

# Environmental Communication for Mangrove Restoration and Conservation in a Fishing Village, Sri Lanka

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**Abstract:-** Puttalam lagoon as the largest and destructed mangrove forest in Sri Lanka has gained much attention from researchers. The study was carried out in Anawasala; a fishing village in Kalpitiya to evaluate the contribution of environmental communication on mangrove restoration and conservation. Randomly 30 households were selected for the questionnaire survey and a vegetation survey was performed too. Field observations were carried out to find out the success of mangrove restoration areas. MS Excel 2013 version and Shannon-wiener diversity index were used for data analysis. The study found that lower education, lack of diverse communication methods, unawareness, poverty negatively impacts on the success of environmental communication. 63 % of participation for restoration programs also depend on small grants. Only female participation was recognized. 99% are fishermen. Concerning the carrying capacity of the lagoon, the utmost protection of mangrove is necessary as the source of income of residents is the lagoon. To overcome the barriers to the success of environmental communication and mangrove restoration and conservation education level have to be increased and alternative job opportunities have to be established in the area. Also, the restoration process has to be implemented with more technical and practical methods.

**Keywords:** Anawasala, Ecosystem, Environmental Communication, Mangrove, Restoration

## I. INTRODUCTION

Mangroves are dicotyledonous woody trees and shrubs that grow in the intertidal area of the coastline in tropical and sub-tropical countries. The common characteristics all mangrove plants possess are tolerance of salt and brackish water. Concerning the species composition, the highest concentrations of species are found in most Southeast Asian and Oceania countries. Approximately forty percent of eighteen million hectares of mangrove forests occupy in Asia. The most significant mangrove forests are Sundarbans in India and Bangladesh, Indonesian mangrove forests. Systematically mangrove ecosystem is a complex and sensitive ecosystem. Mangrove supply habitat for several species where the association process of an ecosystem highly recognized. The association of mangrove and macroalgae species and association of mangrove and bivalve species are salient examples for the association process in the mangrove ecosystem. The complex food web of the mangrove ecosystem is the prominent factor effect for the diversity of mangroves; both in flora and fauna. The ecosystem services of

mangroves are very specific. Mangrove is perfect for carbon sequestration which is a green light helpful for the reduction of severe global warming issue. As a type of coastal wetland mangroves has a high level of economic value. Therefore diversification of livelihoods through communication have to be expanded for the utmost protection of the ecosystem.

In the past human pressure towards mangrove was limited. With the demographic explosion in the recent past, the human disturbance for the ecosystem dramatically increased. The settlement is expanded into marginal areas. As a result of the population explosion mangrove and other types of forests directly become vulnerable for the destruction and degradation. Mangrove forests in coastal belt threatened with the expansion of commercial aquaculture and shrimp farming. Mangrove trunk was used as a source of timber for firewood and pole for the fence. Also, some of the tender leaves of mangrove plant species are used as cattle fodder. As a response for human disturbances, the mangrove areas are now limited only to small patches along the coastal belt. Generally, mangroves are confined only to a narrow strip along the coastal belt including lagoons and estuaries. Because of the limited space occupy for mangroves natural and anthropogenic disturbances are directly affect the destruction of mangroves. During the early 1970s, the interest of mangrove ecology began to establish a scientific foundation. The scientific research on mangrove enthusiastically erupts with the severe destruction of mangroves and the identification of mangrove ecosystem services.

According to Jayatissa (2012), the current extent of mangroves in Sri Lanka has been estimated between 4000 ha to over 10,000 ha. The Puttalam estuary is the second largest lagoon in the country where the largest mangrove extent of Sri Lanka also can be seen. The mangrove cover presently exists in the lagoon is about 1642.3 ha (Nisansala et al, 2015). Not only the largest mangrove extent but the heaviest destruction of mangroves also exists in Puttalam estuary (Figure 1a and b). As a response to the mass degradation of mangroves, the conservation and restoration process has been activated in the area. Community-based conservation and restoration programs are launched with the integration of government and non-government institutions. The first step of mangrove restoration emerged with the tsunami devastation in 2004. Researchers identified mangrove as a buffer which stands

against for high oceanic destructive waves. Environmental communication has been playing a major role in mangrove restoration and conservation in Puttalam estuary where one of the survived restored mangrove areas exist. Anawasala and Kalpitiya are well-known mangrove restoration areas where 90% and 60% of replanted mangroves are survived respectively (Ranasinghe, 2012). Technically restored mangroves have not received regular observations and some of the socio-economic factors affect the destruction of restored mangroves in Puttalam estuary (Gunathilaka, 2016). As a result, the environmental communication process becomes a failure. Therefore it is important to improve environmental education and communication to protect both dependents and the ecosystem.

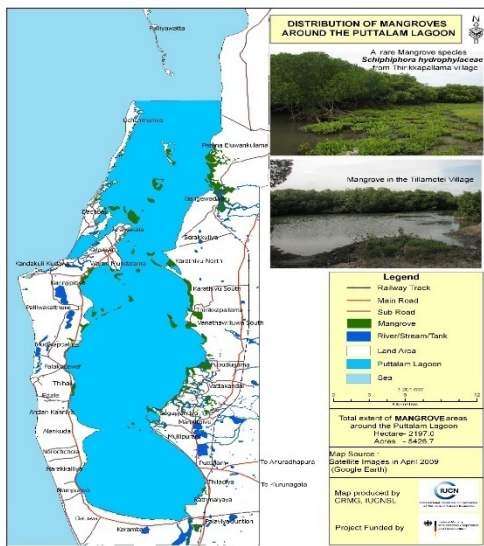
The paper consists of an introduction to the relevant study, the relevant literature on environmental communication and mangrove and the methodology of the study, descriptive analysis to discuss the contribution of environmental communication and recommendations and policy implications.

1.1 Objectives

Mangroves as an important ecosystem supply all forms of ecosystem services to the villagers in Anawasala. As a fishing village, the education level of residents is generally poor. The study aims to evaluate the contribution of environmental communication on mangrove restoration and conservation in Anawasala to fulfil the aim of the study attempt to achieve the followingsub-objectives;

- Identify the natural mangrove and restored mangrove patches in the study area
- Identify the education and particular socio-economic criteria of residents

a)



b)

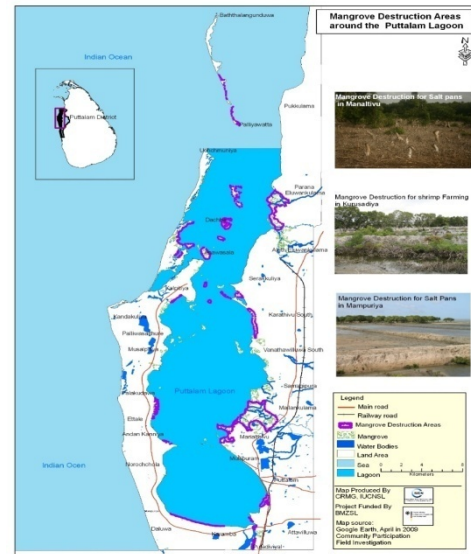


Figure 1: a) mangrove distribution b) mangrove destruction of Puttalam estuary

Source: IUCN, 2010.

1.2 Literature Survey

The origin of the disciplines of communication is a more recent phenomenon. Some theories of communication clearly explain why and how people communicate (Littlejohn and Foss, 2009). The communication attitude of people towards ecological issues are quite marginalized in rural areas. Scholars of communication show that the enthusiasm of people in the modern industrialized world towards ecological phenomena have not shown a positive response. Verbally communication is a simple process which depends on the communicator perception. Communicator perception includes culture, skills of communication, experience, attitudes, memories, physical and emotional state and expectations (Wekasa and Aswani, 2015). In 1948 Harold Lasswell designed the verbal model and in 1955 Elihu Katz and Paul Lazarsfeld presented a two-step flow of communication. Human communication ranges from talking to yourself to mass communication which can be identified in several types including,

- Intrapersonal communication
- Interpersonal communication
- Small group communication
- Public communication
- Mass communication

Environmental communication emerged as a subfield within the communication disciplines (Milsten, 2012). Two core assumptions of environmental communication can be identified. The first assumption shows that the ways people communicate powerfully influenced to shape the understanding of nature in the minds of people while the second assumption shows that these understandings inform

how people relate with and within the living world. In the simplest form environmental communication means communication about environmental affairs (IECA, 2011). Today environmental communication has expanded up to environmental decision making through public participation. Concerning the participatory communication, the Freirean perspective shows that the crucial importance of dialogue where Freire points to the core importance of communication for learning and creating awareness resulting in action. Also, Freire shows that the concept not only for few men or women but also for every man and woman. Participation of every human in any decision making the process for development is an appropriate method to share information, knowledge, trust, and commitment in development projects (Servaes, 1996).

In 2000 Sittikityothin studied the factors affecting people's different decision in participation. Moderate level of the participants for conservation and restoration of mangroves showed with particular factors including sex, occupation, knowledge, understanding of mangrove and community group's member. Three types of participation were mentioned in the study; opinion participation, project planning participation and project implementation participation. In Marasri's study (2000) high level of participation in mangrove conservation showed without the support from government officers the villagers participate in such programs. Production of mangroves is mentioned as the key factor affecting the participation of mangrove conservation and restoration programs (Ganagasai, 1997). Kongtong in 1993 mentioned in her study that people supply little participation in mangrove conservation and restoration activities such as preparatory meeting, seed collection, reforestation of the community mangrove forest, maintenance of the forest. Participation is influenced by the quality of communication methods. Wekasa and Aswani (2015) show the importance of informal meetings which often use as a source of mangrove information among people. Informal meetings help individuals to change their attitudes and behaviour with new ideas and practices which will improve their socio-economic levels.

## II. METHODOLOGY

### 2.1 Data collection and data analysis

The study mainly based on primary data obtained by conducting a questionnaire survey in Anawasala which was based on the random sampling method. The sample size is 30. Randomly selected thirty fishermen households are used for the questionnaire survey.

### 2.2 Study area

The study area belongs to Puttalam district, Northwestern province in Sri Lanka. Anawasala is one of the well-known fishing villages in Puttalam, about ninety percent



Figure 2: Study area

Source: Google satellite image 2016

of fishermen in which, depending on the fisheries of Puttalam lagoon. The study area can be identified in the eastern part of the Kalpitiya peninsula (Figure 2). The area was populated as a result of in-migration which was started as a response for the civil war in recent past of Sri Lanka. As a fishing village depends on the lagoon, mangrove ecosystem is a crucial factor effect for the fisheries activities of the area. According to the aerial photographs, most of the areas were directly open towards the lagoon where less extent of mangrove can be seen along the coastal belt of the lagoon.

## III. RESULTS AND DISCUSSIONS

As a fishing village, Anawasalahas to protect *Rhizophora* species (Maha Kadol). The root system of *Rhizophora* spp supply a breeding ground for crustaceans: prawns and brackish water crabs and some of the finfish species in the lagoon. The study area mainly depends on the small-scale fisheries of the lagoon. The periphery along the lagoon in the study area had not many mangroves in the past. Mangroves along the periphery of the lagoon are recently restored mangroves. Concerning the economic importance of mangroves, only *Rhizophora* species are selected for mangrove restoration in Anaiwasla. As a perfect salt-tolerant species, *Rhizophora* spp are suitable for any area which has a perfect tolerance of salt. Because of this, there is no diversity of mangroves in the area. Therefore *Rhizophora* species have become the most important species in the village.

The community-based mangrove restoration and conservation programs have been launched by government and non-government institutions in the area. High level of stakeholder participation for such programs clearly can be seen in the area. The restoration and conservation programs are conducted by the National Aquatic Research and Development Agency in the area and Small Fishers Federation in Kalpitiya also well known as Sudeesa. Recently the contribution of Navy force for such programs also can be seen in the area. Small Fishers Federation have launched mangrove restoration programs with applying a considerable level of environmental communication. Stakeholders generally targeted women in households. The circulation process of the particular message of mangroves is sometimes had a negative aspect. As the women fail to spread the exact message among their family members with a low level of educational qualifications, males and kids contribute to the destruction of newly planted mangroves.

The current method of environmental communication in the village is “group communication”. The dialogue is limited only to one or two groups and the rest of the community fail to share information on mangroves. The pathetic situation clearly shows that the lack of adequate public speaking is a salient drawback of environmental communication. The informal platform in the village is one of the best places to talk and share their thoughts. Informal platforms are including boatyards, village retail shop, playground and other agglomerations of villagers. The informal platforms are the places where villagers criticize every activity in and around the village.

Participated women for mangrove restoration and conservation programs only aware of *Rhizophora* spp as the stakeholder pay attention to the occupation of residents with mangrove protection. On the other hand, villagers also expect to have much more harvest of brackish water fish and crustacean species. Therefore the destruction of landward mangrove species in the area can be identified. The sources of landward mangrove destruction are animal husbandry especially including goats and cattle, for firewood and timber for the fence. Also, some of the illegal fishing activities are directly contributing to the destruction of waterfront mangroves. In this way, the environmental communication efforts have covered only too few residents in the village. In the case, the impact of poor education level directly affects the lower perception and knowledge of mangroves.

The enthusiasm of villagers to protect their associated ecosystem even for the utmost safety for their income source is significantly low. Residents are themselves the post-plantation observers as there is no regular observer for replanted mangrove areas. The post-mangrove restoration information is collected according to the informal observers. Therefore the reliability of the information becomes problematic. The success of environmental communication depends on the success of the restoration and conservation of mangroves, therefore, the orientation of particular

environmental communication officers have to be applied into the area.

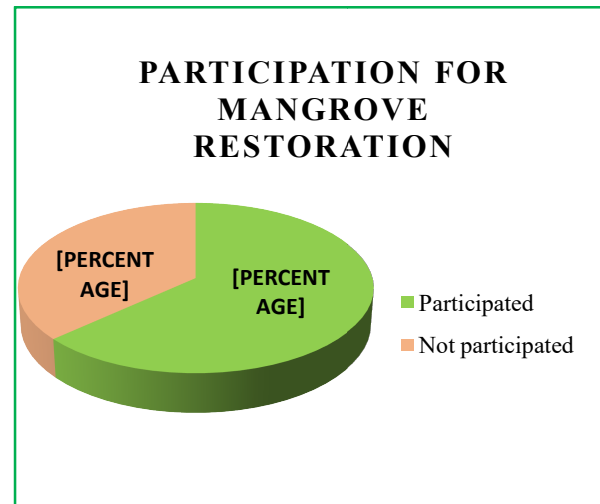


Figure 3: Participation for mangrove restoration in Anawasala

Source: Calculated by the author based on the collected primary data

According to the data, 63.3% (approximately 63%) (Figure 3) of women in households in Anawasala have participated in mangrove restoration and conservation programs. Only 52% of participated women have considerable knowledge of mangroves (Figure 4). Environmental communication on mangroves between stakeholders and women in the area can be seen significantly. But the fishermen or the sole breadwinners of the families are not much concerned on newly planted mangroves as the plants limited the area for boatyards. Consequently, newly planted mangroves are damaged and fail to survive.



Figure 4: Knowledge of mangroves

Source: Calculated by the author based on the collected primary data

According to The Freirean Perspective (Wekesa and Aswani, 2015), environmental communication should touch all residents with interpersonal communication not only group communication. Production of mangroves and socio-economic variables are the main factor to participate for such programs while knowledge and conservation on mangroves are not affected for the participation for mangrove conservation and restoration programs in Anawasala. The lack of male participation for such programs shows that negative impact of fishermen on mangroves. The reality is most participates were based on the small grant benefits. Which is directly imply the neglectful attitude towards mangroves. If the community have no responsibility to protect their independent variable as dependents, they are the most suffering group with the loss of mangroves in the area. Loss of mangroves directly influenced the decrease of brackish water fish production.

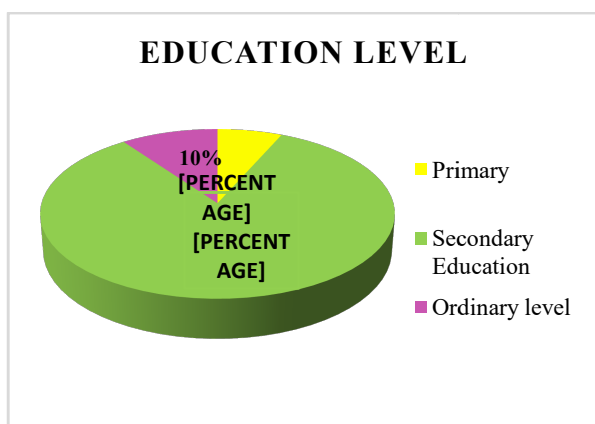


Figure 5: Education level of Anawasala

Source: Calculated by the author based on the collected primary data

Data shows that 99% of residents are fishermen and their children also become fishermen shortly. 83.3% of residents in Anawasala only have secondary education between grades 6 to grade 10. The education level is not an important factor for people in Anawasala. Only 10% have sat for ordinary level examination are not aware of mangroves (Figure 5). Relative to the mangrove knowledge of women who participated for mangrove restoration programs most school students have poor awareness of mangroves.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

More fishermen mean low space for mangroves along the periphery of the lagoon. The trend is to become a fisherman comes through generation to generation; grandfather – father – son-nephew. Therefore the education level should be expanded via supplying more education facilities to the area to create new alternative job opportunities. Generally the area prone to coastal erosion where the necessity of mangroves is highly identified as a buffer for coastal erosion. Besides, the carrying capacity of the lagoon has already reached its maximum level and the lagoon will be unable to protect more dependents with lower coverage of mangroves. The breeding

grounds will vanish with the loss of mangroves. The outcome is a rapid decrease in fish production and economic failure of residents in the area. Which is another point that shows the importance of controlling the fishing activities in the lagoon by supplying alternative job opportunities? Environmental communication should be increased not only among women in the area. The education level effect for a high degree of environmental communication and both stakeholders and participants should have environmental education. Application of new and diverse methods of communication is necessary for the success of environmental communication goals. Furthermore, a handbook of mangrove planting for communities have to be distributed among residents in the area (Arihafa, 2016 and Maniwavie *et al*, 2013). How much the stakeholders try to receive the benefit of mangroves the illegal fishing methods of residents harm the ecosystem. As the villagers survive through the ecosystem it is their responsibility to protect the ecosystem. Not only Rhizophora species but also other species should apply for restoration projects otherwise the diversity and the abundance of mangroves will be lost.

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