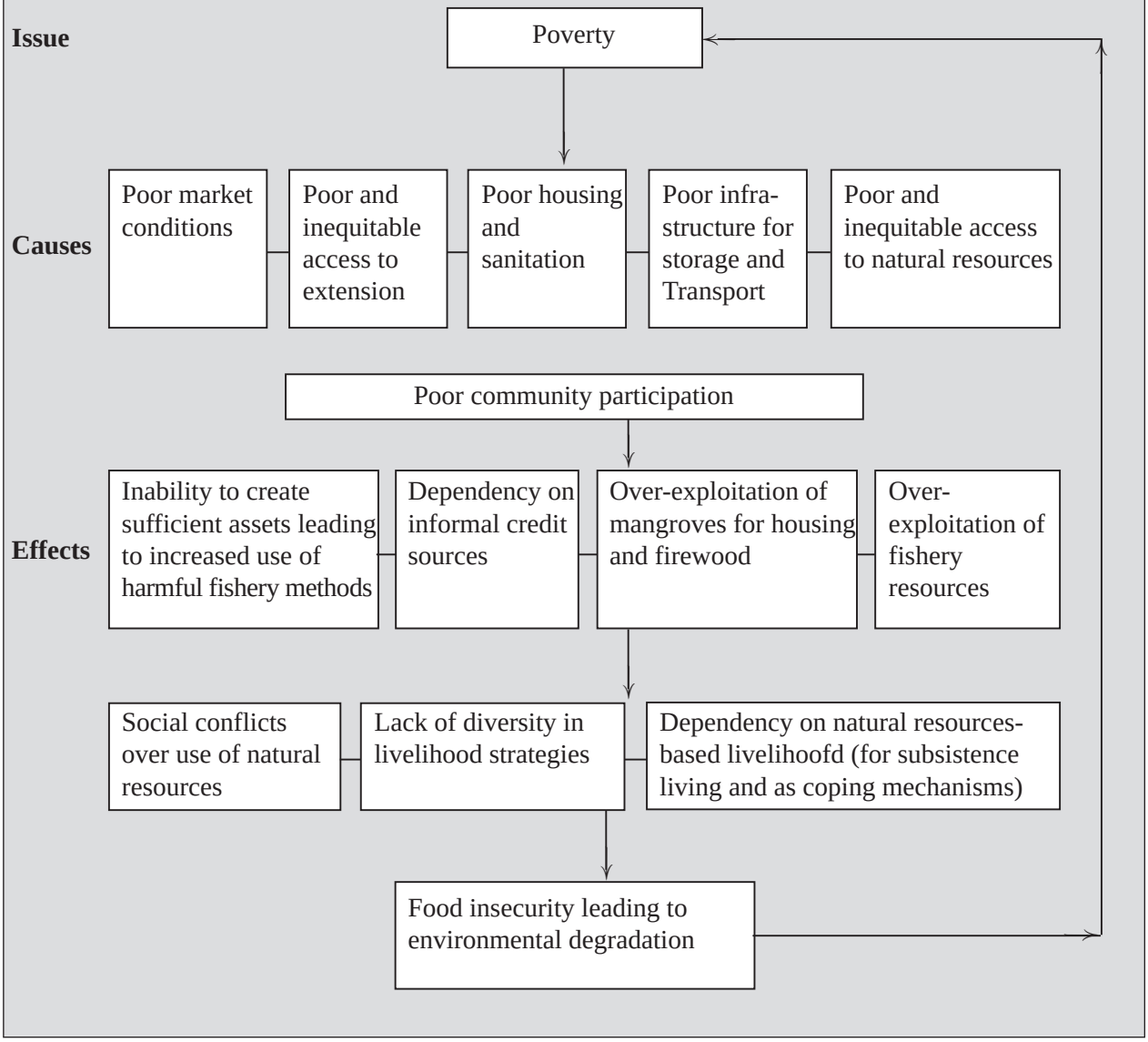
The economic valuation in respect of mangroves has reported as follows: “55% of the households around Puttalam estuary used mangroves as firewood. This figure has further increased as a result of the influx of the refugees to the area. In 1986, it was estimated that 12000 kg. of bark were extracted annually from the Dutch Bay.” (Amarasinghe 1988)

The report further states that occasionally the communities in the four pilot villages use the mangrove to extract fuel wood as an energy source, timber for shed construction and making tools, wildlife for meat, fish for subsistence, honey, and some edible and medicinal plants. It is not only the households of Gangewadiya, but also people from the adjoining village of Elluwankulama who reap the direct benefits of this resource.

7. Environmental Degradation and Poverty

Based on the discussion above a cause and effect model for environmental degradation was conceptualized (see Figure 2). This identifies several socio economic factors as causal to poverty the effects of which have a detrimental bearing on the resource base.

Figure 2 : Causes & Effects model for environmental degradation



8. Conclusion

It is apparent from the above analysis (Diagram 1) that the income levels and livelihood strategies of the poor households impact the natural resource base by bringing about food insecurity. This cause and effect model was developed based on the findings of the study on the four pilot villages. It also shows that there is a spiral effect on poverty vis-à-vis environment, taking into consideration the causes that lead to poverty and effects that ultimately lead to resource degradation.

Suffering from absolute poverty, the poor have few options in terms of livelihoods, food security and social well-being. In turn, this has an adverse impact on the natural resources in terms of extensive pressure on the resource base. The poor are aware of the consequences of unsustainable harvesting practices. Investment capacity to engage in efficient livelihood strategies very often determines what technology should be used for harvesting of natural resources. Poverty is absolute when the poor are not creditworthy, do not have marginal savings, and when they are unable to compete with other resource users. Intensity of poverty tends to grow when the poor are marginalized from the development mainstream, politically polarised and socially excluded.

Households clinging on to subsistence income levels are vulnerable to the slightest changes in the environment and socio-economic conditions. The more vulnerable they become, the more destructive and more harmful will be their livelihood strategies. When the livelihood strategies are not efficient they damage the resource base. Therefore any attempt to alleviate poverty can be a prudent step in the direction of stabilisation of natural resources.

Poverty reduction can be achieved through diversifying livelihood strategies. More livelihood options need to be made available so that single-source-based livelihoods can be eliminated. Poverty reduction programmes should therefore target strengthening pro-poor policies, ensuring that:

- Poor communities will be able to generate sufficient assets through moblisation of savings and through access to formal credit. Present credit schemes should accommodate the poor fisher folk who are unable to provide collateral. Subsidies should be made available to fishing communities whose practices are contributing to natural resources degradation, to allow them to adopt different, more sustainable practices.
- Poor communities have access to an equitable share of natural resources. Regulatory mechanisms should be introduced to discourage organised fisher folk from encroaching onto the fishing territories of the poorer fisher folk.
- Poor communities have diverse avenues for income generation and that they possess diversified skills. Special training modules should be introduced into the curricula of technical training institutes to enable poor coastal communities to acquire artisan skills.

- Poor communities benefit from the social infrastructure. The policies that are directed to providing housing to the various categories of society should be extended to those communities living along lagoons
- Poor communities can influence the decision-making. The proposed "Totupola Sanvidanaya" Act should be reviewed to ensure that Lagoon Fishery communities also benefit from such organisations.
- The responsibility of arresting resource degradation lies not exclusively with the poor. The entire society, irrespective of whether they are poor or rich, individually and collectively should work towards achieving such a goal.

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