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Social Inequality and Environmental Threats in Indus Delta Villages: Pakistan

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Editorial

The conference “Tracing Social Inequalities in Environmentally-Induced Migration” was the second in a new series of conferences on “Environmental Degradation, Conflict and Forced Migration”. It was organised by the European Science Foundation, in cooperation with Bielefeld University and its Center for Interdisciplinary Research. Already on the occasion of the first conference of the series the Center on Migration, Citizenship and Development (COMCAD), the university’s unit responsible for scientific content and quality of the conference, had launched a COMCAD Working Paper Series on “Environmental Degradation and Migration”. In the wake of the second conference, the editors are pleased to now start the second round of this working paper series. It intends to give conference participants the opportunity to share their research with an even broader audience.

The 2010 conference focused on how environmental change impacts the interplay between vulnerabilities on the one hand and capabilities on the other hand, and how this relationship affects mobility patterns. The 2012 conference concentrated on the societal backgrounds of this interplay and is meant to integrate a social inequalities perspective into current debates. Not all actors are equally vulnerable to climate and environmental change and environmentally-induced migration. Therefore, social inequalities between world regions, countries, geographical regions, organizations, groups and categories of people involved in environmental and climate-induced migration constitute the core thematic focus. Differential susceptibilities and capabilities to cope with environmental change on local, national and global scales rather depend on resource inequalities, power inequalities and status inequalities. Differences in vulnerability result from and are reproduced by the unequal impacts actors have upon politics and society as well as by the material and immaterial resources at their disposal. The 2012 conference was thus meant to shed light on the role of social inequalities in environmentally-induced migration and the mechanism of its reproduction.

The researchers invited represented a wide range of disciplines, including sociology, social anthropology, migration, conflict, gender and development studies, geography, political science, international law, as well as climate and environmental science. The conference was well balanced in terms of geographic origin, gender, and academic status of the participants. The conference programme and full report can be found at the conference website ([http://www.uni-bielefeld.de/\(en\)/tdrc/ag_comcad/conferences/envimig2012.html](http://www.uni-bielefeld.de/(en)/tdrc/ag_comcad/conferences/envimig2012.html)).

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Abstract

The physical presence of historic villages and habitats on the Indus Delta is observed to be under threat due to environmental changes and permanent disasters. The delta of River Indus has distinct social, economical and environmental features as compared to the rest of the coast of Pakistan. The delta population, being the lower riparian of the River Indus, receives a limited flow of fresh water. This is causing environmental degradation and negatively impacting traditional livelihoods, survival and resilience patterns in the presence of high levels of social inequality. Climate and environmental changes over time are deemed as a root cause of the rise of sea level which is leading to a loss of land, rendering it unusable for cultivation, increase in salinity, depletion of mangrove forests and a decline in fish catch. This paper is an outcome of field visits to the Indus delta's inland and the island villages in Kharo Chan in particular. In this paper, the focus is on environmentally induced migration caused by slow-onset disasters and its linkages with social inequality based on class, caste and kinship groups.

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1. Environment and Climate Change

Research on migration caused by environmental and climate change is largely deemed as a sub-set of social sciences and varying terminologies for such migrants are being debated since the last decade. These terms, such as “climate change refugee” or “environmental refugees”, are of importance in the legal framework of “refugee and protection” mainly for the developed countries, but of less importance for countries like Pakistan, where environmental or climate change induced or voluntary migration from disaster prone areas to safer places is limited to within the country.

It is a fact that developing countries have suffered numerous environmental and climate change disasters; international organizations state that climate change disasters have affected around 262 million people annually from 2000 to 2004 and the larger proportion of the affected population lived in the developing world¹. The debate by environmentalists (see Raleigh et al, 2008; Renaud et al, 2007; Brown, 2008; Hugo, 2008; Knivet et al, 2008) is widely discussed by Laccko and Aghazarm (2009) who have categorised four major paths by which climate change may affect the population and cause migration. They are:

“Intensification of natural disasters, such as hurricanes and cyclones that destroy housing and livelihoods and requires people to relocate for shorter or longer periods”.

“Increased warming and drought that affects agricultural production, diminishing people’s livelihoods and access to clean water”.

“Rising sea level that render coastal areas uninhabitable”.

“Competition over natural resources that may lead to conflict, which, in turn, precipitates displacement”.

Globally, all four categorised paths of climate change disturb the population and can be major causes of temporary and permanent migration. Unfortunately, all four categorised paths are valid in the context of Pakistan. For example intensification of natural disasters such as an earthquake of magnitude 7.6 on the Richter scale in 2005 severely damaged the northern parts of Pakistan. This earthquake damaged an area of more than 30,000 square km and made over 3.5 million people homeless. Over 85,000 people lost their lives and more than

¹http://hdr.undp.org/en/media/HDR_20072008_Summary_English.pdf accessed on 29th Jan 2013

77,000 were injured (IUCN 2005). In the floods of 2010-2011 over 1,700 people died and over 18 million people were displaced. The economic cost of damage was reported in the range of \$8.74 billion to \$10.85 billion across Pakistan (Budhani and Gazdar 2011). Al-Qaida and Taliban's violent invasion and military operations in Swat valley displaced almost 38 per cent of total population who moved to the urban areas of Peshawar and Karachi to seek refuge (Sayeed et al 2013).

Increasing temperatures and drought are the main source of permanent migration unlike cyclones, floods, storms and earthquakes which may cause only temporary displacement.. The population in Pakistan, particularly Sindh and Balochistan, has experienced significant periods of drought (Gazdar 2007).

Rising sea level, the third main cause of climate change, has also been the main cause of induced migration in Pakistan. In fact, the fourth one path mentioned above is also very relevant to Pakistan's social, economic and political context. The researcher based in Pakistan had highlighted the conflict over natural resources as the main cause of induced migration in some parts, particularly in Balochistan (a province of Pakistan). For example, Gazdar (2007) discussed that natural resources or rent seeking behaviour between tribes is the source of conflict and displacement.

Migration and causes of migration in a broader sense are also debatable but by narrowing down the debate on induced migration by climate change we need to focus the simplified international definitions. The IOM (2007) has defined 'environmental migrants' as

“persons or groups of persons who, for compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad.”

The four paths discussed earlier can be perceived as primary factors or drivers of environmentally induced migration in Pakistan and other developing countries. Environmentalists and social science researchers around the world have further tried to theorize such migration in terms of temporary verses permanent as well as voluntary verses induced or forced. Disasters such as sudden or humanly unexpected disasters like cyclones, floods, and earthquakes divert global attentions as compared to slow-onset environment and climate disasters such as drought and rise in sea level. In this paper I have focused on voluntary or induced migration caused by slow-onset disasters those are resulting from the reduction of fresh wa-

ter flows in the Indus Delta and rise in sea level. The following section is about impacts of environmental disasters and its correlations with existing social inequality.

2. Environmental Disasters and Social Inequality

Gazdar and Mallah (2012) have reopened the debate on class, caste and kinship in light of their field studies and by reviewing several past and present research studies (Alavi 1972, Ahmed 1977, Hussain 1980, Rouse 1988, Martin 2010 and Eglar 2011). They argue that the kinship group, *biraderi*, *zaat* or *qaum* is a social and political unit of solidarity as well as of social inequality predominantly in Pakistani Punjab.

A number of ethnographic accounts of post-colonial Balochistan, particularly the southwestern coastal eco-region of Makran, throw light on inter and intra-tribal social hierarchy. The position of Afro-Baloch descendents of former slaves has been the subject of interest. The owners of the oasis, generally known as *hakim*, dominated the Afro-Baloch *ghulam* (literally slave, *nakeeb*, or *hizmatgar*) as well as other non-*hakim* cultivators – with all classes being identified as patrilineal kinship groups (Field 1955).

Academics such as Feroze Ahmed (1984) write about Sindh's traditional village or *raj*, socially arrayed around dominant landowning families and kinship groups, as already in a state of change by the 19th century. One of the few post-colonial village studies in the province was conducted by Honigmann (1960) who also described Sindh's villages as virtually defined by patrilineal kinship groups. Early colonial understanding was influenced by Burnes (1837) who saw the Sindhi village as a mobile unit of close kinsfolk which changed its location over time and became known by the name of its current leader. Burnes (1837) further says that "To quote legends, Sindh has vast number of villages, most of which are moveable. In the desert they are called "Wa'ndh," near the river "Ra'" and "Ta'nda" (pp-14).

The ethnographer Henry Field in his book "An Anthropological Reconnaissance in West Pakistan, 1955" has observed that

"Kalmatis: Soon after their arrival on the Makran coast the Kalmatis conquered the Meds and ... (pp-54)".

"The women are hard-working and hard-worked. Excluding women of dominated classes and of more prosperous families, those of poor and nomad groups, the Darzadas, Naqibs, Meds, Loris and servile dependents are, generally,

of lax morals. the Baluchis kept many slaves, the fruits of their raids. The seamen and fishermen are divided into two classes known as the Koras or Langas, and the Meds...” (pp-67).

The academics see existing social inequality on the basis of class, caste and kinship as the primary source of social vulnerability and marginalization. The above excerpts from ethnographic and geographical studies also show a high level of persecution of the occupational caste groups by powerful invaders and the elite. So by examination of social vulnerability of individuals and the groups one can assess their accessibility to and use of human resources in normal situations as well as their resilience and response in times of unusual environmental stress and shocks. Deshingkar (2006) highlights that the poor often adopt internal circular migration behaviour in case of environmental stress and other sudden shocks but the poorest or most vulnerable are unable to find/do not have the resources to move from one place to another. Sen's (1981) theory of 'entitlement' of individuals, groups or communities sees to what extent individuals, groups or communities are 'entitled' to make use of resources. This theoretical approach says that low levels of openness to entitlements and consumption do, obviously, affect the ability of individuals, families and communities to deal with shocks. By using a similar framework here in this paper I would like to limit the discussion on security of entitlements of individuals, families and communities in general and the adverse environment and climate impacts on socially vulnerable. For this purpose I have purposively selected a field site in the Delta to focus on the long term hazardous disaster: the rise in sea level (Nicholls 2003) and incursion of saline sea water into fertile agricultural and pastoral zones.

3. Brief Description of the Indus River Basin and Deltaic Ecosystems

In Pakistan the Indus River is the primary source of water and the Indus Basin is calibrated among the world's biggest basins. Out of the total basin area of 1,138,810 square kilometers around 597,700 (Sq km) falls in Pakistan's territory. The River Indus flows about 3,000 kilometers (km) through the mountains of Khyber Pakhtunkhwa (KPK), Punjab and Sindh provinces of Pakistan (ADB 2010). However, Pakistan is counted among the top arid and most water stressed countries.

Historians and geographers such as Tremenheere (1867) describe the remarkable physical and environmental characteristics of the lower portion of the Indus River. Tremenheere writes

“The Indus, like other tropical rivers, is subject to annual inundation, the extent of which had been carefully registered for many year both at Sukhur and at Kotree. At the former place it generally rises from 12 to 13 feet above a fixed datum, assumed as its low or cold-season level..(pp-69). The amount of rainfall in Sind is so small that cultivation may be said to be entirely dependent on the rise of river.....(pp-69). The extensive sand-banks formed in the bed of the river are frequently many feet above the level of the water during the low season, and become quickly covered by a thick growth of young tamarisk; those which are not swept away by the next inundation...(pp-71 The main banks, where they have not been cleared for cultivation, are also covered with a luxuriant growth of tamarisk and elephant-grass, or forest trees... (pp-72)

The author Trememheere quoted Sir A. Burns’ *Travels into Bokhara*’ in which he had stated that

“previous to 1792 the Phooran, then a branch of the Indus, emptied itself into sea by passing the western shores of Chutch..but in 1802 the Indus water was entirely excluded by the erection of another bund at Ali Bunder... pp-74.

It is striking that the Trememheere had established a view point regarding the transformations in Indus delta due to environmental changes and it is very relevant to the subject of this case study site from the Thatta district. The author describes that

“Whatever may have been the position of the Delta of the Indus in former times... it must now be deemed to commence at some distance to the south of Tatta. It will be seen that only branches leave the river from the right bank, the Buggaur and Hujjamree. The first, now a small channel, not more than 80 yards in width during inundation, discharges its water after a very winding course into what must be considered as a large lagoon extending from the vicinity of Kur-rachee to the main embouchure of the river; the second, the Hujjamaree, carries off a large body of water, about one-third of that in the main stream Kurrachee...(pp-74).

Burnes (1837) writes that

“The great feature of Sind is the Indus... Its Delta, however, commences below T’hat’hah in the latitude of 24° 40’,* after which it enters the sea by eleven mouths, and presents of face of 125 British miles to the ocean.... Much of the land that is adapted for agriculture, is only used for pasture. Much of it also lies neglected; yet the crop of rice is extensive, and far exceeds the consumption of the country. It is the staple of Sind; the inhabitants live on it, the merchants export it...(pp-12). Its length of course, and the body of water discharged by this river, prove it to be one of the largest in the old world. Its tributaries even are rivers of some magnitude. The Hydaspes, Hydräotes, and Hesudrus, are superior to the Rhone...(pp-19)

Environmentalists and organizations currently working in Pakistan’s eco-regions claim that the Indus Delta is comprised over 30,000 sq km in a triangular fan-shaped area. The Indus River empties it flows in 17 creeks (Khan 2008). Khan, an environmental journalist in Pakistan, in her article “Death of Indus Delta” argues that the rise in sea level due to climate change and reduction in fresh flows in the delta is turning acres of fertile agricultural land into wasteland².

Gulich in his geographical research in 1963 says that

“Irrigation works have existed in the Lower Indus Valley for centuries. Wheat, millet, and cotton were raised by the people of the early Indus Valley civilization of Mohenjo-Daro between 3000 and 1500 B. C.,...Moguls and early Kalhora rulers of sixteenth, seventeenth, and eighteenth centuries build and extended canals...(pp-87) The British, between 1843, when they took Sind, and 1932, maintained and improved the existing inundation systems. Irrigation acreage was enlarged to three million acres early in the twentieth century...five-sixths of the land received lift irrigation, where

²http://www.lead.org.pk/hr/attachments/Compendium/04_Environmental_Rights/Death_of_the_Indus_Delta.pdf accessed on 22 Jan 2013

in southern deltaic area two-thirds of the irrigation was by flow. This was situation in 1927 also... (pp-87-88).

Gulich further explained that the British government was motivated to develop agricultural irrigated land in Sindh through construction of dams or barrages on the Indus River. The author told of construction dates

“The Sukkur (or Lloyd) Barrage was completed in 1932, the lower Sind (or Ghulam Mohammad) Barrage in 1955; the Gudu Barrage is scheduled for completion in 1962” (pp-83).

Khan (2008), provides diverse community perceptions and evidences regarding displacement because of sea erosion and both environmentalists and communities relate sea erosion to scarcity of fresh water flows in the sea. On other hand, climate scientists see global climate change as the main precedent for rise in sea level. Some climate scientists don't see fresh flows from the Indus River into the sea as the only solution to reduce sea intrusion (Rasulet, al 2012). It is a fact that Pakistan's growing population needs supply of irrigation water for plenty of food production and so far water and water resource management remain controversial and politicised between India and Pakistan as well as between upstream and downstream provinces. The water experts and politicians from upstream Punjab province see flows of water in the delta as an unacceptable loss of water.

The British government, early 19th century onwards, was preoccupied with converting the uncontrolled Indus waters into a scientific irrigation system through the construction of dams and water channels in order to divert and store water to increase capacity for crop production. The partition of British India created two sovereign states in August 1947 and the riparian issue between Pakistan and India remained at a standstill till March 31, 1948. That standstill agreement lapsed when Indian Punjab stopped downstream flows which flared up crises in Pakistani Punjab. Finally, the World Bank intervened and the Indus Water Treaty (IWT) between Pakistan and India was signed in 1960. According to this treaty, all flows of the three eastern rivers of the Indus Basin (Ravi, Beas and Sutlej) were awarded to India and Pakistan was authorized to use the western rivers (Indus, Jhelum and Chenab) (Gazdar 2005). However, hydro-politics remained an issue between the two sovereign states and between provinces Sindh, Balochistan and Khyber Pakhtunkhwa versus Punjab (Mustfa 2010).

An IUCN report states that flows of Indus River water have continuously decreased from around 185,000 million cubic meters in 1892 to 12,300 million cubic meters per year in the 1990s.

Decrease of fresh water flows in the delta

Year	Flow rate (million cubic meter per year)	Causes
1892	185,000	Uncontrolled flows
1932	105,000	Construction of Sukkur Barrage
1960	79,581	Construction of Kotri Barrage (1956)
1970	43,000	Indus Water Treaties (1960)
1990s	12,300	Indus Water Accord within provinces

Source: IUCN³

The above data shows a higher decline from 1960s onwards. The Indus River's pre- 1960s uncontrolled fresh water flows in coastal regions of Sindh Province made coastal ecosystem more productive including agriculture, mangrove forests and fisheries. The rapid decline in last half century led to a general reduction in the health of the floodplain and Delta ecosystems. The IUCN report portrays the Indus Delta as being more important from a biodiversity perspective because it has 10 species of mammals, 143 species of birds, 22 species of reptiles, over 200 species of fishes, many invertebrate species (including 15 species of shrimp) and some rare species such as the freshwater dolphin, *Platanista minor* and the fishing cat. The rapid decline in fresh water also damaged the quality of water in the delta and it became increasingly saline. The saline sea water has intruded 64 km inland which includes 1.2 million acres of farmland. Gill et al (2012) very clearly mentioned that because of imbalance be-

³<http://cmsdata.iucn.org/downloads/indus.pdf> accessed on 30th January 2013

tween fresh and brackish water the area had been converted to saline pools. However, the delta communities

“have greeted the 2010 flood with the belief that agricultural land will become fertile due to the dilution of salt by freshwater flooding”.

Ram (2012) has analyzed the reduction of water flows since 2000-1 and strongly emphasized that the survival of Indus Delta depends upon Indus water flow into the sea. Before the creation of Pakistan around 80 MAF (1 million acre-feet) of fresh water was allowed for downstream Kotri and emptied in the sea. After the Indus Water Accord (IWC) in 1991, between provinces of Pakistan, the flow was reduced up to 10 MAF. Panhwar (2002) says

“due to a lack of water in the river flowing to the sea, tide water started entering the river. The high tide is about ten feet in height and with poor slopes of land of 2 to 3 inches a mile (00035 to 0.005%), water reached upstream of Sujawal Bridge in the bed of the river...(pp-23).

The residents of the deltaic region are forced into involuntary migration and so far 1.5 million people have been displaced (Junejo 2011).

4. Research Site: Kharo Chan

Pakistan has four broader administrative units or provinces and two provinces, Balochistan and Sindh (previously spelled as *Sind*), have littoral regions over 778 square kilometers with the Arabian Sea. Around 350 sq.km of the total coast of over 778 sq.km and the entire Delta of the Indus River lies in the province of Sindh. The primary administrative unit in the province is a district and the selected district Thatta (spelled as *Tata*, *T'hat'hah* in colonial times) is the lower riparian district which covers a larger part of Indus Basin and the Delta.

At present there are 9 *Talukas* or secondary administrative units in the district. Out of 9, 6 Talukas have boundaries with the Arabian Sea. Taluka Kharo Chan is one among the 6 coastal and deltaic Talukas of the district. The Indus delta in general and the Kharo Chan area in particular face serious ecological and economic threats as a result of greatly diminished Indus water inflows downstream of the main barrages. Previously fertile agricultural lands and entire settlements have been abandoned to seawater intrusion. The Kharo Chan

consists of two sub-regions mostly inland and some islands. The islands face greater fresh water stress and are also cut off from the mainland. Kharo Chan itself is a name of a village and a Union Council. This Union Council consists of over 3 island *dehs* called Bablo, Sukhi and Betri.

Deh is the smallest administrative unit in rural Sindh and the term *deh* literally means ‘village’ in the administrative vocabulary. Several villages and small settlement make up a *deh* and some *dehs* make up a Union Council, which is the smallest unit of political representation in local government. Actual human settlements, known as *goths*, are smaller entities which have only notional linkages with the *deh*. It is often but not always the case that the largest settlement in a *deh* will share its name with the *deh*. Actual villages or *goths* are often divided into sub-clusters called *para*, which are almost always populated by extended families belonging to one caste or a kinship group. It is common that big multi-caste villages often break up due to several social and environmental changes as well as disputes among caste and kinship groups. Even big villages with a single caste break up in small settlements of over 8 to 10 households due to disputes over social, economic and political ‘entitlements’.

5. Field work in 2005 and 2011

Secondary literature reveals that Kharo Chan was historically the hub of trade in the region, a fact that is corroborated by our field interaction. Around a half century ago there were three rice mills owned by Hindu *baniyas*. Before the partition of the subcontinent in 1947 in two sovereign states India and Pakistan, Hindu merchants dominated trade in Sindh and were active in informal banking as money lenders to landlords. Soon after partition the Hindu merchant class was forced to leave Pakistan and their properties such as agriculture lands, mills, factories and living houses were labeled as evacuee property. The government of Pakistan awarded their properties to *muhajirs*-Muslim who migrated from India after the partition. In remote areas those properties were also leased to Hindu landlords’ *haris* (sharecropping tenants) and caretakers of their lands. In Kharo Chan most of the evacuee property was leased (seven years lease) during the first democratic government led by Zulifkar Ali Bhutto to potential local applicants. In the agricultural sector in inland *dehs* of the delta there are a few landlords with large landholdings and many others with smaller holdings. The landless poor in inland villages work as sharecroppers or labourers for the large landlords. Some parcels of salinity free land were converted into banana and *paan* orchards which caused changes in sharecropping tenancy patterns. The tenant/labourer’s share in orchards is 1/6th of the total produce, while in other crops it ranges from 1/4th to 1/5th of the output.

The qualitative phase of this study in 2005 provided basic understanding of social inequality, poverty in general and links of both with long term environmental degradation and intentional and unintentional migration. The respondents in individual and group interactions reported about two cyclones in 1965 and 1999 which changed the demography of the area. The cyclone 1965 damaged government buildings and some private brick and lime made houses. The Indus water was controlled first time through Gullam Muhammad Barrage constructed at Jamshoro, Kotri in 1960 which reduced flows of fresh water in the Indus Delta. After construction of the barrage, two rice mills in Sokhi and one in Bablo became worthless. There were three wells with quality drinking water before the early 1960s.

In early 1970s a saint namely Pir Yar Muhammad Shah (Pushto speaking) came to this area. He used to eat raw meat and people were attracted by his miracles. People of the area were able to feed him and after his death his shrine was constructed there.

People call the Indus River “*Sindh Nadi*” or Sindh canal and the sea as “*Dariya*”. In 1940 there was big breach in the sea which made a new mouth for the Indus River and people named it as “*Phaat Dariya*”. Now Bablo *deh* falls between Phaat Dariya and Mir Wah branch of the Indus River. Gharo, a big township at present, is said to be smaller at that time than the township called Sokhi Bunder on Mir Wah’s embankment. The respondents had revealed almost similar demographic features of the Indus Delta or above 17 water emptying mouths as in Tremenheere’s and Burnes’s historic demographic research with minor spelling differences.

There were, broadly speaking, three kinship groups with high numerical weights in island *deh* Bablo and several smaller groups. The most conspicuous were the Kachhis’ who speak Kuchhi dialects and are 15 per cent of the population. Kachhis’s are said to be of Kuchh (presently Indian territory) origin, those who had migrated to Sindh before the partition of India. At present they dominate the main market and also hold agricultural lands. However, because of salinity resulting from sea erosion and scarcity of fresh water flows the land is not necessarily a source of potential wealth or income. Kachhis’ are largely occupied in commercial activities as were the Hindu *banias*. Kachhi community was known as “*zargars*” and *Khattis* because of their traditional occupations of dying and washing clothes. But at present no one is attached with their ancestral traditional occupation.

The second prominent group was Khaskhelis, who are perceived as slaves of the ruling Baloch Mir’s or Talpur’s dynasty in Sindh. After the end of the Talpur dynasty and during the colonial period in Sindh, Khaskhelis indulged in land related labour for the rural landed elite. Some of the Khaskheli respondents revealed that their parents used to take care of the lands

of Hindu *baniyas* in Kharo Chan. After partition, a few got land on lease and others became share-tenants of Kachhis' and other landlords. But due to non-availability of fresh irrigation water most of their families adopted marine fishing and other casual labour. This is the largest caste group in the village and accounts for a quarter of the village population. There are several individuals among the Khaskhelis who were of some local prominence and active in politics as well.

The third group is the Mallah, the name for traditional seafaring communities also known as *muhana* or *machayra* and *med* in Pakistan's coastal belt. Within the Mallah occupational caste there are several distinctive kinship groups known by their *paras* or *biradari* or sub-castes. One of the largest landlords of the village is from a Mallah family, who have extensive economic and political links with the powerful fishing cartels based in Ibrahim Hyderi in Karachi. The Mallah chief is a player in local politics as well as in the wider politics of the seafaring communities. While the extended family of the Mallah chief were important land and boat-owners, most of the other Mallah are landless and poor. There are also other kinship groups claiming Mallah status by the virtue of being traditional seafarers and not through any proximate kinship association with the empowered Mallah kinship group.

Caste and kinship, sometimes defined in ethnic terms, are significant markers of identity, solidarity and conflict among indigenous and migrant ethnic Baloch tribes. In the delta region, traditional occupational groups such as the Mallah (fisher-folk) and carpenters within the Kalmati Baloch were perceived as lower status groups. Kalmatis locally known as *karmatis* were reported to be tribal Baloch migrants from coastal Gwadar. There were several caste or kinship group among the Kalmatis who dominated fishing jetties, harbours and cultivated parcels of the land in inland villages of the Kharo Chan Taluka. However, in the case of *Bablo deh* all habitants belong to a socially marginalized class, caste and kinship groups if seen in broader understanding of social hierarchy and patterns of social exclusion in Pakistan.

The Sherazi Syeds were perceived as the dominant landed elite in inland as well as in island segments of the Indus Delta. There are considerable economic inequalities across the region, with evidence of high levels of concentration of land ownership in the hands of economic elites. The situation with respect to fishing communities is also marked by high levels of inequality and unfavourable concentrations of economic power. The economic elites in these sectors are heavily implicated in the local level environmental challenges to the ecology, particularly, with respect to deforestation, water body contamination and overfishing. Local economic elites can call upon kinship group solidarity, political networks and religious affiliation to maintain their power.

For the Kachhi as a group, the incidence of land ownership is 48 per cent and they have significantly higher levels of education as compared to the other kinship groups. In the Mallah chief's kinship group there is a sharp distinction between the chief's family and the rest of the group who is poor and socially marginalized.

Khara Chan: Kinship groups and access to entitlements

	Share of population	Land owners	Tenant farmers	Highest education in household			
				None	Up to primary	Up to secondary	Above secondary
Mallah (poor)	23.5	49	3.3	79.1	11.8	9.2	0
Mallah (rich)	15.5	12.5	0	67.5	20	2.5	10
Khaskheli	25.3	10.5	10.5	86.2	6.9	6.9	0
Kachhi (rich)	15.1	48.4	0	16.1	41.9	32.3	9.7
Kachhi (poor)	5.1	0	0	91.7	8.3	0	0
Kalmati Baloch	7.9	4.8	0	85.7	14.3	0	0
Others	7.6	15	5	50	45	5	0
Total	100	17	3.3	73.8	16.1	7.3	2.8

The quantitative field work showed that around 99 per cent of houses were made *katcha* and around 94 per cent households reported that they own the built structure of the house. All three island *dehs* had no electricity and gas connections for gas. People used mangroves' wood for cooking purpose.

Patriarchy is closely connected with class, caste and kinship hierarchy. Women do not hold any assets (such as boats or land); all economic activities are controlled by men and the inheritors of assets are also always men. Women are the most vulnerable and marginalised where kinship identity remains integral through patrilineal descent. The respondents were not sure about their ownership status of the land on which their homes were made. Homestead land ownership is a peculiar issue in overall Pakistan particularly in Sindh as most of the villages are not registered with land revenue departments like they are in Punjab. A smaller number of the village in Sindh got *sanads*, individual ownership entitlements, through the Sindh Goth Abad Scheme but a large number of homes are made on government, privately owned or occupied land (Gazdar and Mallah 2010). Poor tenants and casual labourers in Kharo Chann were reported to be living on land owned or occupied by the landlords.

The fish lords dominate water resources and the marketing of fish catch. The elite landlords, politicians, businessmen with a strong relationship with Karachi fisheries markets, the Fisheries Department of Government of Sindh control the fishing economy with the collaboration of powerful people at the village level. The poor fisherfolk do not own boats, nets or other fishing equipment and perpetually work as labourers for the fishlord. The moneylenders in the Karachi fisheries market and on local jetties play the role of middlemen between the fishlord and labourers. A large number of boat holders do not own the boat because the original boat ownership documents are with the moneylender who is doing business in local or Karachi markets. The boats were given to people after a local middleman's guarantee. The indebted boat holder is responsible to sell the catch to the moneylender on lower than market prices which are fixed for the whole season. A few boat holders were reported to be free of debt. The people who owned boats also needed loans during the non-fishing season and for maintenance of their boats and equipment every year. The indigenous poor for whom fishing is a traditional occupation do not have free access to the market due to indebtedness.

In Kharo Chan it appears to be stark class polarization as most of the residents are landless workers either as fisher-folk, *haris* or wage labourers, who are indebted and have no or little access to use of resources. There are few places in inland delta villages where there are in-between classes such as those who self-cultivate small plots of land. In addition to the landlord/fishlord versus assetless worker division, other economic stakeholders such as traders and moneylenders are allied to the economic elite in its relationship with the assetless.

6. Migration Stories, Perceptions and Interventions

It is difficult to gauge the number of people that have migrated, their destinations, how they survived there and whether their migration was induced or voluntary specially in cases when individuals, families and community migrated because of slow-onset or permanent type of the disaster. However, a combination of population census records in Pakistan with qualitative and quantitative field work in the research site gives a number of diverse migration stories, perceptions and variations in population. Permanent disasters, as compared to temporary disasters, are given less attention by international relief and rehabilitation organizations, but long term factors damaging biodiversity caused permanent induced migration of indigenous communities from one place to another (Mallah 2011). The first priority destination of environmentally induced migrants is the province's big urban hub, Karachi. But the assetless individuals, families and communities cannot afford permanent migration as compared to empowered individuals, families and kinship groups with complicit right over use of available resources and assets. The socially marginalised castes and kinship groups with no land tenure and residential security could not migrate or prefer internal circular migration toward the safer place within the area or migrant friendly urban centres.

“Around 250 households permanently migrated to Buhara, Baghan and Gharo within the district. No human habitation remained in *deh* Betri and only a few households remained in *deh* Sukhi. Many households who had livelihood resources in Karachi also migrated permanently” said a respondent.

It is a fact that environmental or climate change migrants from the selected sites preferred Karachi as prime destination, where the tension between regulation and regularization of migrants' cohorts is the main cause of conflict and political violence. Rural to urban migrants in search of shelter and livelihood require collective action and effective social and political mobilization in order to attain the regularization of the squatter settlements they reside in (Gazdar and Mallah 2011). The ethnic political groups in Sindh province and particularly Mut-tahida Qaumi Movement (MQM) ruling urban Karachi resisted Internally Displaced Persons (IDPs) migration from northern Pakistan's terrorism ridden regions⁴ and IDPs from rural Sindh who were affected by the 2010 floods⁵.

⁴http://www.dailytimes.com.pk/default.asp?page=2009/05/23/story_23-5-2009_pg12_4 accessed on 24 Jan 2013

⁵<http://crss.pk/downloads/Reports/Special->

The following table shows variation in population ratio of increase in urban towns and decrease in population ratio in the rural deltaic settlements (three dehs in Taluka Kharo Chan) directly affected by decline of flows fresh water, rise in sea level and salinity.

Population and variation due to migration							
	Census year 1971	Census Year 1981	Percent Variation between 1971-1981	Census Year 1989	Percent Variation between 1981-1998	Collective Census 2005	Percent Variation between Census 1998 and 2005 survey
District Thatta	695,861	761,039	9	1,113,194	46	***	***
Kharo Chan Taluka	***	16,903	***	25,700	52	***	***
Bablo	1,890	2,000	6	2,363	18	1,831	-23
Betri, Nind	979	847	-13	754	-11	10	-99
Sokhi	127	164	29	85	-48	0	-100

The population district headquarters or non-fishing and non-agricultural area increased by 9 per cent between 1971 and 1981 and increased from 46 to 52 percents between 1989 and

1998. In deltaic *dehs* during 1971 and 1981 there was an increase in population by 6 per cent and 29 percent in Bablo and Sokhi respectively but in Betri there was a decrease in population of 13 per cent. Between 1989 and 1998 there was an increase in population only in Bablo and a high decrease in Sokhi. Our qualitative and quantitative field survey in year 2005 shows 23 percent decrease in Bablo and around 100 per cent decrease in both Betri and Sokhi *dehs*.

A Khaskheli responded stated “We cannot move from here. We need a ‘Bund’, an embankment, to protect our village from saline water and high tides”. He had some parcel of land on lease but he had not cultivated it since 1990s. Individuals and families who had relatives in Karachi can move and get work there but others cannot. “We used to grow ‘Khara Ganja’ red rice here some decades ago but now we can only grow some vegetables during the June-July flooding in River Indus” said a Kachhi respondent.

“We are not free people but enslaved by the ‘dalals’ middle men who provide us debts to purchase ‘rachh’ fishing nets and cash for the repair of our boats, we often sell our fish catch to the money lenders in the market at half prices because we are indebted” shared a Mallah boat owner

Our respondents revealed that mangroves and fresh water from Indus River are the main sources or dens of fish breeding but the depletion of mangroves and salinity have caused a large number of fish species such as the *palaa* or *hilsha* and other shrimps to disappear. There is no livelihood source other than deep fishing and now all deep fishing contracts have been given to international companies. These companies use fishing nets such as the *Boolo* and *Gujo*, which cause significant damage as they catch small fish or minnows which are then used for chicken feed.

“We have no option other than to leave this area permanently, but where and how can we afford to purchase new homestead land” said a respondent. During field work in 2005 we met a person known as “Doctor”, who was a health technician. He was the only person with a motorbike and “clinic” in a small shop who was providing health treatment in all big and small hamlets inside *deh* Bablo. He was believed to be the only well educated person in the village and was a good story writer in the Sindhi language. Doctor drew a demographic map of the delta on my field diary in which he clearly mentioned Manhoru and Korangi creeks and mouths from Karachi to Seer mouth in Badin near Indian Kuchh. His demographic map resembled Tremenheere’s historic maps. During 2005 some of his family members had migrated to Ibrahim Hyderi Jetty in Karachi but Doctor had stayed in his ancestral village.

However, Doctor was not in the village in 2011. “He is gone from here permanently. Recently his mother died and he buried his mother there in Karachi” his relative told us. “Yes, we believe if a

family chooses another destination and intend to bury their deceased there than that family may be counted as a permanent migrant” he continued.

A respondent from an empowered Mallah kinship group we met in 2005 told us that not one outsider researcher or NGO worker had visited *deh* Bablo before, with the exception of some political leaders and female health workers. His family was active in the Pakistan Peoples’ Party and facing their opponents Sherazi Syed families associated with the Pakistan Muslim League (Quaid-e-Azam). During our second meeting in 2011 he told us that all of his family members had shifted to Karachi and all their children were studying in Karachi. He further revealed that a number of NGOs were present who played a role in service delivery, infrastructure development, employment and micro-credit. For example, Pakistan Fisherfolk Forum (PFF) in Kharo Chan had mobilized poor fishing communities to fight for their rights. The government, in cooperation with local advocacy organisations, has introduced some safety networks for fishing communities and has provided direct access to fish catch, nets, and boats. Another nationally operational social protection cash transfer programme for poor women was launched by Pakistan Peoples’ Party’s government called Benazir Income Support Programme (BISP) in 2008. There are a fair number of women beneficiaries in our research site.

“There are around 200 BISP beneficiaries here. Our women don’t go to receive money but we send a person who collects money from the post office in Baghan”, said a respondent from a BISP beneficiary household. The government has also introduced cash transfer modalities such as smart and debit cards for women’s direct access.

The respondents, during qualitative field work in 2011, were apprehensive about a mega project launched by the current provincial government of Sindh led by Pakistan Peoples’ Party. This mega project is named as “Zufikarabad Mega City” operational under Zufikarabad Development Authority (ZDA) along the coastal strip of the Indus Delta⁶. This mega project will seize around 1.3 million acres in four deltaic Talukas including Kharo Chan of District Thatta. Some environmental experts say that more than two-third of the land used for this mega city project is under a sea intrusion threat⁷ while others are of the view that no such study on environmental impact assessment for the mega project is done according to the

⁶<http://zda.gos.pk/> accessed on 2nd Feb 2013.

⁷<http://www.thenews.com.pk/Todays-News-13-19680-Zufikarabad-project-environmental-threats-being-reviewed> accessed on 2nd Feb 2013.

Pakistan Environmental Protection Act 1997⁸. The indigenous communities always view the mega projects as a conspiracy against their identity and for their forced evictions from their homestead lands. A series of mega projects including some controversial projects were launched by last military government in Balochistan, especially for the coast of Gwader (Budhani and Mallah 2010).

The respondents in inland and island *dehs* of the area fear for their leased or occupied government agricultural lands with no secure entitlements. The farmers and landlords are worried if they will get plenty of compensation for their land with no secure tenure. Poor tenants, landless individuals, families and communities in inland and island villages are worried about their homestead land with no secure tenure or entitlements. The marginalized sections of the population are also hoping for increase in employment opportunities and an alternative to having to move to Karachi. The landed elite are hoping for heavy compensations for their land that was acquired for the mega city project.

“Under a secret agreement the land of Sokhi *deh* has been sold to America and the government wants to displace all poor and indigenous communities from here. That is why the government is not ready to allow fresh water in the delta”, said an NGO worker.

A political worker said that “this government has roots in all types of ethnic groups in their political constituencies. Therefore, there is little chance of forced evictions or displacement against no compensations. The ruling party has struggled a lot against unfair sharing of Indus waters in the past”.

People who were depending on agriculture directly or indirectly owned large number of domestic animals and pasture lands. Mangroves and other shrubs were the main grazing sources for their animals.

“There is no electricity, supply of gas or drinking water in all three island *dehs*. We use shrubs and mangroves as cooking fuel and buy drinking water cans. Now some NGOs have controlled cooking fuel and animal grazing resources. Yes, we will allow those NGOs to protect or grow more mangroves but only if they will provide us with substitute resources and infrastructure”

a social and political worker revealed.

⁸<http://dawn.com/2012/08/27/zulfikarabad-or-indus-delta-revival/> accessed on 3rd Feb 2013.

7. Conclusion

The protection of environmental and climate change migrants or refugees and the debate on the legal framework of refugees' rehabilitation is a matter of major concern for international humanitarian as well as development oriented organizations. But there is little focus on gradual or slow-onset disasters and there is little ethnographic research work in the regions under severe permanent threats because of environmental and climate change. Although most developing countries have signed international conventions on the protection of environmental and climate change migrants and refugees, there is no or little background research for a wider understanding with right to use of resources by the marginalized sections of population of these coastal and deltaic disaster zones.

In developing countries like Pakistan, India and Bangladesh where basic social and economic inequality has been is well researched through class, caste, religion and ethnicity lenses but less ethnographical work on existing social inequality and its correlations with environmental and climate induced migration.

Identification of socially marginalized sections through population surveys, particularly in environmental and climate hazardous regions, targeted social protection programmes such as BISP and residential land allotments are believed to be potential instruments of social protection reforms.

Social science researchers' contribution to climate change and global warming science may prioritise linking existing social inequality with induced or voluntary migration in both, temporary or permanent disasters cases. The Indus Basin's controlled fresh water flows might be potential for perennial agricultural products and vital for food security but water management, environmental experts and pro-development national and international organizations need to regard the indigenous habitants of the coast and the Indus Delta's ecology.

Disputes regarding Indus Waters between India and Pakistan and upper and lower riparian provinces of Pakistan, the demand for construction of more dams and political movements against mega dam projects are ongoing simultaneously. A high decline in fresh water flows in Indus Delta is a contentious issue for water and environmental experts in the region. The evidence from historic, geographical and ethnographic research and evidences and perceptions from diverse community groups and individuals provide an authentic viewpoint that gradual and rapid decline in fresh water flows in Indus Delta is main cause of sea intrusion. However, the main disadvantageous groups are those who are socially marginalized, asset-

less, with poor networks in urban residential and commercial markets and are therefore, more vulnerable to this slow-onset environmental disaster.

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