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Destruction of Natural Resources as a Consequence of Human Interventions: Case of Fishermen Community Living along Karachi's Mangrove Forests

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Abstract

It is a grave reality that humans have always over utilized the natural resources in the name of development and caused its destruction. It is imperative to evaluate the actions of humans while they utilize a natural resource because the nature of human activities always varies to greater extent and the community living near natural resources always has a direct or indirect dependency on it. There are various indicators which imply that the poverty and inaccessibility to services and infrastructure may lead to destruction of mangroves ecosystem in the form of its misuse or commercial exploitation. However; appropriate input and interventions may lead to conservation of this natural resource. An aware community that realizes the significance of mangroves can be a useful catalyst in this task. The objective of this paper is to comprehend the realities of fishermen community living along mangrove forests at Kakapir village Novanall Island, Karachi. The scope of findings includes the documentation of the physical realities of the built environment, socio-economic conditions of the community, perception of the community regarding mangroves, its significance and use and their dependency on the mangroves ecosystem.

Key words: Community perception, Destruction of natural resources, Formal and informal sector development, Human Interventions, Kunda System.

1. Introduction:

The aim of this paper is to investigate and report the destruction of natural resources as a consequence of human interventions. Basically it's a case study of a fishermen community of Kakapir village living along the Mangrove forests at Novanall Island in Keemari town Karachi. The concept behind this paper is the assumption that, we humans always over utilized our natural resources in the name of development and the communities living near natural resources has a direct or indirect dependency on it. There are various indicators which imply that the poverty and inaccessibility to services and infrastructure may lead to destruction of mangroves ecosystem in the form of its misuse or commercial exploitation. However; appropriate input and interventions may lead to conservation of this natural resource with an enlightened community that realizes the significance and protection of mangroves rather than its destruction.

1.1. Objective:

The objective of this paper is to understand the realities of fishermen community living along Mangrove forests at Kakapir village Novanall Island, Karachi. The scope of findings includes the documentation of the physical realities of the built environment, socio-economic conditions of the community, perception of the community regarding mangroves, its significance and use and their dependency on the mangroves ecosystem.

1.2. Methodology:

The method by which this study is conducted includes; preparation of an original map of Kakapir village so that the physical layout of the study area and its architectural character may be determined and further investigation could be conducted. The second step was a house-to-house questionnaire survey conducted during May-August 2003 in Kakapir village to document community's socioeconomic conditions and its relationship to the mangroves ecosystem. The third and final step was the analysis of questionnaire survey, identification of the potential threats to Mangroves Ecosystem and interventions in the context with an explanation of the learned lessons.

area inhabits various vertebrate and invertebrate species. The settlement of Younisabad is located on the northeastern part of Novanall Island and Kakapir Village is located on southwestern part. Both settlements have varying characteristics. The major activity in Younisabad is boat manufacturing and there is a natural jetty where small boats are brought for repair and refueling. Younisabad health center is located at the edge of settlement which is the only health center for both the settlements and inadequate to cater the needs of the community. [Fig: 1]

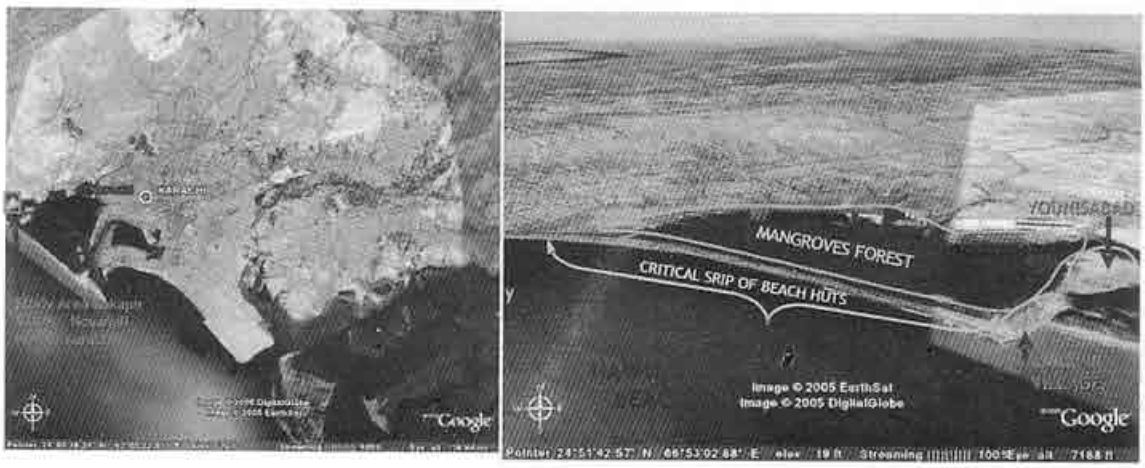

Fig. 1: Location of study area on the satellite image of Karachi on the left and the details of the context on the right.

2. Context of Study Area and the Physical Realities of Its Built Environment:

The city of Karachi is the major urban center and a mega city of Pakistan with a variety of natural resources. Karachi's coastline is more than 60 km long. Along the coastline there exists a natural resource known as the Mangroves Ecosystem. Along the beach of Sands Pit and Hawkes Bay at the western edge of Karachi, a Mangrove Forest is popular for nurturing precious marine species such as green turtles and other habitat that survives there. Just at the southeastern edge of these Mangrove forests there is a settlement known as Kakapir Village in Novanall Island. Basically in Novanall Island there are two settlements i.e. Younisabad and Kakapir Village and there is only one approach road to the Novanall Island which passes through salt ponds where the salt is extracted and sold. These saltpans have special significance with respect to biodiversity in the mangrove forest because the

3. Kakapir Village Profile:

3.1. Physical and Morphological Character:

The settlement of Kakapir village is a low rise medium density housing which is divided into two clusters. The main institutional buildings are located in northern cluster which include a mosque, primary school, police station and a commercial center. The southern cluster consists of a large jetty for fishing in the open sea. This jetty is used only for eight months a year whereas for four months it remains closed. The Mangrove forests of Kakapir village consist of one major species i.e. Avicenna marina which extends over 400 hectors. [Fig: 2]

3.2. Housing and Living Conditions:

A detailed survey was undertaken on the houses and their living condition in Kakapir village during 2003. (Dholandas, 2003) There are a total of 119 households in Kakapir village. Poor housing conditions are quite evident; for instance only 7.56% houses are constructed with

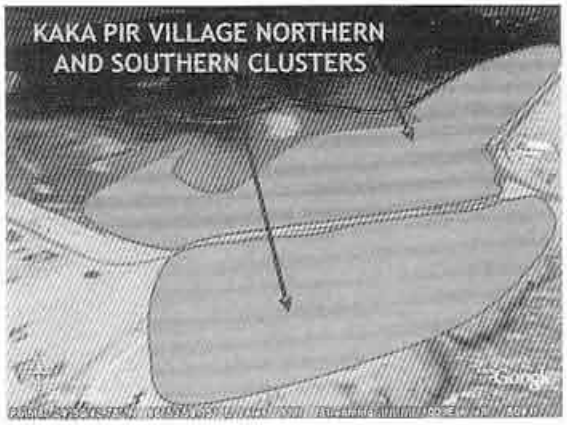

Fig. 2: The Physical Limits and Morphology of Kakapir Village

permanent materials i.e. RCC frame structure, whereas; 84.03% structures are of semi permanent materials i.e. load bearing block masonry with poor workmanship and remaining 8.41% are made up of temporary materials. The living conditions of the community is also worse i.e. 80% people live in one to two rooms house, with average family size of 8 persons per house, whereas; remaining 20% households live in three to four rooms house. The poor housing and living conditions clearly establish that the Kakapir village is a low income settlement.

3.3. Infrastructure:

A deprived condition of infrastructure is also quite evident in Kakapir village. There are numerous unpaved streets inside the village which always remain filthy with heaps of waste which show the absence of a proper solid waste management system. As a repercussion all the waste ultimately disposed in the Mangrove forests. Similarly the paved road connecting the village with rest of the city is seldom maintained. In Kakapir village many residents have access to electricity, however very few have any legal connection. Mostly they obtain electricity by illegal means through "Kunda System" from available power lines. The inadequacy of fresh water supply is another major problem of Kakapir Village. Though the water is supplied through pipelines, however; the piped water supply is available to only ten houses; whereas the remaining one hundred nine houses obtain water through community taps. The water supply through pipelines is also not regular. The water is supplied two hours a day and usually on alternate days. The other source of water supply is through commercial water tankers. The water supply through tankers is bought and stored in community water storage tanks twice a week. These water storage tanks were constructed in 1983 with the community contribution. Regarding sewerage disposal in Kakapir Village, there is no system of underground sewerage lines or its treatment. Instead, at surface sewerage drain pipes are made which discharge all the sewerage of this settlement into Mangrove forests. Most of the time these sewerage lines also get choked and the area get very filthy. These sewerage lines were laid by people themselves on self help basis. It shows that if the community is mobilized it may bring a better change in the context.

3.4. Socioeconomic Conditions of the Community:

The total population of Kakapir village community is more than 1000 persons mainly they are fishermen. The majority fishermen belong to *Sindhi* and *Lasi* ethnic group while few belong to *Jat* tribe with a consanguine family structure of 8 to 11 family members. Only 48% families send their children to school which shows that majority are illiterate and they require an input for education initiative. From these families 88% children study at primary level, 9% at secondary level and only 3% at graduation level. This reinforces the argument that an education initiative is quite necessary.

In Kakapir village majority are fishermen and belong to low income group (Refer table.1 and 2). The reason of this poverty is the 4 months off season for fishing whereas during off seasons people engage themselves in other occupations whereas; quite a few people possess a decent job in government service. As the community is at poverty threshold and lives near Mangrove forests so there is a great potential for commercial exploitation of the forest.

Table. 1: Employment Areas

Sector	Fishing	Government Service	Private Service	Night Watchmen	Labour / factory worker
%age of Households	70.6	4.2	10.9	12.7	1.6

Table. 2: Income Levels

Monthly Income PKR	1500–2500	2501–3500	3501–4500	4501 & above
%age of Households	73.1	7.6	4.2	15.1

Source: Questionnaire survey at Kakapir Village conducted by Saveeta Dholandas for her MA Sociology Thesis in 2003.

Table. 1: Employment Areas

4. Community Perception Regarding Mangrove Forests:

The socio-economic conditions of the community clearly indicated a potential threat to Mangrove forests, however; when the community was surveyed between June-August 2003 it designated a totally different perspective. For instance; 90% of the community perceived plants in sea or at land as necessary for human survival and only 10% persons has no perception about necessity of plants. It is also identified in house-to-house survey that, Mangroves Ecosystem is a major natural resource for the community. Because 97% community identified the significance of Mangrove forests in their life as a source of firewood for cooking, 1% as fodder for animals and only 2% says that Mangrove forests may be utilized as an income source by selling its wood. The community dependency on Mangrove forests may seem to be a very natural phenomenon because they are poor and had no alternate source for cooking like natural gas and especially because they live adjacent to it in close proximity. Regarding community perception about protective functions of Mangrove forests it is also found that, 89% of the community perceived that Mangrove forests can protect the coastline from erosion and 10% community perceived that 'Mangrove forests can protect the coastline from storms. This result indicates that majority community at Kakapir Village has traditional wisdom which they learned from their forefathers because majority is illiterate. Whereas; it was also evident that, 93% community had clear idea that Mangrove forests are breeding grounds for Prawns, Shrimps, Lobsters and other Fish species, however; 7% of the community had no idea about it. Thus these results clearly specify that being a fishermen community they had conventional knowledge about Mangroves. In house-to-house survey it is also identified that, 81% community perceived that, if Mangrove forests become less; then fishermen will be affected, whereas; 19% people have no perception regarding this notion. Hence it is quite evident that the community living at Kakapir village realizes the significance of Mangrove forests. It is also an amazing fact that community had the perception about the danger of overuse of Mangrove forests. The survey indicates that, 52% people believed that Mangrove forestss have danger of overuse, whereas about affecting aspects to growth of Mangroves 87% community consider that cutting wood from Mangrove forests is affecting its growth; and only 13% believed that eating/grazing by animals is affecting its growth. Thus one can clearly ascertain that community living at Kakapir village perceives that Mangrove forests are more threatened by people who cut the wood from Mangroves than animals that eat/consume them. The survey also identified that, 53% community believed that Mangroves can be replanted, whereas47% have no concept about re-plantation. Regarding Mangroves replanting initiative at Kakapir Village the survey also acknowledged that, 60% of the community was willing to help in Mangroves replanting initiative, whereas; 40% refused to help in any such initiative. The analysis of general community responses clearly shows that, the majority of the community living at Kakapir Village have interest in the initiative of Mangroves re-plantation and would help in any such endeavor.

5. Dependency of Community on Mangrove Forests:

With relation to dependency of Kakapir village community on Mangroves Ecosystem, the survey indicated that, 89% community is dependent on firewood as a source of cooking, 9% community depends upon cylinder gas and only 2% depends on kerosene oil as a source of cooking. Simultaneously from that 89% firewood dependent community only 2% obtain firewood by purchasing from the market and 98% obtains firewood by cutting the Mangrove forests. The survey also identified that all of the firewood dependent community is cutting only dry wood from Mangrove forests and none of them cut wet wood or leaves. The cutting dry wood is also simply for cooking and not for any other commercial purpose. The analysis also showed that from the entire community 25% men, 67% women and 8% children participate in cutting wood from Mangrove forests. This means the community chiefly depends upon women and children for cutting of wood.

6. Destruction of Mangroves Ecosystem:

The analysis of house-to-house questionnaire survey and empirical documentation of the context, which was conducted during 2003, had clearly indicates that there are various threats to mangroves ecosystem at Kakapir village. [Fig: 3] For instance; the dependency of community for cutting firewood from Mangrove forests is the first and foremost threat which required intervention in the form of community awareness and provision of alternate source for cooking. Another major threat is the destruction of mangroves by domestic animals that use it as a fodder. The next major threat is the disposal of all the sewerage of the community living in Kakapir village in the Mangrove forests. This sewerage disposal affects the growth of mangroves because it increases the brackish water.

The other major threat is the natural jetty in northern cluster of Kakapir village which is used by fishermen for fishing within the Mangrove forests and for visitors to enjoy the forest. As the Mangrove forests are breeding grounds for various species there are strict restrictions for fishing in them. However; this intrusion and fishing in

Fig. 3: Threats to Mangroves Forest in the form of cutting firewood for cooking. This picture is taken in May 2003 by authors during empirical study of Mangroves Forest.

backwater may cause the reduction in the biodiversity. The next major threat to mangroves ecosystem are the beach huts that exist in between the Mangrove forests and the sea. (Refer fig. 1) This three kilometer strip of beach huts blocks the way of green turtles to sea and pose major threat to habitat in the Mangrove forests. The problem of these beach huts is complex. The land where these beach huts exist belongs to Karachi Port Trust (KPT) and the people who own these huts are quite influential and use these huts for recreational purposes. At the same time these huts are also an income generating source for the community of Kakapir village who work as watchmen in these huts. While the huts create employment for locals they are also a regular threat for the Mangrove forests. The fact that removal of these huts from the area is near to impossible is another problem.

7. Interventions in the Context by 'WWF-P':

7.1. Development of Wetland Center:

WWF-Pakistan was established in 1970 and works under the aegis of WWF-International based in Switzerland. WWF started work in Sindh province on Conservation of Nature since mid 90's. In order to protect and conserve the Mangrove forests, the World Wide Fund for Nature (WWF-Pakistan) decided to establish a Wetland Center within the forest in 1996 with funding from WWF-International. The Karachi Port Trust (KPT) had donated 500 square yards of land at Sands pit to WWF-Pakistan to establish the Wetland Center in the middle of the Mangrove forests opposite the turtle nesting beach. [Fig: 4] The construction of the Wetland Center took place from January 1999 and officially it was inaugurated in February 2001. This Wetland Center not only monitors the degradation of the Mangrove forests and its habitat but also tries to improve the existing conditions in the forest and in Kakapir village. Furthermore it also works for education and awareness regarding mangroves ecosystem and habitat.

7.2. Development of a CBO and their Initiatives:

The second most important intervention of WWF-Pakistan in Kakapir village was the support in development of a community based organization (CBO) and awareness of the community about the significance of Mangroves Ecosystem. In this respect, community meetings were held in December 2003, at Kakapir Village and community decided to develop a CBO. In January 2004 the CBO came into existence which is then registered with the Social Welfare Wing Community Development Department City District Government Karachi in April 2005. With the establishment of a CBO the community was provided with a platform to identify their issues, discuss them and try to solve them on self help basis. The CBO formed three committees on environment, health

Figure # 4: WWF-PAKISTAN'S WETLAND CENTER IN MANGROVES FOREST

and education, respectively. Then a series of meetings were held by WWF with these committees to guide them to identify their roles and responsibilities. The Environment committee worked for controlling fishing in the Mangroves backwaters. The Health committee formed a one room health center where a paramedic works on volunteer basis and a doctor also visits on a regular basis from Younisabad to look after the community health center. The education committee supported the initiative of school for girls and motivated the community in this respect.

7.3. Incentive for Female Education:

Another significant intervention of WWF-P in the local context was the awareness and education campaign for community women regarding the Mangroves Ecosystem and its significance. Additionally an incentive was offered to the community to educate their girls and various trainings were conducted for women to learn about income-generation methods other than fishing. For that purpose a vocational training center was also developed in the Kakapir village. This vocational training center is empowering and training women to become economically self-sufficient. The skills imparted through this vocational center include sewing, embroidery and social forestry. A one room school was established for girls by voluntary contribution of a community member who gave a room in her house for the community. However; when the number of children increased it was shifted in a government primary school by taking their two rooms and hiring two teachers from the community.

7.4. Community Involvement in Mangroves Nursery Establishment:

The community women in Kakapir village were motivated to participate in the development of a nursery for re-plantation of Mangroves. For this matter financial incentives were offered to community and training workshops were conducted to involve the community. Once the community got trained in Mangroves plantations they motivated each other to work towards Mangroves protection. There were six stages of the Mangroves nursery's establishment in which the community has participated and contributed with hard work and enthusiasm. They include: Seed collection, Seed sorting, Seed sewing, Monitoring, Plant growth and Re-plantation. Once the realisation about the significance of mangroves ecosystem emerged, the community planted 30000 plants in just one month in June-July 2004. After the involvement of women the men were also motivated to participate in the nursery development and re-plantation. Especially the men's involvement in protection and re-plantation activities of Mangroves Ecosystem was really a big task that was achieved. Thus men, women and children of the community were all involved in the protection and conservation of the Mangroves and all this happens because of community's own interest and involvement with the small efforts of a community mobiliser.

7.5. Development of Infrastructure:

Another intervention in the context was the involvement of formal sector through installation of gas pipelines and provision of Gas for cooking. The request for gas lines was made in June 2003 and the gas pipes laid by November 2004. The local Nazim and Sui Southern Gas Company (SSGC) were approached by CBO members. The WWF-Pakistan supported the community in this endeavor and provided them with all the technical support.

7.6. Training Regarding Solid Waste Management and Plantation:

A training regarding solid waste management was also held with the community so that awareness can be generated and people can be motivated to take care of this issue on a self help basis. Similarly the community is also trained for plantation of mangroves. Separate trainings were held for both males and females and now the community is totally aware regarding protection and conservation of the Mangroves ecosystem.

8. Conclusion:

Finally the lessons learned through the experience of Kakapir village community can be summarized as follows:

8.1. The hard work of WWF-P in the local context leads to a profound impact on the community in the form of awareness as well as a sense of belongingness towards a natural resource. Especially by setting up the wetland center, monitoring of the degradation in the Mangrove forests, helping in formation of a CBO, female education, mangroves nursery establishment, serving for development of infrastructure and the training of the community regarding solid waste management and plantation. All these labors of WWF-P diverted the community from destruction to edifice of the natural resource with minimized human interference.

8.2. The efforts towards the conservation of natural resources require an in-depth understanding of a community's legitimate needs and aspirations. As evident from the case of Kakapir village community where the empirical evidence shown that community is destroying the natural environment by cutting wood, whereas; it was utter need for survival because they required firewood only for cooking. There was no visual evidence available during the survey of Kakapir village that the community has consumed natural resources for dwelling purpose, however;

it is recommended that a detailed investigation should be carried out in this respect.

8.3. It's the inadequacy or unjust distribution of resources that lead to destruction of natural resources, whereas; in actual terms they required an alternate energy source like natural gas to cook their meals. But as its availability was denied to the poor villagers by the formal sector institutions so they were compelled to take firewood from Mangrove forests. Now as the alternate fuel is available the community is protecting the natural resources.

8.4. Each community possesses a traditional wisdom regarding protection of environment and its just little pains and humble efforts required to revive their wisdom by carefully listening and understanding their problems and issues and to solve them with the involvement of the community. As a repercussion the community may do wonders and start working on self help basis for the betterment and protection of natural resources. Then they work as watchdogs to stop any misuse to occur in their natural resources.

8.5. In traditional societies like Kakapir village community women play a pivotal role and community is dependent on women participation for development as well as for survival. Without involving the females of the community successful natural resource conservation is also not possible. As established through Kakapir case studies that when women were involved and motivated to participate in CBO formation, education program and nursery establishment they motivated their men to participate in these endeavors. As a result whole community worked together for Mangroves re-plantation.

8.6. The role and responsibility of formal sector is very crucial and instrumental in protection of natural resources. As evident in Kakapir village in the form of natural gas supply lines laid for the community which results in reduction of cutting firewood from Mangrove forests.

8.7. The elites and influential people of the society shall always remain an unavoidable threat to the growth and development of the natural resource its protection and conservation. As evident in the case study that the beach huts on 3km long critical strip in between the Mangrove forests and the sea that hinders the pathway of turtles to the beach may never be removed and there is no mechanism yet established to influence the influential elites.

Thus finally it is recommended that, "A balance should be maintained between development and natural resource management otherwise destruction is inevitable."

Glossary of Local Terms Used In the Paper:

Community referred in the paper used for the community of Kakapir Village

Context means the physical setting, framework or milieu

Development means physical, social and economic growth of the community.

Formal Sector means public and private sector institutions working under the framework of Government.

Informal Sector means people and organizations neither working under the framework of Government nor recognised by the Government.

Interventions mean initiatives of community Based Organisations (CBO's) and NGO's in the context.

Natural Resources mean Mangroves Ecosystem.

Kunda System is basically a local phrase which means a system of illegal electric connections develops informally by people themselves through the help and support of informal electric suppliers.

Sindhi, Lasi and Jat is the names of ethnic groups of Kakapir village.

Nazim means Mayor.

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http://www.wwfpak.org/

http://www.wwfpak.org/wetlandcentre.php

The satellite images are taken from freely accessible demo version of **www.google.earth.com**