

**Socioeconomic Study and Proposal for
Livelihood Improvements:
Badin and Thatta Districts, Sindh, Pakistan**

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Acronyms and Abbreviations

ADB	Asian Development Bank
AWB	Area Water Board
CARW	Creation of Assets for Rural Women
CIF	Community Investment Fund
DCO	District Coordination Officer
EDO	Executive District Officer
FAO	Food and Agriculture Organization
GDP	Gross domestic Product
GOP	Government of Pakistan
GOS	Government of Sindh
HANDS	Health and Nutrition Development Society
ICZM	Integrated Coastal Zone Management
IUCN	International Union for Conservation of Nature and Natural Resources
LBOD	Left Bank Outfall Drain
MAF	Million Acre Feet
NCHD	National Commission for Human Development
NGOs	Non Governmental Organizations
NIO	National Institute of Oceanography
NRSP	National Rural Support Program
OFWM	On Farm Water Management
PEPA	Pakistan Environment Protection Agency
PFF	Pakistan Fisher Folk Forum
PMU	Project Management Unit
RBOD	Right Bank Outfall Drain
SCDRP	Sindh Coastal Rehabilitation Project
SRSP	Sindh Rural Support Program
SPO	Strengthening Participatory Organizations
SUPARCO	Space and Upper Atmospheric Research Organization
TMA	Tehsil Municipal Administration
WAPDA	Water and Power Development Authority
WWF	World Wide Fund for Nature

GLOSSARY OF LOCAL TERMS USED

<i>Deh</i>	A little bigger than a village. Equivalent to a <i>Mauza</i> in Punjab. Several Goths constitute a <i>Deh</i>
<i>Goth</i>	The smallest unit of settlement which can be equated with a hamlet or village.
<i>Dhand</i>	Shallow water lakes formed in a depression.
<i>Hari</i>	Tenant or peasant
<i>Kamdar</i>	The supervisor or manager for the large landlord who supervises the tenants and makes on the pot decision for the absent landlord.
<i>Katcha</i>	The area adjoining the river which used to bring the fertile silts and was highly prized for cultivation. Title for this land was not traditionally allocated to anyone and in theory it was used on a first come first served basis.
<i>Kharif</i>	Summer cropping season
<i>Rabi</i>	Winter cropping season
<i>Seth</i>	Wealthy or influential owner.
<i>Taluka</i>	Administrative tier below the district.
<i>Zamindar</i>	Landlord

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EXECUTIVE SUMMARY

1. Extreme weather events and natural disasters have persistently plagued the coastal areas of Sindh, especially the Badin and Thatta Districts. In addition to the natural disasters, these two districts have also suffered as a result of inequity in water distribution and inability of existing infrastructure to drain surplus water during heavy rainstorms. Reports prepared by UN Agencies (FAO, WFP) suggest that the impact of these natural calamities has been severe for the low income and vulnerable groups and resulted in a general disruption in livelihoods, increased their vulnerability and, in some cases, led to out-migration.

Overview of Coastal Districts

2. The current combined population of the districts of Thatta and Badin is estimated to be around 2.26 million. Participatory assessments in the area indicate that as much as 86 percent of the population in the districts see themselves as poor and only 10 percent perceive of themselves as non-poor. However, the people with the most threatened and vulnerable livelihoods are the people along the coastal areas. Overall, about 1.2 million people or 44% of the population of the two districts live in the coastal *Talukas*. In terms of households, this would mean about 175,000 to 200,000 households depending upon the size of the household.

3. In the past, these coastal villages used to rely on multiple sources of income depending upon the household resource ownership. While fishing formed a major part of their livelihoods, crop farming was also a key component as each family had access to some land which they cultivated on a subsistence basis. The first diversion of livelihoods from crop and livestock farming towards the fishing sector coincided with the decrease in the fresh water flows in the Indus Delta. These changes forced the agricultural communities to shift their livelihoods to fisheries. Livestock ownership was an additional strategy for supplementing household consumption needs and as a store of value. Wood cutting enabled households to meet their fuel needs as well as supplement incomes for the poorer households. The decrease in water availability and increase in salinity was a source of pressure on all the diverse livelihoods. The choice that was once available to households gradually diminished and increasingly households became dependent upon one or two sources of income. Fishing, the single most important source of income for many families become highly unreliable with much lower returns than were possible a decade or so ago. There is significant out-migration, especially, from the coastal areas of Thatta as a result of the shortage of drinking water and disruption of livelihoods.

4. It is assessed that there has been a significant change in the fishing sector in the last few decades. The number of fish species, which were in abundance, has now declined; however, the number of fishing boats have increased and there is increased mechanization in the sector. Threats to fisheries come from pollution of fresh water lakes and creeks and change in the system of regulation of fishing.

5. Agriculture is largely underdeveloped. Due to the flood irrigation system, acute water shortage and inadequate system of drainage, the cultivable land has degraded to a varying degree causing a threat to food security and incomes and, employment of the farming community, particularly of small landowners and *haris*. Eighty one percent of the households interviewed in the survey did not report income from agriculture. Only 11 percent of the households earned more than 80 percent of their income from agriculture. Wood cutting and wage labor contributed 12% and 10%, respectively. In addition, about 62% of the households were reliant on a single source of income. Farmers in coastal areas traditionally keep a few heads of livestock. This situation has changed and the capacity of local households to own and maintain livestock has diminished considerably. The household survey indicated that there is a considerable degree of concentration in livestock ownership. It is reported that 68

percent of the coastal communities have no livestock and 29 percent of the households own between 1 to 10 large animals. Livestock in the district suffers in particular from shortage of feed and fodder crops as a result of the overall shortage of water.

6. Land ownership is highly skewed and more than 80 percent of the land is owned by only 9 percent of the households in Badin District. The data on income of surveyed households by the household survey team shows that 70 percent of the households were earning less than Rs. 4,000 per month. Less than two-thirds of the population in the two districts is literate. There are sharp differences in the literacy ratios by sex and area. Health facilities and infrastructure are quite inadequate in the two districts. There is a high incidence of infant and maternal deaths. The household survey revealed that 54 percent of the households reported fever or some minor ailment within the last two weeks.

7. The two districts are limited in terms of their access to water supply and sanitation. Only 26 percent of the people included in the survey had access to water supply from within the village. While 70 percent of the people were not paying for the water, at least 28 percent reported having to pay for their water supply. In some areas like Keti Bander and Shah Bander drinking water was being purchased at a high cost from private tankers by all the households and lack of access to drinking water was one of the principal reasons that households out-migrated. Electricity is available to about one-third of the housing units. More than 80 percent of the housing units in the two districts were using wood as cooking fuel. Only about 1/3rd of the residents have a separate sanitation facility.

Vulnerability of Livelihoods

8. Vulnerability in the coastal areas is caused as a result of several factors, the most important of which is poverty. The Badin and Thatta Districts of Sindh have experienced four disasters in the last five years, namely, a cyclone in 1999, drought in 2000, earthquake in 2001 and drought and floods in July 2003. A Food and Agriculture Organization/World Food Program (FAO/WFP) mission estimated that more than 500,000 people live in the most severely affected areas in Badin and Thatta Districts.

9. The household survey conducted as part of this socioeconomic study indicated that 82 percent of the people had suffered a reduction in their income as a result of shortage of water, lack of government interest, and decrease in fish price, in the order of importance. While no rigorous assessment has been made of the carrying capacity of the coastal districts of Sindh in terms of people and livestock, it appears that the original capacity has rapidly diminished, particularly in Thatta due to lack of fresh water along the delta. Badin's carrying capacity might be better than Thatta, but is affected by the overflowing of the drains, the pollution of the sweet water dhands and the effluents that are drained into the district.

10. The households met during the focus group discussions reported lack of health and educational facilities and, a dire need for drinking water as important issues that need to be addressed immediately. They did not have sweet water to plant crops or sweet water in their ponds for breeding fish. They also reported lack of fodder for livestock. People reported major inequities in the distribution of rights for fishing between large contractors and local fishermen and also referred to the inequitable pattern of land distribution and water allocation which had led to extreme hardship for them and impacted their capacity to earn their livelihoods.

Key Coping Mechanisms

11. Among the principal coping mechanisms of the poor in the coastal areas in dealing with disasters include the following:

- The immediate short-term response is reducing their food consumption. The poor spent more than 80 percent of their income on food. As a result, one of the first adjustments made by them is in their food consumption;
- Households had absorbed the shocks through the sale of livestock;
- Seeking wage employment was also immediate and short-term and medium term actions taken by households;
- Incurring debt is a key coping mechanism for both the farming and fishing communities, particularly for *hari* families who have very limited capacity to deal with any reduction in current production;
- While the government has a Program of social transfers through its system of *Zakat* and *Bait-ul- Mal*, this did not figure in the coping strategies of the households. Very few households encountered during the household survey reported actually receiving these transfer payments; and
- Seasonal and permanent migration is another key coping strategy.

Institutional dimensions

12. The governance framework in Badin and Thatta Districts is identical to what prevails in the rest of the country. Devolution places greater responsibility for planning and implementation at the local level. However, this capacity is limited. There is lack of funds to implement economic and social development projects. A large share of the district government's budget is for staff salaries and therefore, in practice, the District Government can only decide on the allocation of a small fraction of the budget for development. A Sindh Coastal Development Authority (CDA) was established in 1994 through an Act of the Provincial Sindh Assembly for the development of the coastal areas of Thatta and Badin only. However, CDA also faces a capacity and resource constraint, to play an active role in the socio-economic development of these areas.

On-Going Development Initiatives

13. The Government has undertaken measures to address the problems of people affected by disasters as well as repairing the damages to infrastructure affected by floods, cyclone and earthquake. In response to the drought of the last few years, the government has provided funds for relief operations, waived land taxes, postponed the recovery of loans, provided subsidised wheat, mobilized medical and veterinary teams to the areas. A wide range of short, medium-term measures such as the construction of roads, installation of pipeline water scheme, electrification and public work programs were implemented. Despite all these measures, the steps taken by government are far from adequate. Most measures have had a limited impact on rural livelihoods and most affected households feel that the Government has done little to ameliorate their suffering or provide basic services.

14. Many donors responded quickly and provided relief measures when the disasters occurred. Some donors like the Asian Development Bank (ADB) and the World Bank have long-term assistance programs in the province and some of them have activities in Badin and Thatta. The ADB has on-going projects (Sindh Rural Development Program and the Sindh Devolved Social Services Program) which provide overall budgetary support for investment in the social sector. ADB is also considering an Integrated Coastal Zone Management project. USAID is implementing several projects in the education sector. The World Bank has undertaken several initiatives in the province such as the On-Farm Water Management Project and the Pakistan Poverty Alleviation Fund (PPAF). The PPAF is designed to provide micro-credit through Partner Organisations as well as provide assistance for community infrastructure projects.

15. There are a large number of NGOs working in Badin and Thatta Districts. These organisations have all types of orientations ranging from relief and rehabilitation, welfare, social sector, livelihoods improvement, development of economic infrastructure, provision of micro-finance, advocacy and awareness raising, etc. Some of the key agencies include the National Rural Support Program (NRSP), the Sindh Rural Support Program (SRSP) and the National Commission for Human Development (NCHD). An NGO which has become active in the coastal areas is the Pakistan Fisher Folk Forum (PFFF). The capacity of these local NGOs to undertake sustainable development Programs is generally limited. Most of them are small welfare oriented organisations, which do not have the experience and the capacity to provide services. They work on a small scale and generally do not have strategies that are likely to contribute to sustainable increases in incomes or livelihoods.

Proposed new development initiatives

16. A new project is proposed to address some of the constraints faced by communities in the coastal area. The objective of the proposed project is to improve livelihoods of the people residing in the coastal areas through promoting:

- (i) better access to basic services and facilitating infrastructure;
- (ii) higher income generation through improved production and marketing of saline agricultural crops, fisheries and livestock;
- (iii) secure access to, and better management of the coastal area natural resources;
- (iv) viable community organizations that can operate in partnership with the public and private sector and NGOs; and
- (v) improved access to high quality education, information, training and better nutrition and health.

17. It is proposed that the project be focused on the 175,000 to 200,000 households who live along the coast in the eight Talukas of Badin and Thatta District, out of the 11 Talukas.

18. The project, which is estimated to cost US\$ 13.5 million, would have the following major components:

(a) *Community investment fund component (CIF) - \$10.0 million*

19. This is a fund that can be accessed by Community Organizations (COs) for services and infrastructure that are their priority needs. Through the use of this fund, coastal communities that are identified to be poor will be the direct beneficiaries. There will be full participation in choice and decision regarding the interventions to be put in place in the communities. Participating Organizations (POs) with experience in social mobilization will be selected to work in the coastal Talukas and would assist in the organization of communities, preparation of action plans and, when approved, in implementation and operation of the sub-project activities. The fund will be used to finance any community infrastructure or services not included in a *negative list*, which will be prepared during project preparation.

20. Interventions that will be supported under CIF, among others, include:

- (i) Mobilization of Community Organizations (COs)¹ where such organizations do not exist and, strengthen existing ones in order to promote demand-based development initiative and for getting active community participation and

¹ The Community Organizations (COs) could be Community Citizen Boards (CCBs), Fisheries Associations or other form of associations that will be organized for the purpose of carrying economic and social activities in the coastal areas.

ownership; training and orientation of the key office bearers and members of COs;

- (ii) *Advisory services in saline agriculture*, i.e., dissemination of plant and crop varieties that Pakistani researchers and researchers from other countries have identified as suitable for saline water agriculture;
- (iii) *Social Services*: construction of primary schools and health centres; mobile clinics wherever it is feasible: equipment and furniture, teaching materials, books and operating expenses; reconstruction of residential houses for those households whose houses were destroyed by flood and cyclone;
- (iv) *Water supply and sanitation*: functioning water supply schemes and promotion of hygiene and sanitation;
- (v) *Community - based fishery management*: includes assistance in training, management of fishing facilities, introduction of concept of community-based coastal resources management, preparation and implementation of fishery management plan, development of local fishing regulations and licensing and enforcement mechanism;
- (vi) *Support for coastal aquaculture*: assist the COs involved in fishery to explore the potential for high value marine products such as shrimp, mussels, etc.;
- (vii) *Construction of wharfs/jetties, provision of fishing boat and improvements in landing fish*: rehabilitate and construct wharfs and small jetties, on selected landing centres; provide essential infrastructure such as water supply, offices and small storage facilities; to improve fish landing, each landing centre equipped with a chilled store; ice maker with store and fish store;
- (viii) *Support for improvements in marketing and processing*: streamlining the marketing chain to create value for COs involved in fish production and marketing; provision of marketing facilities; assist in establishing fish processing plants or facilities;
- (ix) *Rural road and rural electrification*: upgrade existing road networks and construct new roads; increase access to electricity to improve living conditions, improve the delivery of basic social services such as health, education and water supply and, spur economic development in the area.

(b) *Mangrove rehabilitation and ecosystem management (\$2.00 million)*

21. This component will develop a program of protection and development of the mangrove forests and the delta ecosystem in collaboration with coastal communities. POs such as IUCN and WWF-P and, Government Departments such as Sindh Forest Department will take the lead in the effort to rehabilitate the natural resources along the coast.

(c) *Project management and monitoring and evaluation (US\$ 1.5 million)*

22. This component will support the PMU-that will be created to coordinate the implementation of the project. The PMU will have a competitively recruited Project Coordinator and key staff and will coordinate activities between stakeholders during the implementation of the project.

23. There are ongoing IDA supported operations in Sindh that can be closely linked to the proposed project in order to maximize the benefit for the targeted communities. Particularly, the On-Farm Water Management Project that has the objective of improving the efficiency, equity and reliability of irrigation water distribution can be refocused to support Badin and Thatta to access and utilize water efficiently. The PPAF that aims to alleviate poverty and empower the rural and urban poor by providing them with access and services can also play a critical role. It supports poverty alleviation programs run by NGOs, thereby, increasing incomes of poor households by providing loans and technical support; empowering the poor, especially women; increasing access of the poor to physical infrastructure in order to improve their livelihood opportunities. Through this project the microfinance requirements of the beneficiaries of this project could be met.

Implementation Arrangement

24. Arrangements for the implementation of the project will be through multiple channels in order to respond quickly to the needs of the communities and at the same time to create ownership and to ensure sustainability. These are:

- (i) *Partner organizations (POs)*. There are several NGOs currently operating in the two districts and providing services at the grassroots level (Annex 3). These NGOs are specialized in one or more sectors or sub-sectors. The most experienced of the POs will be selected and contracted to organize COs, help in the preparation of action plans and, when approved, help in implementation. The implementation arrangement that is used by PPAF will be readily used for purposes of quick project start up.
- (ii) *Private sector contracting*. Sub-projects identified by COs and Local Governments will be contracted out to private sector for implementation;
- (iii) *Provincial and local government departments*. There are certain interventions that are best carried out by public sector departments and these will be assigned to the respective departments through implementation agreement signed with the PMU.

25. At the Provincial level, the Planning and Development Department (P&D) will be the focal point for project implementation. A committee chaired by Additional Chief Secretary, P&D, with membership drawn from the relevant departments will oversee and guide the project and ensure coordination among key stakeholders. A PMU will be established and will be responsible for day-to-day management and coordination of the project. The PMU will have a competitively recruited Project Coordinator and key staff and, will work closely with provincial line departments, local governments, POs, COs and the private sector. At the district level, there will be a Steering Committee chaired by the DCO, with EDOs and TMA *Nazims* (representatives) as members. The PMU will be member of the committees both at the provincial and district levels.

Sustaining livelihoods and the project interventions

26. Are the proposed interventions and the anticipated improvements in livelihoods sustainable given what is currently known about the root causes of vulnerability in the coastal areas? Will the interventions have lasting impacts on poverty and vulnerability of the coastal communities? To answer these questions in the affirmative, there is a need to develop an implement numerous environmental and socio-economic programs, which are outside the scope of this study to discuss or analyse these issues. However, the study has identified what it considers as critical actions to make coastal livelihoods sustainable.

27. First, there should be recognition of the uniqueness of the coastal area in that it is prone to natural calamities and people in these areas are highly vulnerable. While totally

avoiding damages and losses from such calamities can be difficult, it can be significantly reduced by making sure the infrastructure already in place is well maintained and managed; making the necessary improvements in anticipation of likely disasters; educating people how to react/respond to emergencies; creating awareness about the likely disasters that could hit the area and establishing an early warning systems.

28. Second, a minimum environmental flow of the Indus to the delta would have positive impact on the environment and livelihoods. The Indus delta has a unique biodiversity and natural resources built up by the discharge of large quantities of silt washed down from the mountain ranges of the north. The two districts have large communities that depend on the delta for their livelihood in one-way or another. The absence of flow into the delta has affected agriculture, livestock and, most of all, fisheries production - major sources of livelihood of these communities.

29. Third, correcting inequity in water distribution and delivering a reasonable volume of water to the tail end of the system is critical for sustainability of the livelihoods and the proposed interventions. Badin and Thatta are at the tail end of the Indus irrigation system. By virtue of their geographic location, they receive the maximum level of drainage effluent and very little irrigation water. The population living along, and close to, the coast suffers, as they are the tail of the tail. Without improvement in the availability of water, the livelihood interventions will have limited impact and, correcting this deficiency and inequity is necessary to get the most out of the interventions in the medium-term.

30. Fourth, correction of the deficiencies that has been observed in the drainage infrastructures on technically and economically sound criteria should be given priority lest a similar disaster occurs and creates havoc again. At the same time, responsibilities for management of drainage systems should be given to an institution along with technical and financial capability to operate and maintain the system.

Looking beyond

31. Looking beyond the immediate and medium term problems and their possible solutions, what appears to be a logical and sustainable proposition is ***planning and implementing a coastal area development program that aims to integrate the economy of this area with the rest of the economy and create new livelihood opportunities***. As noted in the study, coastal communities are isolated. Basic infrastructure and social services are limited. Most residents are without assets and migration in search of wage labour has become a way of life to many. The natural resource base is degraded and reversing this trend would be difficult, if not impossible, given the development momentum and the acute shortage of water in the country. It is therefore intuitive that closely integrating the coastal economy with the rest of Pakistan and with the developed parts of Sindh (Karachi and Hyderabad) would be the way to address the problem in the long run. For this to happen, it is important to develop a strategic plan and articulate the kind of policies, programs and actions that would lead to the achievement of this goal.

1. Introduction

Background

1.1 Extreme weather events and natural disasters have persistently plagued the coastal areas of Sindh, especially the Badin and Thatta Districts and adversely affected them over the last ten years. Preliminary reports prepared by UN Agencies (FAO, WFP) suggest that the impact of these natural calamities has been severe for the low income and vulnerable groups and resulted in a general disruption in livelihoods, increased their vulnerability and, in some cases, led to out-migration. In addition to these natural disasters, these two districts have also suffered as a result of inequality in water distribution and lack of basic social services and infrastructure. This has further aggravated the harsh living conditions and the extreme poverty that characterizes the coastal areas of these districts. In view of this situation, the Government of Sindh (GoS) and the World Bank commissioned a socioeconomic study in December 2004. This report presents the findings of this socioeconomic study and makes recommendations for a livelihood improvement intervention in the two districts. Panel of International Experts has carried out another study that reviews the ecological, hydrological and water quality-monitoring data in the LBOD outfall area and they are expected to issue a report on their findings shortly.

1.2 The main aim behind the socioeconomic study is to highlight the social and economic impact of the natural disasters, identify the most vulnerable segments of the population, understand their coping strategies and recommend interventions that improve livelihoods. The study has thus attempted to identify the target groups to be assisted and proposed a Program of assistance that is able to mitigate the combined effects of the disasters. The current assessment also includes a review of the initiatives undertaken by the Government, donors and NGOs. The study sets the stage and defines the parameters for further detailed inquiry, suggests broad directions for a livelihood improvement assistance Program and identifies potential constraints to such an assistance Program. The livelihood improvement assistance Program focuses on interventions aimed to expand the income and resource base of the poor in a sustainable manner and improve their access to services.

Methodology

1.3 The study used a mix of qualitative and quantitative methods and worked with both secondary and primary information. At the outset, the study utilized secondary data to develop a socio-economic profile of the area and attempted to understand the impact of the natural disasters and extreme weather conditions on the productive potential of the area. Secondary sources of information were collected from some of the key players in the area such as the Government of Sindh, the International Union for Conservation of Nature and Natural Resources (IUCN), World Wide Fund for Nature (WWF-P), UN Agencies, ADB and key NGOs in the area such as the PFF and the RSP. The review of existing information provided a good database to sketch the socio-economic profile of the districts.

1.4 In addition to the review of secondary information, key informants such as community members and leaders, NGO representatives and district government functionaries in the area were also interviewed. Rapid appraisal and focus group discussions were conducted in each *Taluka* with groups of villagers. Smaller meetings were also held with the more vulnerable segments of the population such as fishing communities, wage labourers, women, etc., for a better understanding of vulnerabilities, coping strategies and potential coping mechanisms. Interviews were also held with communities who had migrated from these districts over the last forty years and are now settled in the coastal areas of Karachi such as Ibrahim Haideri and Rehri. While a majority of the population in the district is Muslim, there is a sizeable non-Muslim minority in these districts. A special effort was made to assess if these minority groups face special problems and vulnerabilities. Interviews with women

often result in a very open, frank and fresh perspective and the survey team ensured that special meetings were held with groups of women.

1.5 The team reflected upon the utility and feasibility of conducting a household survey. It was assessed that given the timeframe it may not be possible to conduct a very extensive or detailed household questionnaire. However, since household level analysis was likely to reveal some very useful information on the socio-economic profile of a household, its exposure to vulnerability and its coping strategy, it was felt to be a particularly important instrument for analysis given that previous assessments of the impact of disasters in these areas have been generalized. As a result, it was decided to administer a small and very specific household questionnaire comprising of a sample size of 300 households from the Thatta and Badin Districts.

1.6 A team of three enumerators was used to undertake the administration of the questionnaire. The data was cleaned and organized on a specially written Program on excel and analyzed with the help of a two member team. The questionnaire was field tested in selected areas and modified as required. From the sample, 100 questionnaires were administered in the two coastal Talukas of Badin (Badin and Golarchi) and 200 questionnaires were administered in the six coastal Talukas of Thatta. These questionnaires were administered in the most vulnerable areas of the Talukas and were generally confined to the coastal areas. The selection of the coastal areas was premised on a rapid appraisal which suggested clearly that the livelihoods in the coastal areas were the most vulnerable with some of the poorest communities concentrated along this area.

2. Overview of Coastal Districts

Historical Context

2.1 The districts of Thatta and Badin are located close to Karachi, provincial capital of Sindh, which is the largest city in Pakistan and is a bustling port. The Badin District of Sindh is one of the richest districts in terms of its natural resource base as it produces 45% of the total crude oil production in Pakistan. However, it is one of the poorest in terms of human development. These two districts have been unable to capitalize upon their proximity to Karachi and benefit from the natural resource base. There has not been any major infrastructure development, although in recent years, there has been commercial and industrial investments, which local government officials claim has little impact on employment creation for the poor in the coastal areas.

2.2 The coastal nature of these districts brings with it both advantages and disadvantages. These districts have enjoyed a rich history in the past, particularly Thatta. The name of Thatta points to this rich history as the name derives from the Persian term *Tah* which literary means layer-over-layer. According to the revenue report of 1897, the land of this region was very fertile and the areas of Shah Bander, Keti Bander, Karochan and Mirpur Sakhro had a rich productive potential. These delta lands produced red rice which was not only sufficient for the region but was also exported. The gazetteer of Karachi from 1929, reports that the rice crop was grown on such vast areas that it was not possible for the local people to harvest the crop. Boats full of people from the Kathiawar Region of India used to come to harvest the crop. The region was covered with mangrove forests and timber was exported to Muscat, Aden and the Kutch peninsula. The harbours of Keti Bandar and Shah Bander used to be full of boats from around the region. Along with these historical advantages come a great many disadvantages and these two districts suffer particularly because of their location at the Southern most end of Pakistan.

2.3 The Indus Delta used to be one of the largest areas of arid climate mangroves in the world and was assessed to be the seventh largest delta. It is built up by the discharge of large quantities of silt washed down the Indus River from the Karakorum and Himalayan mountain ranges. The Indus Delta occupied an area of about 600,000 ha, consisting of creeks, mudflats and mangrove forests between Karachi in the north and Rann of Kutch in the South. There were 17 major creeks making up the original delta that was characterized by many minor creeks, mud flats and mangrove forests. With the increased abstraction of water up-stream, the quantity of silt reaching the delta is drastically reduced, thus, affecting the natural livelihood resources of the Delta.

2.4 Historically, fresh water flows to the delta have been about 150 Million Acre Feet (MAF). In recent years, even though 10 MAF per annum was agreed under the inter-provincial accord, the flow below *Kotri* has been far less in any given year.² The Indus River used to bring with it silt which was rich in nutrients. These rich silt deposits were the main factor behind the fertility of the area along the banks. However, the construction of dams and barrages has reduced the silt from reaching the river downstream. Furthermore, the flow of the Indus was preventing seawater intrusion onto the lands along the coasts in the delta region. Today, the coastal eco-system of the delta is under stress from seawater intrusion and an increase in salinity. Many areas along the coast have been inundated and the livelihoods of the fishing and farming communities along the coast are under pressure.

2.5 The reduction of fresh water flows in the Indus River and over exploitation of the natural resources has also badly hit the mangrove eco-system of the Indus Delta. The coastal

² The Indus Treaty between India and Pakistan, which allocated three rivers to India is also a factor for the decline in fresh water flow to the sea.

mangrove creek systems are shallow and nutritionally rich, providing an ideal habitat for a variety of marine animals, fish and shrimps. Mangroves and their associated tidal flats provide habitat for crabs, oysters and other species. Coastal people also use mangrove forests as a source of fuel-wood, timber and fodder extensively. Local communities gather mangrove leaves for cattle, buffalo and donkey fodder. Herds of camels were left to browse on the many mangrove islands along the coast. Mangroves depend upon a steady supply of fresh water to keep the salinity levels within certain limits. The mangrove system of the Indus Delta is thus under stress from the high sea water salinities resulting from the reduction of freshwater input to the delta from the Indus. The Indus Delta mangroves used to occupy 345,000 hectares along the entire Sindh Coast. Recent estimates show that the area of mangroves is now only 160,000 to 200,000 hectare due to lack of fresh water as well as over exploitation.³

2.6 In Badin, lack of irrigation water to support traditional livelihoods and, at times of heavy rain storm, inability of the surface drainage network to evacuate drains adequately has been an issue. There has been considerable sea water intrusion and salinization of the land along the coast, and flooding of cultivated fields during heavy rains. This has led to, degradation of soils and damage to fresh water lakes and fisheries. Communities living in close proximity to this network of drains question the utility of the system and the equity of accumulating and flooding them with the effluents from the upper parts of the province.

Population Dynamics and Profile

2.7 The current combined population of the districts of Thatta and Badin is estimated to be around 2.26 million.⁴ A detailed annex on the socio-economic profile of the districts and main aspects of their physical features and availability of other facilities is given in *Annex-1*. Participatory assessments in the area indicate that as much as 86 percent of the population in the district sees itself as poor and only 10 percent perceive of themselves as non-poor.⁵ However, the people with the most threatened and vulnerable livelihoods are the people along the coastal areas. The population along the coast is difficult to estimate as there is no system in place that tracks the movement of this population. For this study, a good starting point is to take the official population estimate for the coastal Talukas. There are six coastal Talukas in Thatta and two in Badin. The coastal Talukas in the Thatta District have a population of 619,980, which is 48 percent of the total district population. The total population of the coastal Talukas of Badin is 519,824 which is about 40 percent of the total population of the district. Thus, overall about 1,129,704 people or 50% of the population of the two districts live in the eight coastal Talukas. In terms of households this would mean about 175,000 to 200,000 households depending upon the size of the household. The average annual population growth in the coastal Talukas is estimated at about 2.2% per annum.

Table 1: Estimated Population in the Coastal Talukas of Badin and Thatta

Coastal Talukas	1998	2005
Badin District		
Badin	270,361	313,144
Golarachi	180,170	206,680

³ Sikander Brohi. Fisheries Livelihoods in Pakistan. Pakistan Fisherfolk Forum. 2001.

⁴ Estimated for 2005 on the basis of historical growth rates in these districts using the 1998 Census data as the baseline.

⁵ NRSP Survey in Badin.

Thatta District		
Mirpur Sakhro	175,176	203,840
Ghorabari	105,482	120,344
Keti Bunder	23,187	27,000
Shah Bunder	87,174	98,936
Jati	116,175	132,848
Karochaan	25,666	29,012
Total	983,391	1,129,704

Source: 1998 Census Data and projections.

2.8 According to the 1998 census, 53 percent of the population in Badin District was male and 47 percent was female. The percentage of children below 10 years was 33 in the two districts. Between 12 to 16 percent of the population of the two districts was urban and the rest resided in rural areas in a large number of small and scattered settlements or *Goths* and *Dehs*. The population of the two districts is predominantly Muslim at about 80 percent. The most important among the minorities are Hindu (Jati) who comprise 19 percent of the population. Average household size in the two districts was reported to be just over 5 in 1998. For urban areas the household size was reported to vary between 6 and 6.4. This information contrasts sharply with the household survey administered as part of this socioeconomic study which reveals that the household size in the two selected districts is larger than that reported in the last census and that 76 percent of the households have more than 6 household members.

Table 2: Average Size of Household in Badin and Thatta

Number of Family Members	Number	Percentage
0-5	66	22
6-8	171	57
9-11	58	19.3
12-15	5	1.7

Source: Household Survey Data - January 2005.

Migratory Trends

2.9 The data on migration in the periodic census reports only in-migrants and does not provide any information on out-migration. This leaves a very important aspect of the demographic profile of the districts outside the scope of analysis and it is difficult to estimate the extent in spite of verbal reports that there is a substantial out-migration from the coastal areas. In 1998, the total in-migrants in the two districts were estimated to be about 2 percent of the population. The main reason for in-migration was marriage, business and transfer. While census data shows an overall increase of population in the coastal areas of the two Districts, survey interviews with households, government officials, NGOs, and community representatives indicate that there is an out-migration that is both seasonal and permanent in character. While some offsetting may be taking place between in and out migration, there seem to be some inconsistency between census data and survey data which should be further explored.

2.10 Interviews with coastal communities indicated that most of them go seasonally for harvesting of rice. They leave behind only 2-3 persons, usually elders to take care of the

village. The people from Badin District generally go to Golarchi or Badin town while people from Thatta District go to other Talukas of the district like Sajawal and Gharo. They usually go from 15 days to a month. The major work that they do is harvesting of paddy crop and sugarcane. The wages are paid in kind for rice and the amount that each person gets is sufficient for about two months for the family.

2.11 The households surveyed also pointed out that while out-migration has been going on for a long time, there was an increase in the last four years coinciding with the extreme weather events and natural disasters in the area. Nearly 27 percent of the households reported migration from among their families between 2000 and 2004. Most families that migrated relocated to Golarchi and Karachi followed by Badin and other locations. A principal problem with relocation is the availability of land on which to settle. While Karachi is a favourite location for resettling due to its potential for work, the problem is the shortage of land along the coast in and around Karachi. In 57 percent of the cases of out-migration, the entire family moved out; in 31 percent of the cases, only part of the family moved out while in 4 percent of the out-migrations this was seasonal in nature. From among the families that out-migrated, one-third find daily wage labour, one-third undertake farming in another location, one-fifth are engaged in fishing while the rest undertake other types of work (See paragraph 3.20 and 3.21 for further discussion). The principal reason for out-migration is lack of drinking water and health facilities.

Table 3: Year and Place of Migration

Years	Number	Percentage
No migration	189	63.0
1980-1990	14	4.7
1991-1999	15	5.0
2000-2004	82	27.3
Place of Migration	Number	Percentage
Golarchi	40	36.0
Badin	18	16.2
Karachi	38	34.2
Others	15	13.5

Source: Household Survey Data - January 2005.

Sources of Income and Livelihoods

2.12 In the past, these coastal villages used to rely on multiple sources of income depending upon the household resource ownership. While fishing formed a major part of their livelihoods, crop farming was also a key component as each family had access to some land, which they cultivated on a subsistence basis. Livestock ownership was an additional strategy for supplementing household consumption needs and as a store of value. Wood cutting enabled households to meet their fuel needs as well as supplement incomes for the poorer households. As a result of decrease in water availability and increased salinity there has been a pressure on diverse type of livelihoods. The choice that was once available to households is gradually diminishing and households are increasingly becoming dependent upon one or two sources of income. Along the coast, fishing has become the single source of income for many families. In addition, this source of income has become more unreliable with much lower returns than were possible a decade or so ago.

2.13 The first diversion of livelihoods from crop and livestock farming towards the fishing sector coincided with the decrease in the fresh water flows in the Indus Delta after the commissioning of various barrages, reservoirs and dams on the Indus River.⁶ Before the

⁶ Resource Person. IUCN. December 2004.

construction of these dams and barrages, the delta area was crisscrossed by the distributaries of the Indus. The discharge from the river was large enough to push back the ocean currents from the shore. Due to large volume of fresh water and the silt brought by the river, the delta was good agricultural land. According to records of the *Patwari*, rice was the main crop and there was surplus production that was exported to the coastal regions of India and the Gulf. However, with the reduction in fresh water flow, major ecological changes took place and agriculture is no longer the main source of livelihood.

2.14 According to a recent survey,⁷ sea intrusion has inundated more than 1.2 million acres of farmland in the coastal areas of Thatta and Badin Districts. According to the same survey, seawater has intruded as far as 50 km in the sweet water channels downstream Kotri Barrage rendering thousands of acres of farmland saline. These changes forced the agricultural communities to shift their livelihoods to fisheries. A majority of the communities who were previously engaged in agriculture and livestock grazing in the coastal regions have shifted their livelihoods towards the fisheries sector, resulting in greater pressure on this sector as source of livelihood in the coastal areas of Sindh.⁸ Similarly, traditional merchant clans in the coastal areas dealing with the purchase and sale as well as export of agricultural produce have also converted their livelihoods to the fisheries sector.

2.15 The household survey conducted in the coastal areas indicated that, at present, 65 percent of the households along the coast depend upon fishing as their main source of income. Farming is a source of income for another 20 percent of the households and regular employment and wage labour for 6 percent and 5 percent of the households, respectively. About 4 percent of the households did not have primary occupation and source of income and have to rely on extended family and other secondary activities such as wood cutting . In addition, about 62 percent of the households were reliant on a single source of income. Supplementing income through wood-cutting and wage labour are important sources and provided additional income for 12 percent and 10 percent of the households, respectively. Farming supplemented incomes for only 9 percent of the households, livestock for 2 percent and shops for another 2 percent of the households surveyed.

Table 4: Main and secondary Occupation of Surveyed Households

Main Occupation of Surveyed Households		
Profession	Number	Percentage
Unemployed	11	3.7
Fishing	195	65
Crop and Livestock Farming	59	19.7
Regular Employment	19	6.3
Daily Wage Labour	16	5.3
Secondary Occupation		
Profession	Number	Percentage
No Secondary Occupation	185	61.7
Wood cutting	35	11.7
Labour	31	10.3
Shopkeepers	7	2.3
Livestock	6	2
Farming	26	8.7
Others	10	3.3

Source: Household Survey Data – January, 2005.

⁷ Sikander Brohi. Fisheries Livelihoods in Pakistan. Pakistan Fisherfolk Forum. 2001.

⁸ Environmental Degradation and Impacts on Livelihoods: Sea Intrusion. A Case Study. Sindh Program Office. IUCN. May 2003.

Overview of the Fishing Sector

2.16 The Sindh Coast is about 350 kilometres in length and extends from Karachi to the Indian Border. Characterized by a broad continental shelf and a coastline marked by a maze of creeks and mangrove covered mudflats of the Indus River Delta. The Sindh coast serves as nursery grounds for many fin and shellfish species. A large number of the fishing communities are settled along the coastal creeks of the Indus Delta in many small and big villages. The fishing population in this province is reported to be living in no more than one dozen big and hundreds of small settlements and villages in Karachi, Thatta and Badin Districts. Fishing is the key source of livelihood for these coastal communities. While not all families own boats, the people get together in small groups of 5 to 10 and use the boat that belongs to one of them or to a local *seth*. The fishing catch is divided between the owner of the boat and each crewmember. The *seth* receives a share not only for the boat but also for the engine and the net. The captain receives one or two shares and each of the *Khalasis* working on the boat receive one share each.⁹

2.17 Overall, the fisheries sector provides employment to about 300,000 fishermen directly and another 400,000 people are employed in ancillary industries. During the years 2000-2002, the total fish production in Pakistan was recorded as 665,000 metric tones, out of which the share of marine fisheries was 480,000 metric tons while the contribution of inland fisheries was about 185,000 metric tons. Out of the annual marine fish exports of Pakistan worth US\$100 million, about 10 percent originate from the Badin coast. While Thatta provides a major share of the catch as well, the exact figures from this area could not be ascertained. From the total fish production of 80,659 metric tons in Sindh in 2002, about 14,512 tons or 17.5 percent was supplied by Badin.¹⁰ There has been a significant decrease in fishing catch due to sea water intrusion in the area. The brackish water fishing resources are quite significant in Badin District. In Sindh, the major inland catch of fish comes from the Indus River and its canals followed by its lakes such as Manchar Lake and Kinjhar Lake.

2.18 It is assessed that there has been a significant change in the fishing sector in the last few decades. Before 1977, it is reported that the fishing industry was operating in a sustainable manner. There were few fishermen and fishing was considered a subsistence livelihood source and there had been little commercialization of the sector. The coastal fishing waters of Badin and Thatta were free from any governmental control and the fishing communities, through traditional ways administer and regulate fishing practices. These waters were considered as a historical livelihood source of the fishing communities and were protected. In the last thirty years, the Government has pursued a policy of actively investing in infrastructure of fisheries and encouraging export earnings from the sector. Under the deep sea fishing policy, fishing activities were further formalized by awarding fishing licenses to about 29 long liners and deep sea fishing trawlers. As a result, there have been a significant number of new entrants into the sector. The number of fishing boats have increased manifold and there is increased mechanization in the sector. According to the agriculture statistics of 1998-99 more than 20,000 various types of boats and trawlers were being used to exploit the marine resources of the country. More than 17,000 small and big fishing boats are engaged in inland fisheries.¹¹

2.19 Although at the government level it is widely held that the coastal resources of Pakistan are still untapped and need greater mechanization and a larger fleet, the indigenous fishing communities report major decreases in the fish catch. They also claim that a number of fish species which were in abundance in the past have now become extinct. There are

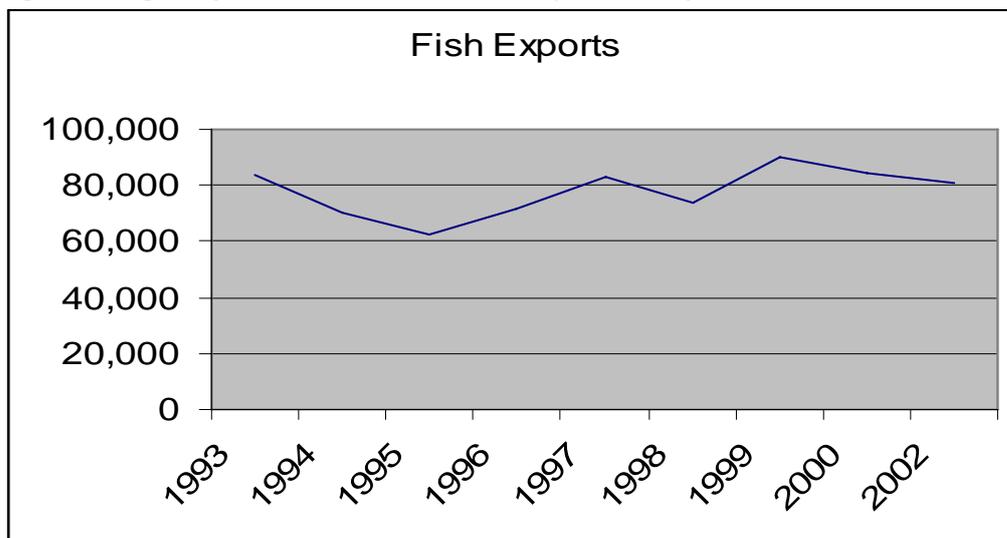
⁹ Sikander Brohi, April 2004.

¹⁰ State of Environment and development of Badin District. IUCN Pakistan. 2004.

¹¹ Sikander Brohi. Fisheries Livelihoods in Pakistan. Pakistan Fishfolk Forum.

reportedly two major indications of decrease in the catch of coastal fisheries in Pakistan - considerable reduction in the catch of some fish species and little growth in overall catch despite increase in the fishing fleet.¹² Official figures also confirm a drastic decline in the catch of big size shrimps. According to the Marine Fisheries Department, the landings of the large shrimps came down by almost half from 10,000 tons in 1971 to a mere 5311 metric tons in 1998. During the last ten years, the valuable *jaira* shrimp catch declined roughly by 47% and the *kairi* shrimp catches by 18%. Another fish, whose catch has drastically reduced over the years is *Palla*. The decline in this fish has been caused by the construction of barrages on the Indus River and decline in the Indus water flow. *Palla* was reported as the single largest specie of fish accounting for 70% of the total catch in the past. Currently it constitutes only 15 percent of the total catch. During the last ten years, the export of fish, shell fish and fishery products *have remained more or less the same in spite of significant increase in deep sea fishing and increase in boats and trawlers.*

Figure 1: Export of Fish, Shell Fish and Fishery Products from Pakistan



Source: Directorate of Marine Fisheries. Karachi 2001.

2.20 In recent years, Government policy and institutional factors in both coastal and inland waters has displaced the small fishermen. Under the Pakistan Constitution, jurisdiction over the sea is shared between the federal and provincial governments. Fishing up to 12 miles in territorial water is a provincial subject. The remaining area in the 200 miles of the Exclusive Economic Zone (EEZ) is solely under federal jurisdiction. The Federal Ministry of Food, Agriculture and Livestock, announced a deep sea fishing policy in 1995, which divides the coastal area beyond the provincial limits of 12 nautical miles into two zones. Under this policy the fishing rights for zone 1 (12 to 35 nautical miles) was reserved for traditional fishermen and Zone II (35 to 200 nautical miles) was reserved for fishing by trawlers under license to be issued by the Ministry . A recent revision of this policy has created a third zone from 0 to 12 nautical miles and now only this has been reserved for traditional fishermen while giving extensive licenses to medium sized deep sea trawlers instead of community fishermen.

2.21 Additional threats to the inland fisheries come from pollution of *dhands* and change in the system of regulation of inland fishing. The Indus Delta creeks and *dhands* receive agricultural affluent containing pesticides from the drains and are affected due to the intrusion

¹² Sikander Brohi. Fisheries Livelihoods in Pakistan. Pakistan Fishrfolk Forum.

of sea water and lack of fresh water flow, thus, threatening the fish production in the Badin District.

2.22 The system of auction under which the government sells the fishing rights on the *dhands* and creeks poses another challenge. Previously, a system of licensing was in place under which a fisherman had to pay a small annual license fee. This system was only for the fresh water inland resources and fishing in coastal areas only needed the registration of the boat. A few years ago, the contract system replaced the license system, which displaced the small fishermen from inland fishing. Under this system, fishing rights were auctioned by the Sindh Fisheries Department and given to large contractors. The large contractor engaged the small fishermen on terms and conditions acceptable to the contractor. These arrangements have worked to the detriment of the small fishermen.

2.23 The control of local fishermen was further eroded when in June 1977 the Rangers (a wing of the Pakistan Military that patrols the border with India) were allowed fishing rights in some key areas close to the international border on the payment of an annual fee. Over the years, the rights of the Rangers were extended to cover many more lakes and water bodies. The Rangers in turn started auctioning their fishing rights to large contractors and small fishermen were driven away from their traditional fishing grounds. The Sindh Fisheries Act of 1980 specifies that in case of auctioning of the fishing rights of any fishing ground, the fishermen fishing in those waters are only bound to provide $\frac{1}{4}$ of the fish catch and are free to sell the rest of their catch wherever they want. In many cases, the local fishermen are allowed to sell only to the contractor on prices specified by the contract. There is a wide margin between prices in Karachi and those received by the fishermen. In September 2004 a protest was launched in Badin against the Rangers possession of the fishing grounds and this became a major national issue. The Government has now promised that the fishing rights would be transferred back to the communities and action is being taken to address this problem.

2.24 The management of the fisheries sector by the government is another major issue for the coastal communities. Despite the fact that the coastal region is a source of livelihood for a large population and is important for the preservation of the ecology and bio-diversity, the government lacks a comprehensive and integrated coastal management plan. It is well established, that the fisheries, mangroves and coral reefs in the coastal and deltaic area depend upon each other for their collective survival. However, these resources are not dealt with in an integrated fashion. The mangrove forests are looked after by the Sindh Forest Department, the fish resources are under the Fisheries Department of the Government of Sindh and water resources are handled by Sindh Irrigation Department and by the Federal Government.

Overview of the Farming Sector

2.25 Sindh's economy is relatively industrialized with agriculture contributing 23 percent of the provincial GDP. It is estimated that 80 percent of the rural population depends upon agriculture and its allied businesses. In 1990, Sindh accounted for 16 percent of the agricultural farms in Pakistan and for as much as 34 percent of the number of tenant farms. Agriculture in the province is largely underdeveloped. Per acre yield is about 30-40 percent of the potential production. Due to the prevalence of traditional systems of irrigation, the cultivable land has degraded to a varying degree causing a serious threat to food security and incomes of the farming community particularly of small landowners and *haris*.

2.26 The situation is much worse in Badin and Thatta as a result of the degradation of the natural resource base. Agriculture production has suffered as a result of reduced water flows in the Indus. According to WAPDA, during 2000-2001, the total water released was 0.72 MAF-and in 2001-2002 it was 1.92 MAF. This flow was for a short period in the *Kharif* season and there was no flow in the *Rabi* season. There are reports that the sea has intruded

34 km to 100 km deep in some areas. Half of Keti Bunder and Shah Bunder Talukas have been badly affected. Furthermore, two Tapas in Taluka Ghorabari, two Tapas in Taluka Jati and four dehs in Taluka Mirpursakhro have lost their productivity due to intrusion of sea water. In Karachan Taluka, at least three tapas have lost their fertility due to sea intrusion.¹³

2.27 Like in the rest of Pakistan, there are two main agricultural seasons. The main crops grown in the district in the *Rabi* season are wheat, barley, gram and oil seeds. In *Kharif* the main crops grown are rice, maize, millet and *Jowar*. Lack of irrigation water limits the amount of land that can be cultivated. Rice is the main crop of the districts. The other crops grown are sugarcane, cotton, wheat and barley. Close to the coastal areas, the kinds of crops grown are very limited. As one move further away from the coast, the kinds of crops grown increase and there is adaptation and diversification towards crops that are salt water tolerant. In the saline coastal areas, sunflower has become a major crop, replacing sugarcane that demands a lot of fresh water. In addition, vegetables such as carrot, radish, onion and tomato are also grown. In Thatta District, the banana crop is commonly grown under saline soil conditions.

2.28 Further away from the coastal areas, a comparison of the area under different crops between 1998 and 2002 in Badin District shows that the cultivation of rice, sugarcane and wheat has gone down while the area under cotton has increased, prompted by the considerable price liberalization in the last few years leading to higher prices and greater production incentives. Although there is no empirical evidence, it is reported that producer, particularly, small farmers and *haris*, find it uneconomic to grow most of the crops, mainly due to the adverse terms of trade for agricultural products, water logging and salinity.

2.29 While the farming sector provides a major source of employment and incomes for the people in the two districts, in the coastal communities, the reliance on crop-farming is much lower than in other parts of the districts. The household survey indicates that in the coastal areas, 81 percent of the households earned no income from agriculture and only 11 percent of the households earned more than 80 percent of their income from agriculture. An assessment was made of the diversification in agricultural production systems for different categories of farmers. An analysis of the degree of differentiation in agricultural production between the poor and the non-poor shows that the poor not only tend to be landless or small landholders and work under special contracts of share cropping, they also have more difficulty in managing risk, and being unable to diversify their production.¹⁴

Table 5: Contribution of Income From Agriculture in H.H income

Proportion of Income from Agriculture	Number of Respondent Households	Percentage of respondents
0%	244	81.3
20%	12	4.0
40%	1	0.3
60%	6	2.0
80%	4	1.3
80% or more	33	11.0

Source: Household Survey Data - January, 2005.

¹³ Concept Clearance papers for Ravages of Sea Intrusion in Thatta and Badin Districts. Irrigation and Power Department. Government of Sindh. 2004.

¹⁴ Poverty in Pakistan in the 1990s: An interim Assessment Summary of the Report. World Bank. January 2002.

Livestock Sector

2.30 In coastal Sindh, most farmers traditionally keep few heads of livestock, ranging from bullocks for draft to bullocks or cattle for milk and poultry for eggs and meat. There have been many traditional communities in the coastal areas exclusively dependent on livestock for their livelihoods. However, the importance of livestock as source of income has declined over the years. Livestock population estimated at 12 million in 1998 in Badin District declined to 860, 000 after the 2003 floods due to disease and sale of animals as a coping mechanism. Between 57 to 60 percent of the livestock was held as large animals and 40 percent was small animals such as goat and sheep. The household survey indicated that there is a considerable degree of concentration in livestock ownership. It is assessed that 68 percent of the coastal communities have no livestock. About 29 percent of the households own between 1 to 10 large animals while 3 percent own more than 11 cattle. Poultry is reared in small commercial farms and also kept at home in small flocks.

Table 6: Livestock Ownership Pattern for Large Ruminants

Number of Livestock	Households Reporting Ownership	
	Number	Percentage
0	205	68.3
1-10	87	29.0
11-20	8	2.7

Source: Household Survey – January 2005.

2.31 The livestock numbers have been particularly affected as a result of the decrease in the flow of the Indus. Livestock in the district suffers in particular from shortage of feed and fodder crops, resulting in overall shortage of water. The government has veterinary hospitals, dispensaries and veterinary centres in the district but the service has deteriorated in the last decade. Shortage of professional staff, vaccines, deep freezes with the poultry development office and lack of feed mills were reported as the main constraints to poultry development.

Asset Ownership

2.32 More than half of the rural population in Pakistan is landless, while about 2.5 percent of landowners control over a third of agricultural land, in holdings that exceed 50 acres.¹⁵ The land ownership pattern in Sindh is more skewed than it is at the national level. Overall, 64 percent of the rural households in Sindh are landless.¹⁶ In 1980, 77 percent of the households in Sindh reported not owning irrigated land.

2.33 The landownership pattern in the coastal areas of Badin and Thatta is worse than the situation for the province as a whole. More than 80% of the land is owned by only 9% of the households in Badin District.¹⁷ Furthermore, over 65% of the rural households are landless and more than fifty percent are tenants who work on share cropping basis.¹⁸ The household survey conducted in the two districts shows that about 88 percent of the households do not have irrigated land holding. Field work carried out by ADB¹⁹ in five districts that included Badin, Dadu, Mirpurkhas, Thatta and Umerkot indicates that households spend close to eighty

¹⁵ Land Tenure, Rural Livelihoods and Institutional Innovation: Haris Gazdar, Ayesha Khan and Themrise Khan. May 2002.

¹⁶ Gazdar et al.

¹⁷ Impact Assessment Baseline of District Badin. Dataline Services (Pvt) limited. Undated. Probably 1993-94.

¹⁸ Saline Agriculture. Situation Analysis in Badin... Pakistan Atomic Energy Commission and the National Rural Support Program. December 2001

¹⁹ A Pro-Poor Development Project in Rural Pakistan: An Academic Analysis and a Non-Intervention. Journal of Agrarian Change. July 2002. Kristoffel Lieten and Jan Breman.

percent of their annual income on food. A similar study carried out in preparation for the Sindh Rural Development Project²⁰ showed that wheat and rice were purchased by 65 percent of the households in the districts of Thatta and Badin for consumption. This leaves little room for other consumption and asset creation as most families are unable to meet their daily subsistence needs.

Table 7: Irrigated land Ownership in 2004

Land Ownership (Acres)	Respondents owning Land	
	Number	Percentage
0	265	88.3
1-10	30	10.0
11-20	1	0.3
21-30	2	0.7
41-50	2	0.7

Source: Household Survey Data - January, 2005.

Employment and Incomes

2.34 The economically active population²¹ in the Badin District was estimated at 18 percent of the total population and 27 percent of the population aged 10 years and above. There is a wide variation in activity rates between males and females as it is 33 percent for males compared to the quite negligible 1.76 percent for females resulting in an overall low participation rate. A high rate of un-employment at 14 percent has been recorded in the district. It varies for males and females as well as for rural and urban areas. The un-employment rate for males is high at 15 percent compared to only 2 percent for females. The low participation and un-employment rates for women clearly indicate that women are generally missing from official statistics. In Thatta District, the economically active population is 25 percent of the total population and 37 percent of the population aged 10 and above. A high unemployment rate of 18 percent was recorded in Thatta in 1998.

2.35 The percentage distribution of employed persons by employment status indicates that 64 percent of the labour force is self-employed.²² Majority of male workers, i.e. 67 percent, are employed in agriculture. About 30 percent of urban males are employed by the private sector compared to only 9 percent rural males. About 17 percent working females are employed in the government sector in the urban areas compared to only 4 percent in rural areas.²³ However, in the coastal areas, a majority of the people are involved in fishing with farming and wage labour as important secondary sources of income.

2.36 The data on income of surveyed households by the survey team shows that 27 percent of the households were earning less than Rs. 1,000 per month (\$0.45 per day) and can be classified as extremely poor. About 48 percent of the households were earning between Rs. 1,100 and Rs. 4,000 per month (\$0.50 - \$2.20 per day) and also fall below the poverty line (Rs 6954). Only 18 percent of the households earned between Rs. 4,000 and Rs. 8,000 and only 6 percent of the households earned more than Rs. 8,000 per month per household in the

²⁰ Household Survey Report. Raasta Development Consultants and Agrodev Canada Incorporated. February, 2000.

²¹ The economically active population comprises the persons of either sex who are engaged in some work for pay or profit including un-paid family helpers. Not working but looking for work as well as those laid off.

²² District Census Data. 1998.

²³ Ibid.

two districts. The *Table* below shows the proportion of households in Thatta who had monthly average per capita incomes in five major categories.

Table 8: Estimated Income of Surveyed Households

Income (per month)	Number	Percentage
Rs.0-1,000	82	27.3
Rs.1,100-4,000	145	48.3
Rs.4,100-8,000	55	18.3
Rs.8,100-12,000	14	4.7
Rs.12,100-16,000	4	1.3

Source: Household Survey – January, 2005.

Enterprise and Industrial Sector

2.37 Many industrialists have taken advantage of the close proximity of the large market and port facilities in Karachi and located themselves in these two districts. From the industrial point of view Thatta District has made good progress. There are about 30 industrial units established in the district. Apart from the sugar mills, all the larger industrial units are located in Dhabeji and Gharo adjacent to Karachi. Most of the labour in these units is generally non-local and commutes from Karachi. Badin District is reputed to be a sugar estate. Presently there are six large scale sugar mills which provide employment to over 6,000 persons. In addition, there are about 70 rice husking and milling units in the Badin District. Recent additions to the industrial units are the car manufacturing plant near Budho Talpur, belonging to the Deevan Group adjacent to the Deevan Sugar Mills in Thatta District. The group also employs non-locals in large numbers

2.38 Badin District produces more than 30,000 barrels per day of crude oil, which constitutes 45% of the total crude oil production in Pakistan. However, the district government does not benefit from this natural resource, as the local government do not collect royalties. It is also reported that the local communities do not substantially benefit from the employment generated from this industry as only about 5 percent of the permanent and tenure track employees come from the local communities. Other natural resources exploited from the districts include the stone from the Makli Hills and Kohistan which is supplied to the Pakistan Steel Mill and the Thatta Cement Factory. There are also large coal deposits in the Thatta Taluka.

Social Outcome Indicators

2.39 Poverty is high in Sindh, especially in Badin, Thatta and neighbouring Tharparker districts²⁴. Alongside the presence of large manufacturing, finance, and private sectors in Karachi, rural Sindh is characterized by weak social services, large gender disparity, landlessness, and high dependence on the public sector. Whereas 19 percent of urban Sindhis are poor, as many as 37 of rural Sindhis are poor, which is higher than Pakistan's average of 33 percent. Within Pakistan, Sindh has the largest rural-urban gap and the largest social gap in human development. It has the highest per-capita incomes, but its human development indicators in rural areas are among the worst in Pakistan²⁵.

2.40 The poverty profile of households in Sindh suggests that the typical poor household lives in rural areas, has little assets or land, depends on wage income, and has a significantly large household compared to the average poor in Pakistan. The poor also tend to be employed

²⁴ The definition of poverty is in terms of the Calorie Based Approach which Defines the poverty line as the minimum expenditure required to achieve a daily intake of 2250 calories per day.

²⁵ Sindh Structural adjustment Credit Project. Program Document. World Bank. May, 2002

mostly in the informal sector in the urban areas and as agriculture wageworkers in the rural areas. In rural Sindh, the concentration of poor is the highest among households where the head is an unpaid family worker, sharecropper, or owner-cultivator owning less than 2 hectares of land and has poverty headcounts of 60 percent, 50 percent and 40 percent, respectively.²⁶ The poor suffer from low quality public services, especially in rural areas. They have relatively low access to safe drinking water and sanitation facilities. They are less likely to use closed sources of drinking water, have toilets in the household, and be connected to a drainage system.

2.41 In terms of the socio-economic profile of the two districts, less than two-thirds of the population is literate. There are sharp differences in the literacy ratios by sex and area. The male literacy ratio was nearly three times higher at just above 32 percent compared to around 12 percent for females in 1998. The ratio in urban areas was more than double at 45 percent compared to 20 percent in the rural areas. Of the total educated persons, 35 percent had passed primary, 13 percent middle and 13 percent matriculation. After matriculation, the percentage falls steeply to 6 percent for intermediates, 3 percent for graduates and less than 2 percent for post graduates. More recent data showed that Thatta had an adult literacy rate of less than 20 percent in 2003, while Badin had a literacy rate of between 21 to 30 percent.²⁷ The households surveyed during the diagnostic survey in the two districts reveal a picture which is consistent with the census data and the district rankings. It shows that in 2005, 61 percent of the population in the two districts along the coast had no schooling at all. Only 21 percent of the population had between 1 to 5 years of education while the rest had access to higher levels. There is lack of schools in these areas. Even where schools exist they have no teachers.

Table 9: Years of Schooling of Surveyed Households

Years of Education	Number	Percentage of respondent households
0	183	61
1-5	64	21.3
6-10	37	12.3
11-12	14	4.7
13-14	2	0.7

Source: Household Survey – January, 2005.

2.42 There is a high incidence of infant and maternal deaths in rural areas. The household survey revealed that 54 percent of the households reported fever or some minor ailment within the last two weeks. While the public sector is expected to be the main provider of services, the private sector is becoming an increasingly important player. However, the private sector is almost exclusively concentrated in urban areas and the quality of service provision is subject of much discussion. In the public sector, the sanctioned staff strength is not all in place and many of the staff positions are vacant. Even where staff is allocated, there is a high degree of staff absenteeism and lack of medicines and supplies. In Badin District, the population per doctor is estimated to be 5,428 persons and there is one hospital for every 240,020 persons and one bed for 7,776 patients. In Thatta, three out of the six coastal Talukas do not have Rural Health Centre. The Basic Health Units and dispensaries are also in small number. It is estimated that there is one dispensary with one compounder for about 5000 people in the coastal Talukas. Government facilities are not appropriate for the scattered nature of the population and they are inadequately equipped and staffed. Thus many of the people have no access to health services within a convenient location from their homes. This

²⁶ Sindh Structural Adjustment Credit Project. Programme Document. World Bank. May 2002.

²⁷ District Rankings by the Sustainable Development Policy Institute. UN, World Food Program. 2003.

has left room for a lot of untrained people posing as health care providers who establish camps and deliver an uncertain quality of service.

Physical Infrastructure

2.43 While the occupants own a large majority of the houses, many do not own the land on which they are constructed. As a result most of the houses have a makeshift appearance. According to the 1998 Census, less than 15 percent of the housing units in the two districts were *pucca* units. Two-thirds of the housing units were constructed with wood and bamboo. More than 78 percent of the housing units in Thatta District and 82 percent in Badin District were one room houses. There is great pressure on the existing housing infrastructure judging by the persons per room and household size. More than half the housing units were constructed at least 10 years ago. Furthermore, there is considerable over-crowding in houses, which are poorly constructed and inadequate as a structure. The current household survey team found that there has been no improvement in the housing stock. In fact, natural disasters further eroded the housing stock in the area and a large number of homes in the coastal areas were destroyed as a result of the floods of 2003.

2.44 According to the 1998 Housing Census, the facility of piped water inside the house was available to 14 percent of the housing units in the two districts. There is a wide divergence in this facility in urban and rural areas. About one-third of the housing units have this facility in urban areas compared to around 10 percent in rural areas. Hand pumps inside the house were available to around 13 percent of the housing units in the two districts. Hand pumps, wells and ponds were almost equally being used as a source of drinking water outside the housing units in the selected districts. About 16 percent used outside ponds for fetching water and 6 percent of housing units used dug wells. Being at the tail end of the Indus River system, Thatta District was facing the worst ever fresh water crisis due to non-release of water in the river.

2.45 In the coastal talukas, only 26 percent of the people included in the survey had access to water supply from within the village. Of the remaining households interviewed, 44 percent had access to water within 5 kilometres of the village while the rest did not have a source within 10 Kms of the village. While 70 percent of the people were not paying for the water, at least 28 percent reported having to pay for their water supply. In some areas like Keti Bander and Shah Bander drinking water was being purchased at a high cost from private tankers by all the households.

2.46 Electricity is available to about one-third of the housing units. There is a wide variation in the availability of electricity in urban and rural areas. It is estimated that about 76 percent in urban areas had access to electricity in contrast to 29 percent in rural areas in Badin District and about 21 percent in the Thatta District. Kerosene oil is used in over 70 percent of the rural dwellings. More than 80 percent of the housing units in the two districts were using wood as cooking fuel. Only 3 percent of the housing units had access to Sui Gas in the district. Only about 1/3rd of the residents have a separate sanitation facility. The residents of units without proper latrine facility use adjacent rural environs.

2.47 Badin is linked with its Taluka headquarters through metalled roads, although most of the road structures need immediate repairs and maintenance. The total length of roads of both high and low type in Badin District was reported to be 2019 kilometres in 1999-2000. The length of the all weather road per square kilometre of geographical area is only 0.30 km which is quite insufficient. The district also has a railway station, which connects Badin with Hyderabad passing through Matli. An airport connects the district with Karachi. The district has good postal and reasonable telephone facilities.

2.48 The Thatta District is linked by road with other districts. National Highway from Karachi to Peshawar passes through Thatta for a length of 200 kilometres. All major towns of the district are connected with metalled roads of 1,585 kilometres length. The district is also connected by the main railway line from Karachi to Peshawar. The principal railway stations are Jangshahi, Dhabeji and Jhampir. The district is also equipped with digital and non-digital telecommunication system besides postage and telegraph.

Social and Political Aspects

2.49 What determines the social interaction among people is the settlement pattern of the rural communities, which is scattered in small villages and, at times, isolated in the two districts. As a result, the coastal communities have a much weaker social network compared to villages in northern part of the province or the country. The people in villages rely very little on common village infrastructure, unlike elsewhere where reliance on a common irrigation channel, or watercourse, or drinking water supply encourages social cohesion. The intensive labour requirements in integrated farming systems in other parts of Pakistan also encourage labour sharing and pooling arrangements that encourage community interaction and cohesion. Among the few in the farming communities, there is greater social and economic differentiation in the two districts. Unlike in communities where land holding is relatively equal and labour is often pooled and shared, in these districts, labour is hired as there is large differentiation between those who own land and those who do not. Thus during harvesting and planting seasons, the farming communities hire labour from among the large pool of landless and unemployed households.

2.50 There is an age old system of share cropping which guides the relationship between the landlord and the tenant or *haris* who are share tenants who till the land of others in exchange for either a physical share of the crop, as in the case of wheat, or a share of the revenue, as in the case of cotton. The *Zamindars* are landowners varying from absentee landlords with large holdings tilled by *haris* and managed by an overseer or *kamdar*. The *haris* are generally illiterate, have limited access to social services, have poor housing conditions and are often indebted to the landlord and many live in conditions of bondage. In Badin, none of the households felt they could leave the employment of the Zamindar without repaying his loan, whereas in Thatta only 23 percent felt they could not leave the employment without clearing their loans.²⁸

2.51 Nomadic *haris* from minority communities are much more liable to undertake seasonal and casual labour. Settled *haris* do not generally engage in this type of labour and prefer to work with one landlord on a more or less permanent basis. These groups of nomadic *haris* are characterized by variations in their patterns of movement and settlement. There is no fixed pattern in their movement, which is dependent upon individual household decisions. They can move on a seasonal basis from farm to farm or settle in one location for an extended period and then move again. The nomadic *haris* from Thar travel to these districts during the harvest season to help local farmers harvest their crop. They often live in thatched straw huts and mostly their entire household moves with them.

2.52 One of the most powerful players in rural Pakistan is the money-lender. In the absence of institutional credit and the hand-to-mouth existence of many of the households, this institution has gained prominence and has become an important mediator of economic transactions. Generally, this role is undertaken by an outsider who has either taken up residence in the community or who commutes on a regular basis to provide and collect loans or by the *Zamindar* or large landlord. The interest costs of these loans are not always apparent and have to be carefully assessed as they are well entrenched in the input and factor prices. For the farming community, the loans are usually provided by the *Zamindar* and for

²⁸ A Household Survey conducted by the Asian Development Bank . 2002

the fishing community they are provided by the middleman or contractor from Karachi who provides loans for purchasing boats, repairing other fishing equipment, purchasing supplies, meeting household consumption needs, etc. Thus, most of the transactions in these subsistence farming and fishing communities acquire the nature of becoming tied transactions where input and output prices are controlled by the money lender which implies much lower profit margins than would otherwise prevail. During the field survey, money lenders and middlemen from other parts of the country were found to be living in some of these communities. While they were performing important functions, the interaction between the buyer and the seller appeared to have little scope for negotiation.

2.53 A large majority of *haris* and fishermen are bonded by debt to the landlord or the contractor. The extent of the bondage varies with the size of the loan advanced by the landlord, usually ranging from Rs 20,000 to more than Rs 100,000. The common pattern is that a small initial debt inevitably grows because the cash equivalent of the crop share received by the *hari* or the fish catch is by and large insufficient to maintain a family and there is a significant amount of inaccuracy in the attribution of production costs to the *hari* or fisherman either intentionally or due to faulty accounting. Thus the debt that may have started with a small advance, increases over time. In the context of Sindh, there are socio-economic characteristics that make some households more prone to the emergence of bonded labour type situations than other groups. Residence on or off the property of the landlord is a major factor that increases or decreases economic and social dependency. *Zamindars* have less control over *haris* who have settled on village land than over those living on their property. The latter category of *hari* is often not allowed to search for wage labour or any other kind of gainful work outside the property of the *Zamindar*. Many of the fishing communities along the coastal areas of Karachi were living on land that was under the control of one or two influential people. Although they did not have legal title to this land, no family could settle here without their permission.

2.54 In the fishing community, the existing informal system of credit is also reported to be exploitative. There are several systems in operation. One system is where a creditor has to sell his catch to the moneylender. According to this system, the fishermen receiving credit from the middlemen for purchasing or repairing a boat or other materials for the fishing are bound to sell their catch to the middleman at a price 20 to 30 percent lower than the market price. Then there is credit from the contractor, or mole holders who are registered with the Fishermen Cooperative Society for auctioning the fish catch of the fishermen. They receive a commission of 6.25 percent from the amount of sale. However the activities of the mole holders have expanded. They have also gradually assumed the role of the moneylender and extend these services to entice the fishermen to bring their catch back to them. These mole holders often charge a higher commission than the official 6.25 percent. There are other sources of credit as well which may be accessed in emergencies from people outside the community at interest rates which can be as high as 10 percent a month.

2.55 Social and cultural factors have played an important part in defining the land and labour arrangements in the agriculture sector in Sindh. The traditional headmen or the *Wadera*, the *Pir* or the religious leader and the *Zamindar* are dominant in major aspects of political, social and economic life in the village.²⁹ In some cases, this predominance leads the headmen to adopt a benevolent stance while in most cases the relationship is characterised as an exploitative one. However, the nature of the relationship is very much influenced by individual personality traits and the social milieu, which generally condones an exploitative nature due to the wide difference in asset ownership, income differentials and literacy levels between the tenants and the landlord. The nature of the relationship is not helped by the limited employment opportunities outside the agriculture sector and wide spread unemployment.

²⁹ Often the *Wadera* and the *Zamindar* are the same person.

2.56 Many of the large *Zamindars* operating in Sindh acquired their land as a result of the property rights granted to them by the British colonial administration for securing their own revenue base and political interests in a colonized country. The process of private ownership of agriculture land initiated by the British was continued after independence. Some of the *Zamindars* also acquired political power by standing in elections and became major players. In selected areas of Sindh the close nexus between religious and spiritual leadership, tribal affiliation and land ownership has placed the large landlords in potentially very powerful positions. This position has been used over the years to consolidate land ownership and accumulate other assets. It is these same large landowners who have been the first to get the requisite licenses and financing for establishing the major industry in Pakistan. This powerful position has been used to defray any attempts at land reform and the implementation of the tenancy act that would give land rights to *haris* in Sindh. The employers in the agriculture sector are in a very powerful positions vis-a vis their employees due to the religious, social and economic influence they wield.

Gender Dimension

2.57 Women's socio-economic profile in the two districts leaves much to be desired. While women have a major share of the work, they have no assets, little income and poor access to social services. Women in fishing communities play an active role in post harvest activities although they are not engaged in fishing directly. Unlike other rural societies there was no veil system for women in the fishing communities. Women had greater role and responsibility in these fishing communities as the men are generally away fishing. However, a large number of agriculture communities have now diverted their livelihoods to fisheries after the agricultural land was affected by the increased salinity and there is noticeable change in the role assigned to women. At one time fishing was considered a family enterprise with men and women and the whole family participating. However, with commercialisation of fisheries, expansion of the fishing into an industry and the over-crowding, women has been slowly and gradually pushed out of the fishing activities.

2.58 At one time, fishing nets were also made by women and were an important source of income for them. However, women have been replaced by industries that produce commercial nets from nylon and plastic. By the early 1970s, artisan fisherwomen were thrown out of the net making business. Today the situation is such that few of the present generation of fishermen have any memories of their women as skilled, paid craftswomen, fashioning fishing nets. With the reduced role in economic activities related to fisheries, the status of women in the fishing communities is on the decline.

2.59 Until the 1950s, female labour was confined to a few specific jobs in agriculture. These were rice planting, harvesting and threshing, wheat harvesting and cotton picking. At present, however, in most places in Sindh, female labour is engaged in almost all agricultural operations. Female casual labour is also hired on a seasonal basis. The gender composition of the working groups depends upon the crop. For cotton-picking, groups of women are hired. For sugar-cane, mixed groups of men, women, children and the elderly are generally hired. For the harvesting of the chilli crop, men and women both work in mixed groups. It was also reported that casual labour was generally hired on a contract basis rather than on normal daily wages. Jobs such as vegetable picking, fruit picking were mostly undertaken on contract basis. Seasonal migration of female labour for cotton picking and harvesting of wheat takes place from Tharparkar District to both Badin and Thatta.

Institutional Analysis

2.60 The governance framework in Badin and Thatta District is identical to what prevails in the rest of the country. Under the Devolution Plan of 2001, the responsibility for the

planning and implementation for all subjects under the jurisdiction of the provincial government have been devolved from the provincial level to the district level. The District *Nazim* heads the local government and is the elected representative. He is assisted by the District Co-ordination Officer who heads all line agencies in the district. There are limited mechanisms for consultation with the coastal or poor farming communities in government programs. Government line agencies have little community orientation or capacity to involve them in the policies and plans being developed for the region. Moreover, there is lack of funds to implement economic and social infrastructure projects. Devolution has not dealt with one of the critical problems in the public sector, which is lack of a performance orientation, high degree of staff absenteeism particularly in the education and health sectors and lack of adequate logistical support. *Annex-2* gives the detailed administrative organisational structure for a sample district.

2.61 As part of the effort to devolve financial autonomy, the provincial government makes a single line transfer to the district government, which is fully empowered to decide how this budget will be used through voting in the District Council. A large share of the district government's budget is for staff salaries and therefore, in practice, the District Government can only decide the allocation of a fraction of the budget for development activities. However, additional funding is also made available under various Programs. In addition to shortage of funds, capacity for financial planning and management is limited.

2.62 An assessment of the financial allocations for Badin and Thatta Districts for the last two years is given in *Table 10*. This table shows that 65 percent of the budget in Badin and 57 percent in Thatta is allocated for salaries. Another 18 percent in Badin and 25 percent in Thatta is allocated for non-salary expenditures. There is generally little allocation for development funds: less than 20 percent of the budget in each district is for development expenditures. Within the salary budget, the education sector takes up between 60 to 70 percent of the allocation as it has the largest number of staff at the district level. However, the critical financial constraint for these districts is that they do not even receive the full budgeted allocations. Last year, the two districts are reported to have received less than one-third of their allocations in certain budget lines.³⁰

Table 10: Budget Allocation for the Coastal Districts (Pak Rs)

Districts/Heads	2003-2004	2004-2005	Percentage
Badin			
Salary	887,695,000	1,073,484,000	65.0
Non-Salary	331,768,000	303,441,000	18.0-
Development	228,000,000	285,000,000	17.0-
Total	1,447,463,000	1,661,925,000	
Thatta			
Salary	820,794,000	903,780,000	57.0-
Non-salary	612,550,000	394,692,000	25.0-
Development	228,000,000	285,000,000	18.0
Total	1,661,344,000	1,583,472,000	

2.63 Additional institutional arrangements have been put in place given the coastal nature of these districts. A Sindh Coastal Development Authority (CDA) has been constituted for the development of the coastal areas of Thatta and Badin. CDA was established in 1994 through an Act of the Provincial Sindh Assembly. It does not have jurisdiction or responsibility for the coastal areas within the territorial zone of the Karachi District. A separate budget line was established in the Annual Development Plan for the Coastal zones. CDA canvases for financial support for the coastal areas and assume the role of a monitoring

³⁰ Interviews with EDO (Finance) in Badin and Thatta Districts. February, 2005.

and evaluation agency with a team of technical expert provide specialist services for coastal talukas. The Authority uses existing line agencies for the implementation of projects and programs.

2.64 Some of the other agencies that are working on coastal issues include the National Institute of Oceanography (NIO), Space and Upper Atmospheric Research Organisation (SUPARCO), Centre of Excellence in Marine Biology, University of Karachi. NIO has 38 scientists among its staff. It works on issues such as global warming and sea level rise, undertakes tidal observations and research on marine and coastal resources, develops GIS for the coast, etc. IUCN Pakistan and the World Wide Fund have been particularly active in the coastal areas. However, the mandates of most of these organisations are quite specific and few and take a broad perspective of livelihood issues.

2.65 The institutional framework for environmental protection was established in Pakistan in 1997 through the Pakistan Environmental Protection Act (PEPA). Environmental Protection Agencies were established at the provincial level and were delegated the powers and functions by the Federal EPA. The Sindh EPA has the primary role for advising and coordinating with government, semi-government organisations, industries and NGOs regarding preventive measures for abatement of pollution and enforcing the National Environmental Quality Standards (NEQS). In practice, these agencies have not played the active role envisaged for them.

3. Vulnerability of Livelihoods

Overview

3.1 The Badin and Thatta Districts of Sindh have experienced four natural disasters in the last five years, namely, a cyclone in 1999, drought in 2000, earthquake in 2001 and drought and floods in July 2003. Similar natural disasters have occurred in the past with varying impact on livelihoods. The shortage fresh water together with salt water intrusion from the sea is changing the geo-morphology of the Indus delta. The drainage infrastructure in central Sindh have lowered and controlled the ground water level in Nawabshah, Sanghar and Mirpurkhas districts, and disposes saline effluents into the fresh water lakes and coastal areas as it passes through Badin.³¹

3.2 The River Indus passes through the center of the Thatta District. There are several sea creeks on both sides of the town. Scanty and erratic rainfall occurs during July to September with an annual average rainfall of 100 to 150 mm. Thatta passed through a heavy cyclone in May 1999, which hit a shore length of 245 kms and damaged the protective bund structure at various sites. From 1999 to 2002, Thatta also faced continuous drought, followed by heavy rains of 2003 that submerged the crop lands and houses.

3.3 In Badin District, the run-off from the prolonged and high-intensity rain-fall in 2003 together with the high velocity canal flows that breached Sani Guni Canal, Phulley Canal, Nasir Canal and other distributaries flooded in lower Badin. To make matters worse, a flow of sea-water from the opposite direction prevented the flood water from draining into the sea. Thus, the flood waters mixed with the sea water accumulated and formed a pool in the thickly populated Talukas of Badin and S.F. Rahu, Golarchi, S.F. Rahu, Tando Bagho, Matli and Talhar.

Extent of Damage

3.4 An estimate made of the cost of rehabilitation of the structural and non-structural damage of the 2003 floods put the cost of rehabilitation at Rs. 4,196 million in Badin and Rs 1,764 million in Thatta. The extent of the damage caused by the floods in 2003 were estimated by a mission organized by the UN agencies (FAO, WFP) and is highlighted in **Table 11**. The extent of the damage was estimated to be much worse in Badin compared with the Thatta District. Similarly, some sectors were more severely affected than others. For example, the agriculture sector was affected more severely than the livestock sector. There was also extensive damage reported to physical infrastructure, particularly housing.

³¹ Needs Assessment for Post-Flood Rehabilitation of Affected Population of Sindh. November 2003. UN Agencies Report.

Table 11: Extent of Damage Caused by 2003 Floods

Description	Badin	Thatta
Area (Sq Km)	17,425	17,355
Population (Millions)	1.136	1.100
Affected Population	366,000	195,000
No of Talukas	5	9
Affected Talukas	3	5
Persons Killed	86	38
Animals Perished	5,462	100
Cropped Area Affected (acres)	226,000	47,000
Houses Fully Damaged	56,000	24,738
Houses Partially Damaged	135,850	74,975

Source: UN Assessment Report. 2003.

3.5 There have been many adverse effects of these natural disasters and the reduction in the flow of the Indus. Parts of the District Thatta, which were previously cultivated are now under seawater. According to a survey carried out by the Irrigation Department and Board of Revenue Sindh, about 1.22 million acres of land in the two coastal districts of Sindh have been degraded as a result of sea water intrusion.³² This means that about 30 percent of the land in these districts has been affected. Sea water has also caused the degradation of the ground water aquifers of the area. The rising salt content of the groundwater has also made it unsuitable for irrigation and the accumulation of salt in the soil has affected yields and overall production. While the ground water was always brackish in all of Thatta District, the fresh water from the river would seep into adjoining areas and dilute the saline ground water. As a result, the brackish water was potable and was used for animals and domestic purposes for centuries. However, the ground water has turned highly saline due to seepage of tidewater to areas both within and outside the flood protective embankments on both sides of the river. Salts have also come up to the surface and surface salinity of soils has increased killing the previous vegetation and making land unfit for cultivation or growing natural grasses. The fallow and waste lands which once were grazing areas have turned into non-culturable wastelands.

3.6 Livestock has been the worst affected as a result of the degradation of the Indus Delta. The deltaic districts of Thatta and Badin were considered as the best grazing grounds for cattle due to their fertile land, green pastures and mangrove forests. Herds of camel were left to browse on the many mangrove islands along the coast. With the lack of grasses, the livestock became physically weak, unproductive and susceptible to disease. Government statistics confirm that sea intrusion has caused a dramatic decline in the number of livestock in the coastal Talukas. This situation was further aggravated by the drought, which affected 66 percent of the livestock in Sindh. The cumulative loss, in the last three drought years, was estimated to range between 10 to 14 percent of the country's livestock population. Heavy direct losses due to animal mortality, production losses and distress sales of animals were widely reported. The proportionate loss in Sindh was much higher than in any other area of the country. *Table-12* below records the decrease in livestock in the Keti Bunder and Gharo Union Council.

³² Irrigation Department and Board of Revenue. Concept Note. 2004.

Table 12: Decrease in Livestock in Union Councils of Thatta

Livestock	1991	1996	2001	(%) Decrease in the last ten years
Union Council Ketu Bunder				
Cattle	36,997	36,020	30,125	19
Buffalo	28,117	27,718	20,127	28
Sheep	21,925	21,400	15,199	31
Goats	27,110	26,606	20,170	26
Camel	1,330	1,108	810	39
Union Council Gharo				
Cattle	1,291	1,119	685	47
Buffalo	1,073	935	693	35
Sheep	1,387	1,231	910	34
Goats	1,433	1,310	839	41
Camel	253	197	105	58
Horse	15	10	8	47
Donkeys	210	160	90	57
Domestic Poultry	2,733	2,227	1,439	47

Source: Livestock census Data and Government of Sindh. 2003.

3.7 A Rapid Assessment Survey and a morbidity and mortality survey conducted by the Aga Khan University in 1987 indicated a high prevalence of communicable diseases in the area, which is attributed to quality of potable water. Households identified the lack of water as major community problem in all the villages visited. This has resulted in increased workload for women and children in the two coastal districts. Many women were now covering longer distances to fetch water as the underground water sources had receded and surface sources had dried up. In many areas, there was increased crowding at the water sources due to decreased water availability. Shortage of drinking water is one of the most serious problems in the region and was named as the number one cause of migration. Water tankers supply much of the water in the coastal areas at a high cost. Small water cans of four gallons is sold at Rs 10 to 20 each.

3.8 The natural disasters and shortage of water has not only caused an erosion of the asset base of farming communities, it has also had an immediate and direct impact on livelihoods. The economic dependence of a large number of people especially those belonging to Jaat communities was on preparing traditional materials of daily use from local bushes, grasses and plants. These items were sold in the urban centres of Sindh. With the reduction in fresh water and the vanishing of these plants, a large number of local people have become jobless. Wage rates have fallen sharply, in some cases, by more than one-half of their 1999 levels, due to the increased number of unemployed people following diminished opportunities within and outside agriculture. This has led to increased indebtedness. Chronic indebtedness is one of the key problems reported in rural Sindh. In many instances, this has led to a situation of bondage, which implicates the entire family for generations.³³

3.9 The household survey conducted as part of this socioeconomic study indicated that 82 percent of the people had suffered a reduction in their income as a result of shortage of water, lack of government support as well as government interference (through Rangers), decrease in fish price paid to them, reduced access to inland waters, overflow of the sea and flooding, in order of importance. **Table 13** below gives the details of the household response to the change in incomes in the coastal areas. Among the factors to which households feel vulnerable, the most often cited were lack of water, lack of credit, lack of schools, poverty

³³ Bonded Labour in the Agriculture Sector in Sindh and Balochistan. International Labour Organisation. 2002.

and lack of health facilities. About 24 percent of the households reported a reduction in their yields due to increased salinity and shortage of water.

Table 13: Reduced Incomes of Households and Increased Vulnerability

Reasons for Reduction in Income	Number	Percentage
No change	53	17.7%
Over flow of sea	14	4.7%
Shortage of water	88	29.3%
Lack of Govt interest	71	23.7%
Ranger force disturb	15	5%
Fish contractor system	12	4%
Decreased fish rates	35	11.7%
Floods	12	4%
Main Factors	Number	Percentage
No Answer	10	3.3
Lack of water	114	38
Lack of schools	31	10.3
Poverty	38	12.7
Lack of health facilities	32	10.7
Provide credit schemes	75	25

Carrying Capacity of the Coastal Districts

3.10 The 250 km of the coast along Thatta and Badin has traditionally supported fisheries, mangroves, which supply wood and fodder and a nesting ground for wild life such the endangered green turtle, dolphins and migratory birds. A total of 200 species of fish and 56 species of birds belonging to 6 order and 14 families have been reported in the Sindh coastal waters.³⁴ While no rigorous assessment has been made of the carrying capacity of the coastal districts of Sindh in terms of people and livestock, it appears that the original capacity has rapidly diminished, particularly in Thatta due to lack of fresh water along the delta. People have responded to the diminishing carrying capacity of land by shifting between different livelihoods, seeking off-farm wage employment and in many cases by out-migration.

3.11 IUCN reports that the ecology and physiology of the richly productive but delicately balanced riverine and deltaic eco-systems are undergoing adverse changes, depleting the biodiversity of these areas. Productivity is on the decline and, in some cases, extinction of species has occurred. The effect on the mangroves can be gauged by the fact that from the original eight species of mangroves only three continue to flourish and from among these only one accounts for as much as 95 percent of the remaining mangrove cover. While the exact reason for this disappearance is not fully understood, experts feel that the lack of downstream flows in addition to pollution are among the prime reasons.³⁵ In addition, a sharp decline in the landing of anadromous fish species, in particular, *Pallah* and *Barramundi* has been observed. The volume and quality of the shrimp catch has also fallen. These developments point towards the persistent degradation of the ecosystems.

3.12 With the degradation of the natural resource base, there has been a persistent decline in the socio-economic conditions of the local communities, rise in poverty levels, malnutrition and the deterioration of people's health in general. The scarcity of potable water is the most significant factor that contributes to the increasing incidence of skin diseases, eye infections and problems with the digestive tract. Lack of drinking water in the coastal areas is one of the most significant causes for out-migration.

³⁴ Coastal and Marine Program. Sindh Program Office . IUCN Pakistan. Sindh Program Office. 2003

³⁵ Ibid. 2003.

3.13 The households met during the focus group discussions were generally very despondent. Many of them did not have any permanent homes and often had to leave their homes in search of work or during flood warnings. The respondents reported lack of health facilities and a dire need for drinking water ponds and storage tanks for water. They could not educate their children due to their transient lifestyles and even those who were settled in one place reported not being able to send their children to school due to the absence of teachers in the schools. They reported lack of health facilities as a result of which they had to travel at considerable expense to faraway hospitals. They did not have sweet water to plant crops or sweet water in their ponds for breeding fish. They also reported lack of fodder for livestock. Even in places where there was previously an irrigation canal, such as “Mir Wah Talar, water did no flow through it any more. Even if the Irrigation Department released water in this canal, it did not reach them because landlords at head reaches use up all the water. People reported major inequities in the distribution of rights for fishing between large contractors, *Rangers* and local fishermen and also referred to the inequitable pattern of land distribution and water allocation which had led to extreme hardship for them and impacted their capacity to earn their livelihoods.

Key Coping Mechanisms

3.14 Among the principal coping mechanisms of the poor in dealing with disasters is the shifting of livelihoods from agriculture to fishing to off-farm work. In addition, vulnerable households reduce their food consumption, undertake sale of assets particularly livestock, search for off-farm employment, incur debt and out-migrate. During the drought years, households had absorbed the shock through the sale of livestock, wage employment, borrowing and the relief measures implemented by the provincial authorities.

3.15 Households incur cost when applying this coping mechanism. In 1999, livestock prices declined by 90 percent compared to 1998. Although, livestock prices have increased in 2001 (due to improved conditions of animals as result of the reduced stock) they had not gone back to the 1998 price level. In Sindh, livestock prices have continued to decline and were lower in 2001 than in 2000.³⁶ There has only been a gradual increase in livestock prices since then. Thus, the drought-affected households had not only lost their livestock, they were also receiving less income from the sale of their animals.

3.16 The drought had also intensified the dependence on migrant wage labour. While households had sent young men outside the village to look for employment, the increased supply of labour had resulted in the decline of wage rates from Rs. 100 per day in June 2000 to about Rs 40-60 in 2001.

3.17 In the same time period, the nominal price of wheat had remained stable as the wheat price was regulated. However, a 50 percent decline in the wage rate and 90 percent reduction in the price of livestock meant that drought-affected households were facing a significant increase in the real price of wheat and other essential commodities. The poor spent more than 80 percent of their income on food. As a result, one of the first adjustments made by them is in their food consumption. Households reported changes in food consumption over the last several years. Many households reported dropping off pulses, meat and milk from their diet. Bread, and in some cases, rice has remained the major dietary components, as they are not often able to afford other foods. In Sindh, households reported consuming chillies, onions and bread. An earlier study reported that the decline in consumption of important food items like milk, meat and vegetables was a major nutrition concern for women and children who already have high malnutrition and anaemia in Sindh. The study also observed that about 42 percent of the children were malnourished, 45 percent of pregnant and lactating women were

³⁶ Needs Assessment for Post-Flood Rehabilitation of Affected Population of Sindh. November 2003. UN Agencies Report.

anaemic while 10 percent of women were severely anaemic. Rural households had higher levels of malnutrition and anaemia compared with urban households.

3.18 Incurring debt is a key coping mechanism for both the farming and fishing communities, particularly for *hari* families who have very limited capacity to deal with any reduction in current production. The *Zamindar* often provides consumption and production loans to the *hari* households and expects that he will provide additional labour services. A survey of selected districts in Sindh indicated that a large number of the *hari* households in Badin were indebted to the *Zamindar* for agricultural loans.³⁷ The *Zamindar* and the shop keepers are also the main source of credit for food items, medical expenses and for other social ceremonies. These loans are extended to the household and women and men both have information about family debts although it is the men who engage in the interaction with *Zamindar* regarding loans. Only in female-headed households do women engage directly in transactions with the landlord. The interlocking nature of these transactions is such that it locks the *hari* and *Zamindar* in a long contractual relationship. While notionally, the *hari* families worked on a half share tenancy basis they rarely got half-shares from the production due to the deduction of input costs and debts. In some cases, the landlord was able to recover the entire harvest as repayment of the *hari*'s share of the input costs, or as repayment of earlier loans.

3.19 Both seasonal and permanent migration was observed in the coastal areas. Most of the residents of the coastal area villages surveyed reported going seasonally for harvesting of rice. They leave only 2-3 people at home usually the elders to take care of the home. The people of Badin District usually go to Golarchi or Badin Town while people from the Thatta District go to the other Talukas of the district such as Sajawal and Gharo. They usually go only for 15 days to a month. The major work they do is harvesting of paddy or the sugarcane crop. After harvesting of rice crop they normally come back with approximately 15 maunds of paddy as wage labor. Reportedly, this paddy was sufficient for two months for each family. Some households reported going to Karachi during the rainy season. They spend about two months there and then return back to the village.

3.20 Permanent migration is an important response to deal with the situation for some families. Such migration was, in most cases, the result of a shortage of drinking water in the village. Permanent migrations from the coastal areas have also been occasioned as a result of natural calamities such as cyclones and floods and lack of livelihoods. At least 7-15 families from each village surveyed were reported to have migrated. People were reported to have gone to other big cities like Badin, Thatta, and Karachi. Some of them were working as *haris* or share croppers while some were working as daily wage labourers. One village reported that before 5 years almost 60 houses left the village and shifted to Taluka Jati, Sajawal or Badin and were reported to be working as *haris*. Their earning was highly dependent upon the yields of the standing crop.

3.21 Some of the villages in the area have started presenting a deserted look as many of the villagers have migrated to the major urban centres such as Karachi, Hyderabad, Sanghar and Nawabshah. In Badin District migration was reported from the coastal villages of Badin and Golarchi Tehsils. Out of the 300 households in village Keerio Bhanderi, 150 households have migrated. Many villages have completely uprooted from the coastal tehsils of Keti Bunder and Kharo Chan. A majority of those who have migrated have settled in Gharo town and other towns of the two districts and in Karachi.

3.22 While the government has a program of social transfers through its system of *Zakat* and *Bait-ul- Mal*, social safety nets or transfers from the public sector did not figure in the coping strategies of the local households. At the national level *Zakat* funds are collected from

³⁷ Asia development Bank. 2001.

deductions made from all³⁸ term deposits and other savings schemes at the rate of 2.5 percent annually. The annual national collections averaged between Rs. 4 to 5 billion and the collection for the year 2001-2002. All collections are remitted to the Central *Zakat* Fund in the State Bank of Pakistan and then transferred to the provinces for distribution to local *Zakat* Committees. While the *Zakat* system provides an effective system of collection, the system of disbursements lacks transparency and proper accountability and has been highly politicised. Local *Zakat* Committees decide upon the eligibility for *Zakat*. Target beneficiaries of the system are supposed to be the *Mustahiq* defined as needy, indigent or poor with preference being given to orphans, widows, the handicapped and the disabled. Very few households encountered during the household survey reported actually receiving these transfer payments. A few households reported that they had received Rs. 1000 to Rs. 5,000 on an ad hoc basis.

³⁸ Except for those claiming exemption under Fiqh e- Jafariya (Shia sect of muslim) and foreigners.

4. On-Going Development Initiatives

Government of Pakistan

4.1 The Government has undertaken measures to address the problems of people affected by disasters as well as repairing the damages caused by the floods of 2003 on drains and irrigation canals. In response to the drought of the last few years, the government has provided funds for relief operations and has requested all provincial authorities to undertake assessments in their respective provinces and submit proposals for funding. In addition, Relief and Crisis Management Centres have been established to coordinate drought activities in all provinces. Working groups have been constituted at the district, provincial and federal level to assess losses caused by the drought and the worst affected areas have been identified as calamity stricken areas. The federal government has established an emergency relief cell in the Cabinet Division to coordinate with the provincial relief cells.

4.2 At the start of 2000, the provincial authorities provided specific support at the district level, as the drought became more widespread. It is difficult to estimate the total amount of public expenditure. The provincial government waived land taxes, postponed the recovery of loans and provided subsidised wheat at half the market price for two months for the population in the areas designated as calamity hit.³⁹ Medical and veterinary teams were constituted to provide treatment to humans and animals. Free fodder was provided to livestock owning households and tube wells were installed to improve the drinking water supply. A wide range of short, medium and long term measures such as the construction of roads, installation of pipeline water scheme, electrification and public work Programs were implemented. These public works projects created some employment opportunities for the local population.

4.3 In addition, many measures are being taken by the Government as part of its annual development Programs in the two districts. For example, the Government of Sindh has developed a five year scheme for the improvement of Livestock in the coastal areas of Thatta and Badin. The project was designed to provide the livestock in coastal areas with veterinary cover and protect it from disease. The main purpose of the project is to increase livestock production, enhance access to extension services, especially of farmers in remote areas and increase rural incomes from livestock.

4.4 Despite all these measures, the steps taken by government are far from adequate. Most measures have had a limited impact on rural livelihoods and most affected households feel that the Government has done little to ameliorate their suffering or provide basic social and economic infrastructure.

Donors

4.5 *Relief Assistance:* A few donors were quick to recognise the plight of these threatened communities. The Governments of Japan, Turkey, Kuwait, Qatar, United Arab Emirates, Saudi Arabia and Nigeria donated emergency funds and in kind assistance to the Pakistan Government for the Sindh province. The United Nations has a Disaster Management Team in Pakistan which meets during emergencies and considers the type of support and financial assistance which will be provided by the different UN agencies. The UN Office of Humanitarian Affairs, UNICEF and other UN agencies such as WFP, UNFPA and UNDP mobilize financial assistance and support. WFP undertook a mission together with FAO to assess the damage and the measures required. ADB and Action Aid also sent

³⁹ The districts designated as calamity hit included the districts of Tharparkar, Mirpukhas, Sanghar, Kachho and Kohistan regions of Dadu and Thatta.

missions to survey the extent of the damage caused in the area. Although WFP does not have an emergency relief operation for drought, it provided a one-time assistance of 352 tonnes of oil to 62 000 families in Sindh.

4.6 *Rehabilitation:* UNDP also launched a Program to study the factors behind the devastation caused by the floods and identified preventive, remedial and mitigation measures designed to provide the basis for better preparedness and disaster management strategies for the future. The WFP has been implementing Food for Work under its Creation of Assets for Rural Women (CARW) activity in the drought affected areas. However, this Program is confined to the Tharparkar District only. Some of the donors are in the process of designing projects for the area. There is little on the ground currently.

4.7 *Development:* The ADB has undertaken several development initiatives in Sindh. Some of the on-going projects include the Sindh Rural Development Program (US\$ 56 millions), which provides assistance for agriculture and infrastructure projects and, the Sindh Devolved Social Services Program (US\$100 million), which provides overall budgetary support for investment in social sector services. The ADB Regional Environmental Technical Assistance Program is aimed at promoting regional cooperation in strengthening the management of environmentally sensitive coastal and marine resources using an Integrated Coastal Zone Management (ICZM) approach in four countries namely India, Maldives, Pakistan and Sri Lanka. As part of the TA, a situational analysis was undertaken to assess the coastal and marine resources. Subsequently a compendium of ecologically sensitive High Priority Areas was developed and in the case of Pakistan, Korangi/Rehri Creek system was selected for the development of an ICZM strategy and plan. ADB is also considering the development of a new Coastal Area Development Project which has a tentative block allocation of US\$ 50 millions.

4.8 USAID is implementing an Improved Quality and Retention in Primary and Secondary Education Program. Under a five year, US\$ 100 million agreement with the Ministry of Education, USAID is improving education policies, with particular emphasis on expanding access to education for girls, developing more public-private partnerships to increase community involvement in primary education, etc. The project focuses on Sindh and Balochistan. While USAID has also provided assistance to increase access to and availability of micro-credit services in Sindh along with other areas, its impact in the coastal areas has been limited.

4.9 The World Bank has undertaken several initiatives in the province such as the National Drainage program and On-Farm Water Management Project (OFWM). The total financing for OFWM is US\$ 49 million. The overall development objective of the OFWMP is to help reduce rural poverty and increase farm incomes through improved agricultural productivity. The four-year project would focus on three canal commands where institutional reforms are in progress and Area Water Boards (AWBs) are being established. This project will assist the two districts in improving on-farm water management and off-farm infrastructure improvement.

4.10 The Bank is also supporting a poverty alleviation Program through financing to the Pakistan Poverty Alleviation Fund (PPAF) project with a credit of US\$ 238 million over the next four years. The PPAF II is designed to provide micro-credit through Partner Organisations as well as provide assistance for community infrastructure projects and help build the capacity of partner organisations. Some of PPAF partners are working in the coastal areas such as NRSP, SRSP, TRDP, etc. At present PPAF operates in Badin District only. Several community organizations have been established and micro-credit is being provided to household interested in carrying out agricultural and trade activities.

Non-Governmental Organisations

4.11 There are a large number of NGOs working in Badin and Thatta Districts. These organisations have all types of orientations ranging from relief and rehabilitation, welfare, social sector, livelihoods improvement, development of economic infrastructure, provision of micro-finance, advocacy and awareness raising, etc. Some of the key agencies include the National Rural Support Program, the Sindh Rural Support Program and the National Commission for Human Development, etc. The first two are broad rural development organisations which focus on the provision of infrastructure projects, micro-finance and skills development through a community based approach. The NCHD supports government line departments, NGOs and elected officials at the district level in primary education, literacy, income generating activities and provision of basic health services. The NCHD recently started their Program in the Badin and Thatta Districts. Health and Nutrition Development Society (HANDS) is working the social sectors, it started its operation in Badin in 1979 and has gradually expanded its work in the area. A list of some of the main NGOs working in Badin and Thatta District is given in **Annex-3**.

4.12 IUCN Pakistan has undertaken several coastal and marine related interventions including restoration and reforestation of mangrove ecosystems, awareness raising and capacity building of coastal communities, research studies on various issues related to the coastal environment but at a small scale. IUCN Pakistan is planning to initiate a comprehensive Coastal and Marine Program. It is envisaged that this Program will comprehensively encompass all issues related to the coastal and marine sectors of the country. WWF-P is also actively engaged in coastal environment rehabilitation and mangrove restoration programs.

4.13 Several NGOs such as Strengthening Participatory Organizations (SPO) are also implementing Programs in the calamity hit areas. SPO devised emergency relief projects and wide scale relief activities were initiated in the two districts. SPO launched the Sindh Coastal Rehabilitation Project (SCDRP) in the coastal and most affected belt of Thatta and Badin Districts. SPO provided families with food supplies and arranged for medicines and mobile medical camps in the area. The medical units reached remote areas of Badin and Thatta. However, they do not have a long-term presence in the area.

4.14 There are few NGOs which work with the fishing communities along the coastal belt. An NGO, which has become active in this context is the Pakistan Fisher Folk Forum which was launched in response to problems faced by the fishing communities. The main objective of the PFF is advocacy for the solution of the problem of fisheries, to make their livelihoods more sustainable and restore their rights. More than 50 PFF units have been established in a number of villages in Karachi and Thatta. While NRSP has been active in the area and is in the process of expanding its Program, it has not made much progress in working in the coastal areas. The SRDP has also not been working with the coastal fishing communities. The *Khushali* Bank has also been asked to provide credit in these areas. The PPAF, a World Bank assisted Program is supporting the NRSP to work in Thatta and Badin. The survey team found that there was little evidence that these Programs had reached coastal communities.

4.15 The capacity of local NGOs to undertake sustainable development Programs is generally limited. Most of them are small welfare oriented organisations which do not have a well tested development approach. They work on a small scale and generally do not have strategies that are likely to contribute to sustainable increases in incomes or livelihoods. They work on an ad hoc basis and are generally focused on providing education, health and other welfare type activities. Some of them are providing credit but the coastal communities generally do not have access to these services. The Rural Support Programs such as NRSP and the SRSP which work in the area have yet to develop a strategy for the fishing communities of the coast which require an innovative approach to infrastructure. For

example, some of the projects which would be highly beneficial would be cold storages, refrigerated transport, fishing jetties and an innovative approach to delivering mobile water supply services, education and health facilities. The existing NGOs have not focused on these very specific needs of the people in these areas.

4.16 The Thardeep Rural Development Program and the Sindh Agriculture and Farmers Cooperative Organisation have undertaken some innovative Programs for the development of desert areas and for dairy development in partnership with the private sector. Some of these experiments and approaches need to be targeted towards the extremely poor and vulnerable households in the coastal areas to look at sectors such as water supply and sanitation, housing, education, health, livelihoods, etc. Some NGOs have developed effective models working with some of the oil companies in Badin and some of the private sector companies in Thatta. The Pakistan Centre for Philanthropy has also been instrumental in facilitating linkages between the corporate sector such as the Deewan Group and district government for providing assistance to public sector schools. A broad based coalition of some of the players could be created and used for innovative service delivery models which address the needs of the vulnerable coastal communities.

5. Proposed Project for Livelihood Improvement

5.1 In this section specific proposals for improving livelihoods of communities in the coastal areas of Badin and Thatta are discussed, based on the analysis of vulnerability and the opportunities identified for the improvement of livelihoods. The study has revealed that the people residing in the coastal area have been impacted by the natural disasters that hit the areas at different times in the last ten years. Main sources of livelihoods have been disrupted and people are more vulnerable to risks than they were in the past. The strategy would be to rehabilitate and reinstate those livelihood sources affected by natural disasters, introduce alternative sources of livelihoods where it is feasible and help in strengthening and supporting some of the coping mechanisms that would lead to more sustainable sources of livelihoods.

5.2 With this in view, the following interventions are proposed to improve the livelihood of the communities that live in the coastal areas of Badin and Thatta.

Objectives

5.3 The objectives of the proposed project is to improve livelihoods of the people residing in the coastal areas through promoting: (i) better access to basic services and facilitating infrastructure; (ii) higher income generation through improved production and marketing of saline agricultural crops, fisheries and livestock; (iii) secure access to, and better management of the coastal area natural resources; (iv) viable community organizations that can operate in partnership with the public and private sector and NGOs; and (v) improved access to high quality education, information, training and better nutrition and health. Women suffer more from the vulnerability of poor households and the lack of basic services especially water, sanitation, health and education. The project interventions would therefore be targeted to reduce the gender gap and to help women to gain improved access to services, income earning opportunities and assets.

Scope of the intervention

5.4 The districts of Thatta and Badin are the most deprived districts of Sindh. Within these two districts, the people in the coastal talukas are believed to have much higher rate of deprivation. Access to housing, sanitation, education and health services is the lowest in the province. They also have minimum access to alternative, sustainable livelihoods that would enable them to rely less on natural resources for their day-to-day survival. While these people include mostly fishing households, they also include small farming communities. It is proposed that the current program be focused on the 175,000 to 200,000 households who live along the coast in the eight Talukas of Badin and Thatta Districts listed in *Table-1*.

Project descriptions

5.5 The project would have the following three major components: (i) community investment fund; (ii) mangrove rehabilitation and Development and, (iii) project management and monitoring and evaluation.

(a) *Community investment fund (CIF) - \$10.0 million*

5.6 This is a Fund that can be accessed by Community Organizations (COs) for services and infrastructure that are priority needs. Coastal communities will be the direct beneficiaries from this intervention. There will be full participation in choice and decision regarding the interventions to be put in place in the communities. Participating Organizations (POs) with experience in social mobilization will be selected to work in the coastal Talukas and would assist in the organization of communities, preparation of action plans and, when approved, in

implementation and operation of the sub-projects. The fund will be used to finance any community infrastructure or services in a positive list, which will be prepared during project preparation.

5.7 To mention some interventions that could be supported under CIF:

- (i) Mobilization of Community Organizations (COs)⁴⁰ where such organizations do not exist and, strengthening existing ones in order to promote demand-based development initiative and for getting active community participation and ownership; training and orientation of the key office bearers and members of COs,
- (ii) *Advisory services in saline agriculture*, i.e., dissemination of plant and crop varieties that Pakistani researchers have identified as suitable for saline water agriculture. There have been rapid advances around the world in the use of saline water for irrigation, including development of irrigation systems, improved water management and control of salinity within the root zone and this knowledge will be tapped,
- (iii) *Social Services*: construction of primary schools and health centres; mobile clinics wherever it is feasible: equipment and furniture, teaching materials, books and operating expenses; reconstruction of residential houses for those households whose houses were destroyed by flood and cyclone,
- (iv) *Water supply and sanitation*: to ensure well functioning water supply schemes and promote hygiene and sanitation,
- (v) *Community - based fishery management*: includes assistance in training, management of fishing facilities, introduction of concept of community-based coastal resources management, preparation and implementation of fishery management plan development of local fishing regulations and licensing and enforcement mechanism,
- (vi) *Support for coastal aquaculture*: assist the COs involved in fishery to explore the potential for high value marine products such as shrimp, mussels, etc.
- (vii) *Construction of wharfs/jetties, provision of fishing boat and improvements in landing fish*: rehabilitate and construct wharfs, small jetties, on selected landing centres; provide essential infrastructure such as water supply, offices and small storage facilities, fences. To improve fish landing, each landing centre will be equipped with (i) a chilled store; (ii) ice maker with store; (iii) a fish store and, (iv) an office space for administrators of the facilities,
- (viii) *Support for improvements in fish marketing and processing*: streamline the marketing chain to create value for COs involved in fish production and marketing; provision of marketing facilities; assist in establishing fish processing plants or facilities,
- (ix) *Rural road and rural electrification*: upgrade existing road networks and construct new roads; increase access to electricity to improve living conditions, improve the delivery of basic social services such as health, education and water supply and, spur economic development in the area.

(b) *Mangrove rehabilitation and ecosystem management (\$2.00 million)*

5.8 This component will develop a program of protection and development of the mangrove forests and the delta ecosystem in collaboration with coastal communities. POs such as IUCN and WWF-P and, Government Departments such as Sindh Forest Department will take the lead in the effort to rehabilitate the natural resources along the coast. These

⁴⁰ The Community Organizations (COs) could be Community Citizen Boards (CCBs), Fisheries Associations or other form of associations that will be organized for the purpose of carrying economic and social activities in the coastal areas.

activities are critical for the protection of the environment, fisheries and local livelihoods. Activities would include community mobilization, awareness and training; creating a sense of ownership of the natural resources of the coast and facilitation of replanting campaigns in the degenerating mangrove areas would be undertaken.

(c) *Project management and monitoring and evaluation (US\$ 1.5 million)*

5.9 This component will support the PMU-that will be created to coordinate the implementation of the project. The PMU will have a competitively recruited Project Coordinator and key staff and will coordinate activities between stakeholders during the implementation of the project. Most of the activities will be implemented through POs and COs and, private sector contracting. Provincial and local government departments will also implement some activities that are not implemented by POs or COs. The relevant Departments at the Provincial level will provide the necessary technical back stopping when needed.

Project Cost

5.10 The total cost of the project including contingencies is estimated at US\$13.5 million.

Linkage with ongoing and new operations

5.11 There are ongoing IDA supported operations that can be closely linked to the proposed project in order to maximize the benefit for the targeted communities. These projects will contribute to improvement on water availability and the coastal communities access to microfinance.

Improving water availability: One of the major constraints that coastal communities are facing is lack of fresh irrigation water from canals. This situation has been aggravated by the recent drought and, as a result, crop and livestock production have been severely curtailed. The Government of Sindh is currently implementing an IDA supported project called On-farm Water Management Project that has the objective of improving the efficiency, equity and reliability of irrigation water distribution. Through this project, a special effort would be made to improve the flow of irrigation water to the tail-enders in Badin and Thatta districts. This would have a major impact on revitalizing agricultural and livestock production and, on the availability of drinking water. The Agriculture Department and Sindh Irrigation and Drainage Authority will be requested to prepare and submit a special sub-program that support Badin and Thatta to access and utilize water efficiently. Moreover, the Sindh Water Sector Improvement Project (WSIP) that is under preparation will include activities that are aimed at improving water availability in the coastal areas.

Microfinance: Another IDA supported project that can play an important role in the implementation of the proposed project intervention is the PPAF. This project aims to alleviate poverty and empower the rural and urban poor by providing them with access and services. It supports poverty alleviation programs run by NGOs, thereby, increasing incomes of poor households by providing loans and technical support; empowering the poor, especially women; increasing access of the poor to physical infrastructure in order to improve their livelihood opportunities.

The proposed project will not have a microfinance component and will rely on PPAF for the microfinance requirement of the project. The following two actions would be taken to create the maximum synergy between the two operations: (i) PPAF would mobilize NGOs to operate in Thatta District (currently there is no PPAF activity in

this district) and, (ii) existing NGOs will be encouraged to expand their Badin program and, new NGOs will be invited to participate in order to expand the outreach. PPAF will prepare a special program for Badin and Thatta that complements the proposed interventions above and, after discussion an agreement with key stakeholders, will implement the program.

Implementation Arrangement

5.12 Arrangements for the implementation of the project will be through multiple channels in order to respond quickly to the needs of the communities and at the same time to create ownership and to build sustainability. Three arrangements for the implementation of sub-projects is envisaged:

- (i) Partner organizations (POs). There are several NGOs currently operating in the two districts and providing services at the grassroots level (Annex...). These NGOs are specialized in one or more sectors or sub-sectors. The most experienced of the POs will be selected and contracted to organize COs, help in the preparation of action plans and, when approved, help in implementation. The implementation arrangement that is used by PPAF will be readily used for purposes of quick project start up.
- (ii) Private sector contracting. Sub-projects identified by COs and Local Governments will be contracted out to private sector for implementation;
- (iii) Provincial and local government departments. There are certain interventions that are best carried out by public sector departments and these will be assigned to the respective departments through implementation agreement signed with the PMU.

5.13 At the Provincial level, the Planning and Development Department (P&D) will be the focal point for project implementation. A committee chaired by Additional Chief Secretary, P&D, with membership drawn from the relevant departments will oversee and guide the project and ensure coordination among key stakeholders. A PMU will be established and will be responsible for day-to-day management and coordination of the project. The PMU will have a competitively recruited Project Coordinator and key staff and, will work closely with provincial line departments, local governments, POs, COs and the private sector. At the district level, there will be a Steering Committee chaired by the DCO, with EDOs and TMA *Nazims* (representatives) as members. The PMU will be member of the committees both at the provincial and district levels.

Next steps

5.14 The first step is to share the report and its main findings and recommendations with the Government of Pakistan and Government of Sindh and seek their agreement to fund and implement the proposed interventions. The source of funding for the proposed intervention could be either a new credit or an existing credit. For an immediate response to the needs of the coastal communities, it is recommended that funds be reallocated from the existing credit under the Sindh on Farm Water Management Project (OFWM). If the OFWM project runs short of funds at later years, a supplementary credit would be requested. In the meantime, US\$13.5 million can be reallocated towards the above-proposed interventions. Preliminary discussions with the GOS will take place as part of the OFWM supervision mission in May 2005 and will be followed up at the federal level. Consultation with ADB should also take place to coordinate efforts in this area.

5.15 Assuming that both Government of Sindh and GoP agree to the proposed interventions and the use of the credit from the OFWM project, the Bank would initiate a process of amending the Development Credit Agreement of the OFWM project to

accommodate the changes in objectives and activities. In the meantime, an agreement on the implementation arrangement will be reached with Sindh government and some further analysis would be carried out, particularly in areas such as the fisheries, where specialized skills and knowledge is needed. For other interventions that are currently implemented by local and international NGOs, terms and conditions would be agreed and they will initiate their own project preparation process. Local government line departments could also be used to implement some of the basic infrastructure and they could also start project preparations and implementation within a relatively short time. Detailed implementation timetable will be prepared on a fast track basis after government approval of proposed interventions.

6. Sustaining Livelihoods and the Interventions – Looking Beyond

6.1 Are the proposed interventions and the anticipated improvements in livelihoods sustainable given what is currently known about the root causes of vulnerability in the coastal areas? Will the interventions have lasting impacts on poverty and vulnerability of the coastal communities? The answer to these questions can be in the affirmative, provided the Governments of Pakistan and Sindh not only implement the interventions proposed above successfully, but also address more fundamental and macro level issues pertaining to system wide policies in irrigation and drainage, access to assets, management of the coastal areas including the Indus delta ecosystem and, the isolation and marginalization of communities residing in the coastal area. The list of actions that need to be taken at the federal and provincial level are many. However, the socioeconomic study has identified few critical areas, which are discussed below that deserve attention to make the proposed livelihood interventions meaningful and sustainable.

6.2 **Recognize the uniqueness of the coastal areas and be prepared for emergencies:**

It is well established that the coastal areas of Badin and Thatta are prone to natural calamities and people in these areas are highly vulnerable to the calamities. Predicting natural disasters is not a perfect science and therefore incidents similar to the 2003 flood or the 2001 cyclone could inflict serious damages to property and infrastructure again. While totally avoiding damages and losses can be difficult, it can be significantly reduced by making sure the infrastructure already in place is well maintained and managed; making the necessary improvements in anticipation of likely disasters; educating people how to react/respond to emergencies; creating awareness about the likely disasters that could hit the area and establishing an early warning systems and, having emergency mitigation plans at hand to respond in a timely manner. Institutional responsibilities to deal with such emergencies have to be properly defined and preparedness for such events ascertained on a regular basis.

6.3 **Provisioning for minimum flow of Indus below Kotri:** The Indus delta has a unique biodiversity and natural resources built up by the discharge of large quantities of silt washed down from the mountain ranges of the north. In the absence of freshwater flow, flora and fauna of the delta is fast disappearing. Moreover, untreated municipal and industrial waste as well as agricultural chemicals, oil spills, etc., contribute to the degradation of the delta. The two districts have large communities that depend on the delta for their livelihood in one-way or another. The absence of flow into the delta has affected agriculture, livestock and, most of all, fisheries production - major sources of livelihood of these communities. Some have migrated and those who remain in the area are scavenging natural resources, such as woodcutting, in order to secure a source of income.

6.4 The situation in the Indus delta is a consequence of a decision to use the Indus water for irrigation by controlling its flow (dams and barrages) and limiting flow of fresh water to the sea. The allocation of three major rivers to India through the Indus Accord should also be mentioned as a significant factor. The benefits of putting in place control structures are quite apparent as it supports the agricultural production systems that are vital to the economy. However, the policy has negative environmental impact as well as negative impact on the lives of people of the coastal areas. Along side this policy, there should have been a mitigation strategy or compensatory measures directed to the affected people. In the future, if minimum flow is not assured, the limited livelihood intervention that this study has proposed will not be sustainable and it is necessary to formulate a long-term program that addresses the needs of people affected by the continued use of water from the Indus for agriculture purposes upstream.

6.5 **Correcting inequity in water distribution:** Another key factor that would determine the sustainability of the interventions is availability of irrigation water and its

equitable distribution. Badin and Thatta are at the tail end of the Indus irrigation system. By virtue of their geographic location, they receive the maximum level of drainage effluent and very little irrigation water. The population living along, and close to, the coast suffers, as they are the tail of the tail. Without improvement in the availability of water, the livelihood interventions will have limited impact and, correcting this deficiency and inequity is necessary to get the most out of the interventions in the medium-term.

6.6 Addressing some of the broader resource management issues. This includes the need to look at broader management and institutional issues in the way fishing policies are being implemented including price regulation, award of fishing licenses, zoning for fishing rights, granting of rights to rangers, etc.. Similarly, in the case of agriculture, landlessness and the relationship between land owners and “haris” may be critical factors to look at for long term solution of livelihood issues. Improving security of tenure among the coastal communities will be a very important element not only for agriculture and fishing but also for housing.

6.7 Dealing with effluent and drains: The drainage structures damaged by floods and cyclones in recent years should be rehabilitated or alternative solutions put in place based on sound technical and economic analysis, to avoid or minimize damages that could arise from similar incidents in future. At this time, it is not clear how the Government intends to manage the effluent disposal from the drains, the sea intrusion and the salinity build up.

6.8 Long-term view: To be able to deal with the problem of the coastal areas in the long run, *integration of coastal communities with the rest of the economy* is necessary. As discussed in an earlier section of this study, communities in the coast are isolated and basic infrastructure and social services are limited. Most are without assets and migration in search of wage labor has become a way of life. The natural resource base is degraded and reversing this trend would be difficult and is a long-term task. It is intuitive that closely integrating the coastal economy with the rest of Pakistan and with the developed parts of Sindh (Karachi and Hyderabad) could be the way to address the problem in the long-run. Therefore, it is important to prepare and implement a strategic plan for development of the coastal area and, articulate the kind of policies, programs and actions that would lead to the achievement of this goal.

6.9 A strategic delta-wide study is also needed to assess the current situation and develop effective improvements to the sustainability of the delta in the context of the current and planned Indus river irrigation system. This study would indicate the dynamics that is underway in the coastal area and in the delta, as well as the opportunities for future use of the resource base in a sustainable manner. The Water Country Assistance Strategy, presently under preparation, would hopefully serve as a platform for coordinated macro level interventions in the water sector.

Annex-1: Main Features of the Program Districts

Annex 1-A: Overview of Badin District

Human Resources

1. Badin was formed as a separate district in 1975. The Badin District of Sindh is one of the richest districts in terms of its natural resource base and one of the poorest in terms of human development. This is a result of the centralised system of allocating resources, which has limited relationship with resource endowment and poverty levels at the district level. According to the 1998 Census, the population of Badin District was 1,136 million. On the basis of the current growth rate of 2.26% per annum, it is estimated that the current population of the district is around 1.328 million. If the population continues to grow at its present rate it will double in about 31 years. ***Annex-Table 1.4*** gives the population and inter-census increase since 1951. The area of the district is 6,726 square kilometres and it had a population density of 169 p./sqkm. in 1998. According to the 1998 census, 53 percent of the population was male and only 47 percent was female. Working age males and females usually from 15-64 years comprised about 52 percent of the district population in 1998. The percentage of children below 10 years was 33. Only 16 percent of the population was urban and the rest resided in 1,547 villages of various sizes. A majority of the households live in small and scattered settlements.⁴¹ Average household size of the district was 5.3 in 1998. The population of the district is predominantly Muslim at 79 percent. The most important among the minorities are Hindu (Jati) who comprise 19 percent of the population in the district.

2. While data on in-migrants is collected during the census, it is difficult to estimate the number of households who have out-migrated. According to the 1998 census, the total in-migrants constituted 2 percent of the total population in the district. However, a fair amount of out-migration also takes place. Many of these families have settled in the coastal areas of Karachi, particularly Ibrahim Haideri and Rehri. Interviews with coastal communities in these areas revealed that the out-migration trend had started fairly early and families have been leaving the district since the last forty years. The principal reason for out-migration was lack of drinking water and basic social services. These families are almost all fishing communities and they prefer to settle along the coast in Karachi where they can continue their age old occupation of fishing.

Physical and Biological Resources

3. The Badin District is part of the Lower Indus Plain formed by the alluvial deposits of the Indus River. The southern part of the district is close to the delta of the river Indus and the land surface is, therefore, relatively low as compared to the northern half. The general elevation of the district is about 50 meters above sea level. The climate of the district is moderate. The maximum temperature in the hot weather does not usually exceed 40°C and the minimum in winter does not usually fall below 8°C. The cold weather starts from the beginning of November when a sudden change from the moist sea breeze to the dry and cold north-east wind brings about a sudden fall in temperature. The hot weather is tempered by the sea breeze which blows for eight months of the year from March to October. During the monsoon season, there is little precipitation even though clouds appear quite frequently.

4. The climate and the soil of the district limit the type of flora found in the district. While there are a considerable number of grasses in the district, there are only about half a

⁴¹ Goth is the smallest unit and is equivalent to a hamlet and several Goths constitutes a Deh.

dozen species of trees. The *Kikar* is common along the canals. It is a tree which has multiple uses; its timber is used for making agricultural implements and as fuel. It also provides a source of animal feed and goats eat its seeds. Its bark also serves some useful purposes and is used for tanning and for distillation of native spirits. The *Babul* (*Acacia Nilatica*) is also commonly found in agricultural fields and along the sides of canals. The *Ber* tree (*Zizyphus Mamularia*) is also found in the cultivated parts of the district. It yields a fine fuel. Other common species of trees and shrubs are the *Pipal* (*Ficus Religiosa*) and *Sohanjro* (*Hyperanthera Ptery Gosperma*) or horse-raddish tree, *Tamarisk* or *Jhau*, wild copper tree or *Karib*, *Nim* (*Melia Azadirachta*), *Acasia* or *Siris* (*Acacia Lebbek*), *Banian* or *Bar* (*Ficus Bengalensis*), *Tamarind* or *Imli* and *Devi* (*Mesquite*).

5. Wild animals are almost extinct in the Badin District. Hyenas and wolves are seldom seen. However, jackals are fairly common and foxes are seen in the dry wastelands. The number of pigs has diminished as a result of defensive action of villagers against them to save their crops. Hare are fairly common. The most common birds found in the district are black and grey partridge, white-checked nightingale, Indian goat horned owl and long billed vulture. Among water fowls, great flamingo is found in the district. Other migratory birds found in the district are tublet duck and lessuewhining duck. A variety of reptiles are also found including the cobra, krait, rat snake dhaman and Indian shelled turtle.

6. The total area under state forests in Badin District is about 12,000 hectares in two irrigated plantations at Buharki and Rarri. According to the Forest Management Plan of Badin (2001), these irrigated plantations are poorly stocked and only 4 percent or about 500 hectare of their total land area has any trees. Large portions of public forest area are encroached upon and affected by salinity and water logging. The forestry development agenda in Badin District includes plantations of public forests, reclamation of water logged and saline patches, block and community plantations around large settlements, promoting agro and social forestry and special tree plantations such as coconut and oil palm and sustainable management of forests through community awareness and participation.

Agriculture and Livestock

7. The total geographical area of Badin District is 1,715,271 acres while the cultivated area is 767,156 acres. The net cropped area is only about 450,995 acres or 58 percent mainly because of lack of irrigation water. Rice is the main crop of the district and is grown wherever water is available. The other crops grown in the district are sugarcane, cotton, *Jawar*, wheat and barley. The total area under different crops is given in ***Annex-Table 1.1*** below. Sunflower has staged a comeback in the district after two decades on account of the crisis in the sugar cane industry and lack of irrigation water. Total area under orchards is reported to be around 12,000 acres. In addition, vegetables such as carrot, radish, onion and tomato are also grown extensively. A comparison of the area under different crops between 1998 and 2002 shows that the cultivation of rice, sugarcane and wheat has gone down while the area under cotton has increased almost three times.

Annex-Table 1.1: Area, Production and Average Yield of Crops In 1997-98 and 2002/03

Crop	Area (Hectares)	Production (Hectares)	Area (Hectares) 2002-03
Rice (<i>oryza sativa</i>)	759,449	151,958	63,866
Cotton (<i>gossypium gebus</i>)	2,732	6,827 (bales)	6,430
Sugarcane (<i>saccharum officinarum</i>)	59,989	3,806,773	50,407
Jawar (<i>sorghum vulgre</i>)	112	48	
Bajra (<i>pennisetum typhoideum</i>)	422	179	

Crop	Area (Hectares)	Production (Hectares)	Area (Hectares) 2002-03
Maize (zea mays)	1,061	482	
Wheat (triticum typhoideum)	32,431	48,725	29,230
Lentil (kens esculenta)	1,366	649	
Peas (lathyrus sativus)	478	234	
Sunflower			37,874

Source: Bureau of Statistics Sindh, Karachi./Office of the Director Agricultural Extension, Hyderabad.

8. While Badin consists of many small farms, a majority of the land holding is dominated by medium and large farmers as farm holdings above 25 acres constitute 57 percent of all land holdings. The key constraints in the agriculture sector include shortage of irrigation water, water logging and salinity, lack of marketing and storage facilities, lack of improved and certified seed, limited supply and non-availability of chemical fertilisers, poor quality and expensive pesticides, lack of farm machinery and tractors, lack of credit, research and extension services and an unsupportive price policy.

9. Livestock population enumerated at 1,140,122 in 1998 declined to 857,501 after the 2003 floods due to disease and sale of animals as a coping mechanism. Prior to the floods, 57 percent of the livestock was held as large animals and 40 percent was small animals such as goat and sheep. The government has veterinary hospitals, dispensaries and veterinary centres in the district but their number has remained static during the last decade. Medical supplies are also in short supply. In addition to the 626,053 poultry birds enumerated in Badin District during the 1996 Livestock Census, a bird population of 219,000 is estimated at the commercial poultry farms.⁴² Shortage of professional staff, vaccines, deep freezers with the poultry development office and lack of feed mills were reported as the main constraints to poultry development.

Fisheries

10. Out of the annual marine fish exports of Pakistan worth US\$ 100 million, about 10 percent originate from the Badin coast. From the total fish production of 80,659 metric tons in Sindh in 2002 about 14,512 tons or 17.5 percent was supplied by Badin.⁴³ Reportedly there has been a decrease in fishing catch due to sea water intrusion in the area. The brackish water fishing resources are quite significant in Badin District. There are 100 public water areas in the district comprising of a network of 28 canals/distributaries, 39 drains and sub-drains, 24 dhands and dhoras and 9 major depressions. In addition, 21 water areas with key potential for fish, prawns and lobster were under the possession of the Sindh Rangers. There are 370 recorded fish ponds on a total acreage of about 16,500 acres.⁴⁴ Many fish farms reportedly established by influential land owners on government land, natural depressions and lakes are not reflected in these figures. One carp fish hatchery was established on 14 acres by the Government of Sindh in 1998. However, this hatchery has organised very limited training courses for fish farmers and has provided only 30,000 fish seedlings on subsidized rates.

⁴² State of Environment and development of Badin District. IUCN Pakistan. 2004.

⁴³ Ibid.

⁴⁴ Ibid.

Irrigation and Drainage

11. Badin District is irrigated by the water originating mainly from Kotri Barrages. The irrigation network mainly comprises Fuleli, Akram Wah (lined canal), and Pinyari main canals with a total length of 187 miles. The Akram Wah is the only perennial canal providing water to the area in Rabi and Kharif seasons. The other canals provide water to irrigation mainly during the kharif season. Since 1991 the average outfall to the sea below Kotri was of the order of 36.3 MAF, 33.9 MAF in Kharif and 2.4 MAF in Rabi. The outflow also varied over a wide range between a low of 0.7 MAF in 2000-01 and a high outfall of 91.8 MAF in 1994-95. In the last four years because of the draught conditions in the country, the flows below Kotri have been substantially reduced. The total irrigation supply, between 1977-78 and 1999-2000 has been on average of 10,590 cusecs to serve a total command area of 1.1 million hectares. Admittedly agriculture productivity and agriculture-based income has substantially increased in the upper part of the district. Since 1999 an irrigation reform has been introduced in Badin as part of the NDP project. NDP has organized an Area Water Board to foster more participatory irrigation management systems. The AWB is fully functional (more than 19 full board meetings were conducted since its creation) and adopted as a policy not to allow new direct outlets in the system as well as conducting an anti-water theft campaign to ensure that scarce water reach the tail enders. So far 13 Farmers' Organizations (FOs) have been formed and 46 unauthorized direct outlets have been closed with a total saving of 175 cusecs. Recovery of "abiana" was devolved to the AWB and improvements have been made in the Akram Wah canal (March 2004 Progress Report). These institutional reforms are among the most advanced in Pakistan.

12. Most of the area in the left Bank Canal system is served by an extensive surface drainage network that includes the Fuleli- Guni outfall drain, Nagan Dhoru outfall drain which discharge directly to the Shah Samando Creek and the dhands system. The Sirani, Lowari, Tando Bago drains have been diverted to the KPOD interceptor drain which form part of the LBOD Stage I Project. LBOD serves drainage areas in the Rohri and Nara Canals which benefits 530,000 hectares of irrigated land in Nawabshah, Sanghar and Mirpurkhas Districts. The creation of a direct outlet to the sea has provided substantial agricultural, employment and income to this area as reported in the LBOD ICR. However, the floods of 2003 have put into question the safety functioning of the outlet. The Bank has organized a panel of expert to review the outfall system of LBOD. The Panel mission took place in December 2004 and will make recommendations as of a possible course of action to identify and mitigate the problems in the outfall area of Badin.

Employment

14. The economically active population⁴⁵ in the district was estimated at 18 percent of the total population and 27 percent of the population aged 10 years and above. Percentage of population by economic categories and unemployment rates is shown in **Annex-Table 1.5**. There is a wide variation in activity rates between males and females as it is 33 percent for males as compared to the quite negligible 1.76 percent for females resulting in an overall low participation rate. A high rate of un-employment at 13.61 percent has been recorded in the district. It varies for males and females as well as for rural and urban areas. The un-employment rate for males is high at 14.16 percent as compared to only 2.22 percent for females. The low participation and un-employment rates for women clearly indicate that their presence is generally obliterated from official statistics.

15. The percentage distribution of employed persons by employment status indicates that 64 percent of the labour force is self-employed. Majority of male workers i.e. 67 percent are

⁴⁵ The economically active population comprises the persons of either sex who are engaged in some work for pay or profit including un-paid family helpers. Not working but looking for work as well as those laid off.

employed in agriculture. Only 12 percent the women are reported to be self-employed. About 30 percent of urban males are employed by the private sector compared to only 9 percent rural males. About 16.74 percent working females are employed in governments sector in the urban areas compared to only 4 percent in rural areas.

Enterprise and Industrial Sector

16. Industrial units in Badin District are mostly agro-based. Badin District is reputed to be a sugar estate. Presently there are six large scale sugar mills which provide employment to over 6,000 persons. Due to the crisis in the sugar industry and reduction in irrigation water supplies, the sugarcane production as well as the recovery ratios have gone down. The issues faced by the sugar industry include de-zoning, lack of research and development Programs especially with reference to seed of new varieties, low per acre yield, lack of timely supply of irrigation water, lack of utilisation of sugarcane wastes after crushing and high cost of production. Furthermore, the sugar industry is one of the main polluters in the area. There are reported to be about 70 rice husking and milling units in the district – 50 percent of which are modern shellers while the remaining are traditional units. These units process the IRRI-6 paddy production for local use and exports. Since the price is set by a handful of exporters, the local industry faces serious price fluctuations with consequent impacts on production and marketing.

17. Average daily crude oil production from four oilfields in Badin District was recorded to be around 30,000 barrels per day in 2001 and constitutes 45% of the total crude oil production in Pakistan. However, the district government does not benefit from this production and gets no royalties. The local communities do not substantially benefit from the employment generated by this production as only about 5 percent of the permanent and tenure track employees of the oil industry come from the local communities.

Marketing Infrastructure

18. Badin is a famous trading centre for sugar products, tomato onion, chillies and fish. Coal produced from the mesquite shrub is sold in various markets in Sindh and Punjab. Livestock markets are organised in various towns on different days of the week. The district is also an important trading centre for traditional and non-traditional oil seeds including sun-flower. Badin town is developing into a population and trading centre for the hinterland extending to remote coastal villages and settlements of adjacent territories of Tharparkar District and Rann of Kutch.

19. Badin is linked with its Taluka headquarters through metalled roads, although most of the road structures need immediate repairs and maintenance. The total length of roads of both high and low type in Badin District was reported to be 2019 kilometres in 1999-2000. The length of the all weather road per square kilometre of geographical area is only 0.30 km which is quite insufficient. The district also has a railway station, which connects Badin with Hyderabad passing through Matli. An airport connects the district with Karachi. The district has good postal and reasonable telephone facilities.

Social Sector Services

20. The literacy ratio of the district has risen from 25 percent in 1998 to 28 percent in 2001. There are sharp differences in the literacy ratios by sex and area. The male literacy ratio is nearly three times higher at 35 percent compared to 13 percent for females in 1998. The ratio in urban areas is more than double at 45 percent compared to 21 percent in the rural areas. In rural areas, male literacy is more than three times higher at 21 percent compared to

female literacy ratio at only 9 percent. It is 56 percent for males and 31 percent for females in urban areas.

21. In June 2004, there were 2,655 primary schools for boys and 316 primary schools for girls. The present number of primary schools is understood to be sufficient up to the year 2010. However, the number of teachers and functional primary schools needs to be enhanced. There are currently 56 middle schools for boys and 28 for girls with an average enrolment of 40 students each. It is estimated that the number of middle schools needs to be doubled during the next decade. There are 43 secondary /high schools for boys and 11 for girls in the Badin District. On the basis of demographic trends, there is projected to be a need for 100 more high schools by 2010. There are only 4 degree colleges for boys and girls and one co-educational intermediate college in Badin District. There are three technical institutes in Badin Taluka – only one of these i.e. the Government Poly Technical Institute Badin is functional with a small number of staff and enrolment. Teacher training and adult literacy Programs are very weak. The main issues in education and training include shortage of female primary and secondary schools as well as trained teachers, inadequate number of higher secondary schools and degree colleges; non-functional training institutions; lack of technical and vocational Programs; and inadequate teacher training and adult literacy Programs.

22. Health facilities and infrastructure are quite inadequate in Badin District. There is a high incidence of infant and maternal death in rural areas which can be prevented by providing basic health facilities at the community level. The sanctioned staff strength is not all in place and many of the staff positions are vacant. The population per doctor is estimated to be 5,428 persons and there is one hospital for every 240,020 persons and one bed for 7,776 patients. The details of the health infrastructure and personnel is given in **Annex-Table 1.8**. The District Population Welfare Officer is the key agent for the implementation of population Programs and delivery of family planning and reproductive health services. There are 20 such service outlets in Badin District for women aged 15-55, including 17 family welfare centres, one reproductive health centre and two mobile service units. These outlets are not perceived to be sufficient. Major issues in the health sector were identified as shortage of paramedical and support staff; inadequate medicine and diagnostic facilities, lack of ambulatory facilities; lack of female medical officers, lack of specialists and lack of rural health centres, maternity homes and MCH Centres.

23. According to the 1998 Census, 11 percent of the housing units in the district were *pucca* units, while 10 percent were *kutch/pucca*, *kutch* houses were 41 percent, *jhugies* or huts were 36 percent while temporary housing units such as tents and *wandhs* were only 2 percent. There is great pressure on the existing housing infrastructure judging by the persons per room and household size. It is assessed that 82 percent of the housing units in 1998 had only one room.

24. According to the 1998 Housing Census, the facility of piped water inside the house is available to only 13 percent of the housing units in the district. It is much higher in urban areas at 46 percent compared with only 8 percent in rural areas. Hand pumps inside the house are available to 16 percent of the housing units overall. There is a wide divergence in this facility in urban and rural areas as 26 percent have this facility in urban areas compared to 14 percent in rural areas. Hand pump, well and pond are almost equally being used as a source of drinking water outside the housing units in the district. **Annex-Table 1.9** gives the sources of drinking water in the district.

25. The major source of lighting is kerosene oil which is available to 63 percent of the housing units in the district. Its use is much higher at 70 percent in rural areas as compared to only 22 in urban areas. Second higher source of lighting is electricity available to 35 percent

of housing units, about three times more at 76 percent in urban areas in contrast to 29 percent in rural areas. *Annex-Table 1.10* gives more details. More than 90 percent of the housing units in the district were using wood as cooking fuel, more in rural areas at 94 percent as compared to 73 percent in urban areas. Kerosene oil is being used by 4 percent of the housing units. Only 3 percent housing units are availing facility of gas in the district. *Annex-Table 1.11* provides percentage of housing units by source of cooking fuel used.

Governance Framework

26. The governance framework in Badin District is identical to what prevails in the rest of the country. The District Nazim heads the local government and is the elected representative. He is assisted by the District Co-ordination Officer who heads the offices of Finance and Planning, Health, Education, Agriculture, Works and Services, Law, Community Development, etc. *Annex-Table 2.1* gives the detailed administrative organisational structure. The performance of many departments especially education, finance and planning and Works and Services suffers from low staff motivation, poor accountability and little performance orientation.

27. There are a large number of NGOs working in the Badin District. However, only 25 of these are assessed to be registered NGOs. Other civil society organisations include the two factions of the Press Club and several wings of political parties, labour organisations and women's groups. The capacity of local NGOs to undertake sustainable development Programs is generally very weak and few has a good record of savings, investment, enterprise development and program management. A list of some of the main NGOs working in Badin district is given in *Annex-Table 3.1*.

Annex 1-B: Profile of Thatta District

Human Resources

1. Thatta is one of the oldest towns in Sindh and is rich in its heritage of pre-historic Arabian culture. Thatta derives from the Persian term *Tah* which literary means layer over layer. The term signifies the settlement of various civilizations in the area. The population of all nine *Talukas* of Thatta District according to the 1998 Census was 1.113 million. Based on an annual growth rate of 2.26 percent the current population of the district is estimated to be around 1.301 million. There are six *Talukas* which are coastal and three which are non-coastal. The population of the non-coastal *Talukas* is the most dense. Mirpur Bathoro is the most densely populated *Taluka* followed by Sujawal and Thatta *Talukas*. The coastal *Talukas* have large geographic areas and much lower population densities.
2. The rural population of the district was 0.988 million in 1998 constituting 89 percent of the population. The average annual growth rate in rural population between 1981-1998 was 2.15 percent annual. Males were 113 percent of females. The age structure of the population showed that those of 18 years and above were 52 percent of the population. The entire district has a broad based population pyramid indicating a high proportion of population at younger age groups. With 68 percent of the people currently married and 47 percent of total females in the reproductive age.
3. The data on migration reports only in-migrants and does not provide any information on out-migration. Thus it leaves a very important aspect of the information on Thatta outside the scope of analysis. In 1998 the total in-migrants into the district were estimated to be 22,871 or about 2 percent of the population. Only 26 percent had migrated within the last five years and the remaining had migrated before this period. Among the reasons for migration was marriage, business and transfer. The most significant aspect as far as migration trend in this district is concerned is the out-migration especially from the coastal areas as a result of the shortage of drinking water and livelihoods.

Physical Resources

4. The Indus Delta is sparsely populated with small predominantly fishing communities living along the creek system of the coast. The most prominent ecological feature of the Indus Delta is the mangrove forest. The Indus delta is the most significant wetland along the Sindh coast and has been declared an ecoregion by WWF in its global 200 initiative that lists the richest ecoregions of the world. Another important wetland of Sindh is the Nurri-Jabbo wetland which is also a Ramsar Site. Though technically a brackish water wetland, it is inundated by sea water through the tidal link constructed under the LBOD in the Badin district.
5. The total area of the district is 17,355 square kilometres. In its physical aspects the Thatta District has very varied features which range from coastal swamps to fresh water marshes and lakes and from river islands to coastal deltas. However, this wide variation has diminished as a result of the lack of water in the Indus River. The current terrain of the district consists of the Makli Hills close by the Thatta Town. These hills are 32 kilometres in length and are well known on account of the ancient tombs which are located here. The north western part of the district consists of hilly tracts known as Kohistan. The hills are bare and mostly composed of limestone while the valleys are covered with grass or brushwood. Southwards, the area degenerates into sandy wastes, uncultivated and almost devoid of vegetation. There are short ranges of low stones, hills and intersected by nais or torrent beds which carry the drainage of the Kohistan to the Indus. To the west, wind has blown sand over

large tracts of land. In the south eastern quarter of the delta, there is a wide expanse of salt waste, embracing a large part of the Shah Bander and Jatti Talukas. Between Sir and Khori Creeks lie the great Sirganda salt deposits which consist of many square kilometres of solid salt.

6. There are many lakes in the district. The most famous are Kalri and Haleji. The Kalri Lake is a reservoir for feeding canals in the Thatta sub-division. During winter it is an ideal spot for fishing and duck-shooting. There have been many ecological changes in the district, which have changed the nature of the delta. The lack of water below Kotri has damaged the ecology of the delta. The old branch of Indus, which used to run past it into the Gharo Creek has silted up. The district also comprises fierce torrents most important of them is Nai-Barun which rises in the Keerthur Range. The other important Nais in the district are Gagar and Ranpathani.

7. The climate of the district is moderate. The mean maximum and minimum temperature recorded during this month is about 40°C and 25°C respectively. The winter season starts from November when the dry and cold northeast winds replace the moist sea breeze. As a result there is an immediate fall in temperature. January is the coldest month. The annual average rainfall of the district is about 200 mm.

Biological Resources

8. The flora of the area is governed by the type of soil and the amount of moisture available. The Thatta District has a wide range of soil types due to its diverse land forms which include sandy, deltaic, alluvial, gravel, coastal and mountainous. In the Kohistan region the dominant trees and shrubs are *hubul* (acacia arabica), *kaneli* (prosopis spicigera) *Pi* (salvadora olioides), *Karil* (capparis aphylla), *rhazya stricta*, *daemia extensa* and many others. The dominant trees, shrubs and under shrubs of sand dunes are represented by *ak* (calotropis procerra), *lai* (tamerix dioica) besides *babul*, *kandi* and *karil*, etc. The plants found cultivated or wild near villages in the alluvial tracts are *neem* (azadirachta indica), *ber* (zizyphus jujube), *serrel* (albizzia lebeck) etc.

9. The wildlife in the area has been affected by colonization of the area and many wild life species have either diminished or vanished. At present hyenas and wolves are hardly ever seen. Jackals are fairly common and foxes are seen in the rapidly contracting area of dry waste. Hog deer which were once seen along the bank of River Indus are uncommon and pigs though diminished are still found in small numbers. Hare and deer are fairly common. The Kinjhar, Haleji and Hadero lakes are located on the international flying routes of the ducks. Among birds both grey and black partridges are very common in the forest plantation. Most of the common kind of wild duck and water fowl are seen in the cold season. Geese are also found penetrating the fields of gram and wheat. Kunj are also regular winter visitors. Sand grouse of various kinds visit the district in the cold weather, but the expansion of the cultivated area has driven them away. This also applies to the houbara which was quite common in former times. Quails are common. The other birds found in the district are Indian cursor, small Indian swallow plover, asian open bill stork, black and glossy ibris, sirkeer malikoha or cuckoo, Indian scoops owl, dusky horned owl, etc. Black or Eurasian coot is also found in the district. The Talukas of Sujawal, Shah Bander, Thatta, Mirpur Sakhro were known for the shikar of deer, ducks and partridges. The water fowl census revealed the biggest concentration in the whole of Pakistan on Keenjhar Lake.

10. The total area under forest in Thatta for 1997-98 was 422,000 hectares which produces 76,000 cubic feet of timber and 228,000 cubic feet of firewood. Most of the forests in the Thatta District are located along the banks of the Indus. There are some forests in other areas of the district as well. Forest growth consists of four chief sorts of trees, namely acacia arabica or babul, prosopis specigera or kandi, populus euphratica or bahan and two species of

tamarisk. Babul has a high economic value. Another tree found occasionally in the forests is dalbergia sissoo or tali. It is found near villages and wells and its timber is highly valued. In the swamps of the protected creeks and river estuaries, there are several types of mangrove plants which were formerly found in abundance. However, the number of species has now decreased and there are only two varieties which remain. From among these, one of them is dominant and comprises about 95 percent of the cover.

11. The fresh water flow in the Indus in the area has been reduced from the historic 150 MAF to less than 10 MAF per annum below Kotri Barrage. However, during most of the year there is no flow below Kotri at all and even the agreed 10 MAF is not supplied. There has also been a reduction in silt from 100 million tons to 30 million tons downstream of Kotri since the last decade. These rich silt deposits were the main factor behind the increased fertility of the area along the banks. However, the dams and barrages upstream now prevents the silt from flowing in the river. Furthermore, the flow of the Indus would prevent sea water intrusion. Many areas have been completely inundated and some of the thriving coastal villages like Shah Bander and Keti Bander are barely inhabited.

Agriculture and Livestock

12. Like in the rest of Pakistan there are two main agricultural seasons in the Thatta District. The main crops grown in the district in the Rabi season are wheat, barley, gram and oil seeds. In *Kharif* the main crops grown are rice, maize, millet and *Jowar*. Most common vegetables are grown in all the Talukas in the district. As far as fruits are concerned these include the date palm which only flourishes in Jhimpir in Thatta *Taluka*. Coconut trees are found in Keti Bunder, Mirpur Sakhro and Thatta Talukas. Bananas are grown in Thatta, Ghorabari and Mirpur Sakro *Talukas*. Other fruits grown in the district are Papaya, Guava and Mangoes. However, the banana crop exceeds the other fruits in terms of the area and production by far. The district is surplus in rice. Besides, bananas of good quality are exported to Iran and the Middle East. The important items of trade in the district are rice, leather and wool.

Annex Table 1.2: Area, Production and Average Yield of Crops in Thatta in 1997-98

Crop	Area (Hectares)	Production (Metric Tonnes)
Rice	65,32	130,629
Wheat	11,024	16,236
Cotton	41	95
Sugarcane	25,851	1,556,127
Jowar	178	72
Bajra	14	5
Maize	211	75
Sesame	43	16
Barley	8,795	4,540
Gram	408	294
Rapeseed and Mustard	1,594	757
Masoor	1,594	757
Other Pulses	588	251

13. Good breed of buffalo and cow are found in the district. Sheep, goat, camel, horse, ass and mule are also the main livestock of the district. The number of livestock in the district in 1997-98 is given in *Annex-Table 1.12*. Like in Badin District, the numbers of large animals far exceeds the number of smaller animals showing people's preferences for keeping cattle rather than goats or sheep. Livestock in the district suffers in particular from shortage of high quality feed and fodder crops as a result of the overall shortage of water. The

livestock numbers have been particularly affected as a result of the decrease in the flow of the Indus.

Irrigation and Drainage Systems

14. The hilly areas of the district are cultivated on monsoon water and wells, while the canals and channels irrigate the other lands. The areas within the protective banks of the Indus used to have fertile patches of land which depended upon flood and lift water system from barrage channels at various places for irrigation purposes. However, the pattern of irrigation has been transformed in the district due to lack of water availability.

Employment

15. The economically active population is 25 percent of the total population and 37 percent of the population aged 10 and above. A high unemployment rate of 18 percent was recorded in Thatta District in 1998. Of the total employed persons, about two-thirds are engaged in primary occupations namely agriculture, forestry, fishing and hunting.

Enterprise and Industrial Sector

16. From the industrial point of view Thatta District has progressed considerably. There are about 30 industrial units established in the district. Apart from the sugar mills all the larger industrial units are located in Dhabeji and Gharo adjacent to Karachi. Most of the labour in these units is generally non-local and commutes from Karachi. These include sugar mills (5), textile mills (9), paper mills (2), flour mill (3) salt works, ice factory (2), etc. In addition, stone from the Makli Hills and Kohistan is supplied to the Pakistan Steel Mill and the Thatta Cement Factory. There are also large coal deposits in Thatta Taluka. Recent additions to the industrial units are the car manufacturing plant near Budho Talpur, belonging to the Deevan Group adjacent to the Deevan Sugar Mills. The group also employs non-locals in large numbers.

Marketing Infrastructure

17. The main commercial trade centres in the district are Sujawal, Jati, Chuhar Jamali, Shah Bander, Ghora Bari, Mirpur Sakhro, Daro and Mirpur Bathoro. The district is linked by road with other districts. National Highway from Karachi to Peshawar passes through Thatta for a length of 200 kilometres. All major towns of the district are connected with metalled roads of 1,585 kilometres length. The main railway line from Karachi to Peshawar also connects the district. The principal railway stations are Jangshahi, Dhabeji and Jhampir. The district is also equipped with digital and non-digital telecommunication system besides postage and telegraph.

Social Sector Services

18. The literacy rate in Thatta District was reported to be 22 percent in 1998. The male literacy rate was three times higher at 32 percent compared with the female literacy rate of only 11 percent. The literacy rate in urban areas was much higher at 46 percent compared to only about 19 percent in rural areas. There is a wider gap between males and females in rural areas where literacy ratio for males is 28 percent compared to only 8 percent for females. Of the total educated persons, 35 percent have passed primary, 13 percent middle and 13 percent matriculation. After matriculation, the percentage falls steeply to 6 percent for intermediates, 3 percent for graduates and less than 2 percent for post graduates.

19. The health infrastructure in Thatta is scant. Three out of the six coastal Talukas do not have any Rural Health Centre or any veterinary dispensary. The BHUs and dispensaries are also in small number. It is estimated that there is one dispensary with one compounder for about 5000 people in the coastal Talukas. A particular problem of access to health services is the scattered nature of the population. Thus many of the people have no access to health services within a convenient location from their homes. This has left room for a lot of untrained people posing as health care providers who establish camps and deliver an uncertain quality of diagnostic and prescribe medicines.

20. More than 78 percent of the housing units in Thatta District are one room houses. Housing units with 2 to 4 rooms are about 38 percent of the total in urban areas compared to only 19 percent in rural areas. There are about 4 persons per room in Thatta District. About 94 percent of the houses are owned by the occupants. More than half the housing units were constructed at least 10 years ago. Two-thirds of the housing units are constructed with wood and bamboo. Only about 14 percent houses are *Pucca* in the rural areas. The Thatta District is also very poor in terms of the indicator of piped water which is available to only about 15 percent of the housing units. About 13 percent of rural households have hand pumps inside the housing units, while 16 percent use outside ponds for fetching water and 6 percent of housing units use dug wells. Being at the tail end of the Indus River system, Thatta District is currently facing the worst ever fresh water crisis due to non-release of water down stream Kotri. Drinking water is being purchased at a high cost in most coastal settlements.

21. Electricity is available in 21 percent rural housing units while kerosene oil is still used in 77 percent of the rural dwellings. Firewood is used as the main cooking fuel in about 91 percent of rural households and 77 percent of urban houses. Only about 38 percent of the rural households have a separate kitchen facility and about 35 percent have separate bathroom facility. The residents of units without proper latrine facility use adjacent rural environs.

Annex Tables

Annex-Table 1.3: Taluka Wise Population of Badin District (1998)

Talukas	Male	Female	Both Sexes
Badin	182,735	163,822	346,557
Golarchi	102,250	90,796	193,046
Matli	143,284	132,532	275,816
Tando Bago	153,973	139,002	292,975
	582,242	526,152	1,108,394

Source: District Census 1998.

Annex-Table 1.4: Population and Inter-census Increase Since 1951

Description	1951	1961	1972	1981	1998	2005
Population (In thousands)	256.04	333.81	607.40	776.61	1136.04	1381.71
Inter-censal						
Increase (percent)	--	30.38	81.96	27.86	46.28	25.00
Cumulative						
Increase (percent)	--	30.38	137.23	203.32	343.70	439.728
Average Annual						
Growth Rate (percent)	--	2.71	5.26	2.95	2.26	2.26

Source: District Census 1998.

Annex-Table 1.5: Percentage of Population by Economic Categories, Sex and Rural/Urban Areas, 1998

Economic Category	All Areas			Rural			Urban		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
Labour Force	17.96	32.55	1.76	17.22	31.54	1.40	21.70	37.67	3.62
Not in Labour Force	82.04	67.45	98.24	82.78	68.46	98.60	78.30	62.33	96.38
Children Below 10 Years	33.11	32.71	33.54	33.54	33.27	33.83	30.92	29.90	32.08
Domestic workers	31.93	3.15	63.87	32.25	3.43	64.10	30.33	1.75	62.69
Students	5.70	10.36	0.52	4.86	8.95	0.35	9.95	17.49	1.41
All Others	11.30	21.22	0.30	12.13	22.81	0.32	7.10	13.20	0.20
Labour Force Participation Rate (Refund)	26.85	48.38	2.65	25.91	47.26	2.12	31.42	53.73	5.33
Un-Employment Rate	13.61	14.16	2.22	13.64	14.07	3.04	13.47	14.57	0.57

Source: District Census 1998.

Annex-Table 1.6: Livestock Population in Badin District (1996)

Type	Number	Percentage
Cattle	289,346	0.25
Buffalo	367,774	0.32
Sheep	163,507	0.14
Goat	302,223	0.27
Camel	7,187	0.01
Horse	1,051	0.00
Ass	9,007	0.01
Mule	27	0.00
Domestic Poultry	626,053	

Source: Livestock Census 1996.

Annex-Table 1.7: Area Irrigated by Different Canals

Source / Canal	Area under command (in acres)	Discharge of Irrigational water (in cusecs)
Guni Canal (non-perennial)	375,815	5,630
Phuleli Canal (non-perennial)	414,600	5,796
Akram Wah (perennial)	416,675	2,906
Nasir Canal (perennial)	302,012	876

Irrigation Department Sindh: 2002

Annex-Table 1.8: Health Infrastructure in Badin District

Type of Facility	Number	Sanctioned Staff	Number
Civil Hospital	1	Medical Officers (Male)	317
Taluka Hospitals	3	Medical Officers (Female)	60
Rural Health Centres	12	Lady Health Visitors	15
Basic Health Units	38	Female Health Technicians	44
MC Health Care Centre	1		
Experimental Dispensaries	40		

Health Department.

Annex-Table 1.9: Source of Drinking Water, 1998

Sources	All Areas	Rural	Urban
Source of Drinking Water			
All Sources	100	100	100
Inside			
Pipe (Nul)	13.00	7.68	46.12
Hand Pump	15.73	14.03	25.99
Well	6.17	6.89	1.70
Outside			
Pipe (Nul)	3.64	3.30	5.72
Hand Pump	9.07	9.59	5.81
Well	7.15	8.11	1.16
Pond	11.05	11.82	6.30
Others	34.18	38.52	7.19

Source: District Census 1998.

Annex-Table 1.10: Source of Lighting , 1998.

Sources	All Areas	Rural	Urban
Source of Light			
All Sources	100	100	100
Electricity	35.14	28.52	76.29
Kerosene Oil	63.44	70.04	22.39
Others	1.42	1.43	1.33

Source: District Census 1998.

Annex-Table 1.11: Source of Cooking Fuel Used 1998

Source	All Areas	Rural	Urban
Cooking Fuel Used			
All Source	100	100	100
Wood	90.74	93.64	72.70
Kerosene Oil	3.57	3.52	3.92
Gas	3.40	0.41	21.97
Others	2.29	2.43	1.41

Source: District Census 1998.

Annex-Table 1.12: Livestock Population in Thatta District

Type	Population	Percentage
Cattle	339,105	31
Buffalo	314,253	29
Sheep	170,031	16
Goat	240,920	22
Camel	11,081	1
Horse	424	0
Mule	183	0
Ass	23,748	2
Domestic Poultry	510,114	Not included

Source: Livestock census: 1996

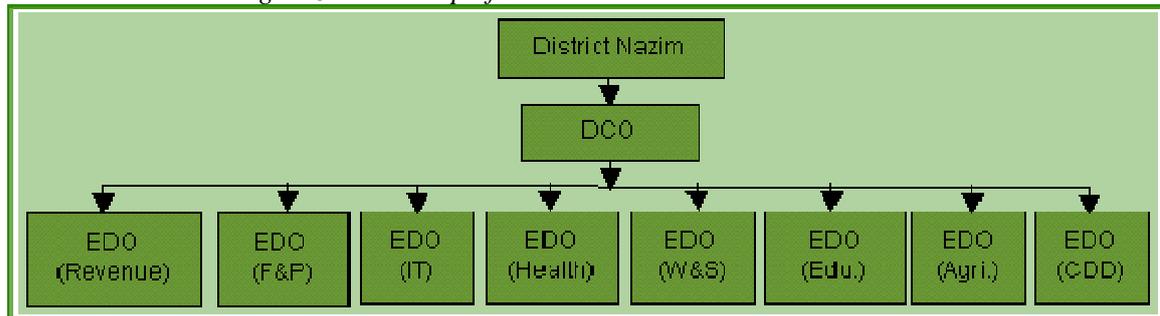
Annex-Table 1.13: Land Degradation Due to Sea Water Intrusion

Taluka District Thatta	No. of Dehs	Area of Talukas in acres	Areas Affected				Total Area Affected in Acres
			Dehs fully eroded by Sea	Area in Acres	Dehs Partially Affected	Area in Acres	
Shah Bunder	92	729,382	12	504,553	31	85,884	590,443
Ghorabari	59	231,980	2	7,316	8	24,174	31,490
Karochan	41	252,110	21	95,910	9	21,913	117,823
M. Sakro	90	736,541	3	11,033	17	49,140	60,178
Jati	132	875,376	1	194,556	10	274,569	226,663
Keti Bunder	42	150,594	28	112,959	1	1000	113,959
A. Sub-total	456	2,975,693	67	414,464	76	456,680	1,140,556
District Badin							
Golarchi	102	440,504	1	6,772	5	23,853	30,625
Badin	140	352,681	4	28,986	6	20,193	49,179
B. Sub-Total	242	793,185	5	35,758	11	44,046	79,804
Total	693	3,769,078	72	450,223	87	500,726	1,220,360

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Annex-2: Organizational Set-up of District Governments

Annex-Table 2.1: Organization Set-up of District Governments



Annex-Table 2.2: List and Contact Numbers of Executive District Officers in Badin

S.No	Designation	Name	Contact No
1	EDO (Revenue)	Mr. Muhammad Ihsan Khan	0227 - 61744,61258
2	EDO (Finance & Planning)	Mr. Syed Mueenuddin Shah	0227-61048
3	EDO (IT)	Haji Noor Muhammad Khatti (In-Charge)	0227-61358
4	EDO (Health)	Dr. Maulla Bux	0227-61871
5	EDO (Works & Services)	Eng. S. S. Faroque Qazi	0227-62283, 0221-720237
6	EDO (Education)	Nizamuddin Tagar	0227-61183, 61784
7	EDO (Agriculture)	Mr. Muhammad Usman Siyal	0227-61623,61785
8	EDO (Community Development)	Abdul Qadir Chandio (In-charge)	0227-61232

Annex-Table 2.3: Detail of Nazim & Naib Nazim of District and Tehsils in Badin

Tehsil (Taluka)	Name of Nazim	Name of Naib Nazim
Badin	Dr. Musrat Hussain Khowaja	Mr. Ali Bux Notkani
Saheed Fazil Rahoo (Golarchi)	Mr. Muhammad Aslam Rahu	Mr. Abdul Salam Arain
Matli	Mr. Asghar Halepota	Mr. Mansoor Nizamani
Talhar	Mir Abdul Qadir Jamali	Mir Wahid Bux Talpur
Tando Bago	Pir Hamid Shah	Sardar Ghulam Rasool Jamali

Annex-Table 2.4: Number of Nazim, Naib Nazim and Members of District, Taluka and Union Councils of District Badin

S.No	Description Number	Number of Positions
1	District Nazim	1
2	District Naib Nazim	1
3	District Council Members	69
4	Taluka Nazim	5
5	Taluka Naib Nazim	5
6	Taluka Council Member	75
7	Union Council Nazim	49
8	Union Council Naib Nazim	49
9	Union Council Members	1029

Annex-3: Key NGOs Working in Badin and Thatta District

Annex-Table 3.1: Key NGOs Working in Badin District

S.No	Name of Organization	Address / Ph.No / E.mail	Contact person
1.	Badin Development & Research Organization (BDRO) Badin	Near new Seerani bus stop, Seerani Road Badin (0227-61429) Email: bdrobadin@hotmail.com	Mohammed Khan Samoon
2.	Badin Rural Development Society (BRDS) Badin	Near Badin X-ray, Badin (0227-61683) Email: brdsngo@yahoo.com	Dr. Akash Ansari
3.	Laar Development Association (LDA) Badin	Golarchi Road Badin, (0227-62318) E.mail: laarbadin@hotmail.com	G.H Mallah
4.	Nojwan Sangat Badin	Municipal shopping Center, Station Road Badin (0227-61902)	Ashfaqe Memon
5.	Anjuman Ashqan Mustafa (SAW) Badin	Madarsa Mazhar-uloom, Shahabaz Road Badin	Iqbal Memon
6.	Society for Science, Education and Research (SSER) Badin	Shah Latif Public School , Seerani Road Badin (0227-62303) sserbadin@hotmail.com	Khadim Talpur
7.	Young Muslim Khattri Welfare Association Badin	PAF Road Badin	Dr.M.Usman Khattri
8.	United Memon Jamaat Badin	Memon Community Center Badin	M.Moosa Memon
9.	Quid -e-Azam Educational Society Badin	Quid Azam Public School , Shahbaz Road Badin	Jamil Memon
10.	Citizen's Welfare Association Badin	Shabaz Road Badin	Khan Sahib A.B Memon
11.	Young Shidi Welfare Organization Badin	Seerani road Badin	Iqbal Hyder
12.	Sindh Aurat Development Association Badin	Kadhan road Badin (0227-61143)	Dr. Najma Junejo
13.	Delta Women Welfare Association Badin	Village Haji Abdullah Shah, Taluka Badin	Abdullah Shah
14.	Women Development Association (WDA) Badin	PAF Road Badin (0227-61516)	Naheed Abro
15.	Pirbhat Social Welfare Association (PSWA) Badin	Gilla Ram Rice Mill, Khoski road Badin (0227-61320)	Kichro Mal
16.	Nindo Shahar Welfare Association Nindo Shahar, Taluka Badin	PO Nindo Shahar Taluka Badin (0227-720282)	Mohammed Khatti
17.	Shaheed Hosh Mohammed Shidi Welfare Association Nindo Shahar	P.O Nindo Shahar Taluka Badin	Fida Hussain Bilali
18.	Village Development Association Village Moosa Soomro, Badin	C/o Sagar Tailor Near Mehmmedi Petroleum Services Badin 0227-61346	M.Suleman Soomro
19.	Natural Resources Protection Program (NRPP) Badin	Seerani Road Badin E.mail: indusbadin@yahoo.com	Abu Bakkar Shaikh
20.	Mehran Social Welfare	Ward No. 03, Golarchi Town 0227-	Javed Iqbal Bhatti

	Association (MSWA) Golarchi	53455 E.mail: javedgolarchi@hotmail.com	
21.	Fundamental Human Rights & Rural Development Association	Ward No. 04 Golarchi Town (0227-53395-53553) Email: golarchi2002@yahoo.com	M. Hassan Mashori
22.	Sarwan Social Welfare Association, Khorwah, Golarchi	P.O Khorwah Taluka Golarchi (0227-53614-15 & Ext: 245)	M.Bachal Nindo
23.	Village Development Association Village Din Mohammed, Pangrio	PO Village Din Mohammed Taluka Tando Bago, (0227-57190 ext: 17)	Arshad Kamboh
24.	Mehran Mouj Welfare Association Pangrio,	PO Pangrio Taluka Tando Bago 0227-57169	Pir Attaullah Shah
25.	Sukh Des Development Society Talhar	PO Talhar District Badin (0227-730126)	M. Anwar Panjwani
26.	Pakistan International Peace & Human Rights Organization	PO Nindo Shahar Taluka Badin (0227-720227) Email: piphro@yahoo.com	Fayaz Hussain Abro
27.	Human Development & Research Organization (HDRO) Matli	Nizamani Mohalla Matli Town (0226-740503) Email: ars114b@hotmail.com	Razaque Nizamani
28.	Sindh Social Welfare Society Golarchi	Paras Public School Golarchi (0227-54117)	M.Qasim Memon
29.	Preh Phuti Welfare Association Matli	Village Ali Mohammed PO Kapri Mori Taluka Matli	Karim Nohrio
30.	Badin Educational Welfare Association Village GM Arain	PO Village Ghulam Mohammed Arain Taluka Matli	Nazir Ahmed Arain
31.	Ansari Social Welfare Association Badin	C/o Yaqoob Hair cleaner Shah Nawaz Chowk Badin	Amar Ansari
32.	Marooara Social Welfare Association Badin	Village Allah Dino Soomro UC Badin ii Badin	Shamas Soomro
33.	Sindh Sahkar Dev: Association	_	Mumtaz Talpur President
34.	Sindh Social Welfare Society	_	M.Qasim President
35.	NRSP	62253	Rasool Bux Soomro
36.	HANDS Health and Nutrition Development Society	62529	Aijaz Memon
37.	SPO	62627	Mr. Javed Hulio
38.	SAFWCO	62621	Ghulam Shabir Kori
39.	FPAP	61306	Gulzar Wasan
40.	Larr Social Welfare Association	53149/53386	Zahida Talpur
41.	Mallah Welfare Organization	61239	M. Siddique Mallah
42.	Sindh Abadgar Board	61149/61237/61697	Haji Muhammad Nawaz Memon
43.	Educational Co-operative Society	Saeedpur, P.O Saeedpur Theba Taluka Talhar	Mohammad Yakoob Thebo Chairman

44.	Sindh Graduates Association (SGA)	C/OJunaid Cloth House Shahbaz Road Badin , Ph. 62367/ 61546	Abdul Sattar Memon
45	Sindh Development and Research Organization (SDRO)	0227-64115	Iqbal Shah
46	Pakistan Fisher folk Forum (PFF)	nawaz_khatti@yahoo.com	Nawaz Khatti

Annex-Table 3.2: Key NGOs Working in Thatta District

S.No	Name of Organization	Address / Ph.No / E.mail	Contact person
1.	Indus Delta Water Area Partnership	Thatta	Karamat Ali
2.	National Rural Support Program	Thatta	Rashid Bajwa
3.	Health and Nutrition Development Society (HANDS	Thatta	
4.	Wahadat	Thatta	Seemi Kamal
5.	Women and Water Networks	Thatta	Seemi Kamal
6.	Citizen's Action Committee	Thatta	
7.	Strengthening Participatory Organisations	Thatta	

Annex-4: Household Survey Conducted By The Diagnostic Team

1. A small and very specific household survey comprising of a sample size of 300 households from the Thatta and Badin Districts was administered as a key part of this diagnostic study. The questionnaire was specially formulated with the help of IFC's guidelines on resettlement which appeared appropriate in the current situation. The questionnaire was field tested in selected areas and modified as required. From the sample, 100 questionnaires were administered in the two coastal *talukas* of Badin (Badin and Golarchi) and 200 questionnaires were administered in the six coastal *talukas* of Thatta. These questionnaires were administered in the most vulnerable areas of the *talukas* and were generally confined to the coastal areas. The selection of the coastal areas was premised on a rapid appraisal which suggested clearly that the livelihoods in the coastal areas were the most vulnerable with some of the poorest communities concentrated along this area. **Annex-Table 4.1** below lists the *talukas* included in the field survey.

2. To ensure the representation of all villages including remote villages, a maximum of 5-6 villages were surveyed in each *taluka*. While a maximum of 35 households were surveyed in each *taluka*. A random sample of villages was selected from each *deh*. Similarly households were also selected randomly. Surveyed households included fishermen, small farmers, tenants, agriculture labour, woodcutters and shopkeepers.

Annex-Table 4.1: Talukas Included in the Survey

District	Taluka
Badin	Badin
	Golachi
Thatta	Mirpur Sakro
	Kharochaan
	Shah Bandar
	Ghora Bari
	Jati
	Keti Bandar

3. A concise questionnaire was developed to obtain detailed information on the socio-economic profile of the household, sources of income and coping strategies (Annex 4-A). A team of trained field investigators with extensive experience of conducting participatory surveys was deployed to administer the survey. The team consisted of four members. Three were male and one female. One senior member also supervised the field team. Prior to the survey, the survey team was assembled in Badin town where the questionnaire was thoroughly discussed and understood by each enumerator. Thereafter the questionnaire was field tested and modified. The questionnaire was administered at the end of December 2004 early January 2005. The data was cleaned and organized on a specially written Program on excel and analysed with the help of a two member team.

4. Focus group discussions were also held in ten villages to get a broad understanding of the area and assess some key trends, opportunities and constraints. A semi-structured checklist was used for group discussions. Information collected through focus group was pertaining to the village level. It was not always easy to get a group of farmers together for discussion. Checklist used for collection of information is presented as Annex-4-B.

Primary school (Rs per student per month)					
Middle school (Rs per student per month)					
High school (Rs per student per month)					
Access to doctor (Rs. Per visit)					
	Amount borrowed (last time)	Source of supply	Cost of Credit (Interest rate per year)	Purpose of loan	Comment
Credit					

4. Has your family suffered any loss of income or assets due to any natural disaster or other reason?

Type of disaster	In the last 5 years	Types of losses occurred		Coping strategy carried out
None		Loss of land		
Floods		Loss of crops		
Cyclone		Loss of water		
Drought		Loss of fishing resources		
Earthquake		Loss of house		
Others (specify)		Loss of livestock		
		Loss of mangrove forests		
		Other specify		

5. Main source of your household income? specify how it has changed, if at all?

Source	1980 (% contribution)	1990 (% contribution)	2004 (% contribution)	If your source of income has changed in the last few years please explain reason why?	Specify which factors you feel you are most vulnerable to with regard to your livelihood?
Agriculture					
Fishing					
Wood Collection					
Wage Labour					
Employment					
Others					

6. If your family is engaged in farming has your cropping pattern changed. If so, specify how?

Crops	Current	Previous	Change in Yield (+) or (-) (mds)
Kharif			
Sugarcane			
Rice			
Tomato			
Sunflower			
Other Kharif			
Rabi			
Wheat			
Rapeseed			
Perennial			
Banana			
Coconut			

7. Reasons for changes in yield _____

8. If your family is engaged in fishing has the pattern of fishing changed somehow, if so specify how?

	Current	Previous	Reasons for change
In-land			
Deep-Sea			
Direct sale			
In-direct sale			

9. Has there been any out-migration from your household or extended family, if so specify who went where and when?

Relation to household head of migrant	Year of Migration	Place of Migration	Type of Migration A= All family P= Part of the family S=Seasonal migration	Current Occupation	Amount of Income (Rs. per month)

Annex 4-B: Checklist for Focus Group Discussions

Date: _____ Goth _____ Deh _____

Taluka _____ District: _____

Households in Village: _____ People present in meeting: Men: _____ Women: _____

1. Socio-economic status of the population and main occupations;

Occupation	No of households engaged in multiple activities	Average income from the occupation	No of households engaged in single activity	Average income from the occupation
Crop Farming (six months)				
Livestock (annual)				
Fishing (monthly)				
Woodlots (monthly)				
Wage labour (monthly)				
Employment (monthly)				
Remittance income (monthly)				

2. Poverty Ranking of Households (Your Opinion)

	Better-Off Households	Middle Income Households	Poor Households	Very poor Households
Numbers				
Principal Occupation				
Approximate Income				

3. Access to Basic Social Services and Credit

Type of service	Availability in the village (Yes/No)	Cost of service	Source of supply	Distance from village	Time taken to go there (hrs)
Drinking water					
Education					
Health					
Credit					
Roads					
Markets					

4. Activities Undertaken by the following Agencies in the Village?

	Water Supply	Education	Health	Credit
Family				
Community				
Government				
NGO				
Private sector				
Landlord				
Local Politician				
Provincial Politician				
National Politician				

5. Is there any seasonal migration of the people from your village? Give details

6. What type of migration has taken place from this village and why (single person, with family or whole village)?

7. Which resources do you think you have a control over? (Describe resources)

8. Which factors contribute to vulnerability and marginalization in this village?

9. What do you think are your rights and obligations?

S.#	Rights	Obligations
1		
2		
3		
4		
5		

10. Who do you think are the most powerful people in the village and why?

Person/Title	Status	Types of power he has

11. Role of women other than domestic chores ...Describe the occasions when women decision is taken or considered?

12. Are there any women in leadership roles?

13. What factors have affected this village negatively during last 10 years?

Negatively Impacting Factors	Resources Impacted	No of households negatively affected	Coping Mechanism	Who helped you during this calamity

14. What factors have positively affected this village during the last 5 to 10 years?

Positively Impacting Factors	Resources Impacted	No of households positively affected	Comment

14. Which type of households require livelihood assistance and why?

15. Types of Interventions and Program Packages are Required?

16. What type of targeting mechanism should be used to reach the poor?

17. What type of implementation mechanisms should be used (government, NGO, private sector, community groups or CBOs, CCBs) and why?

Agency	Reasons for Recommendation
Government	
NGO	
Private Sector	
CBOs formed by NGOs	
CBOs	
CCBs	
Other	

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Maps

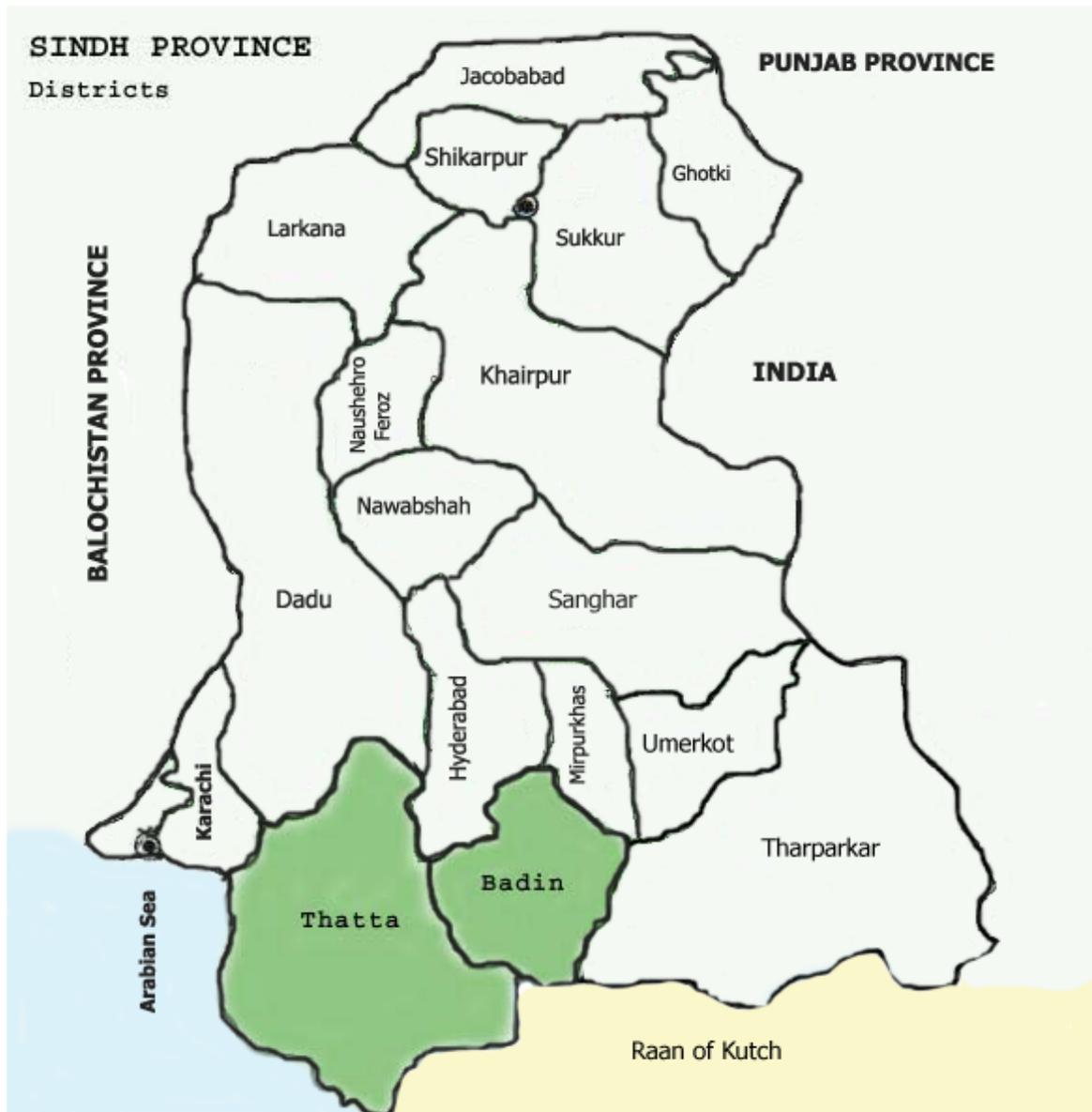


Figure 2: Map of District Badin & Thatta where socioeconomic survey was carried out.

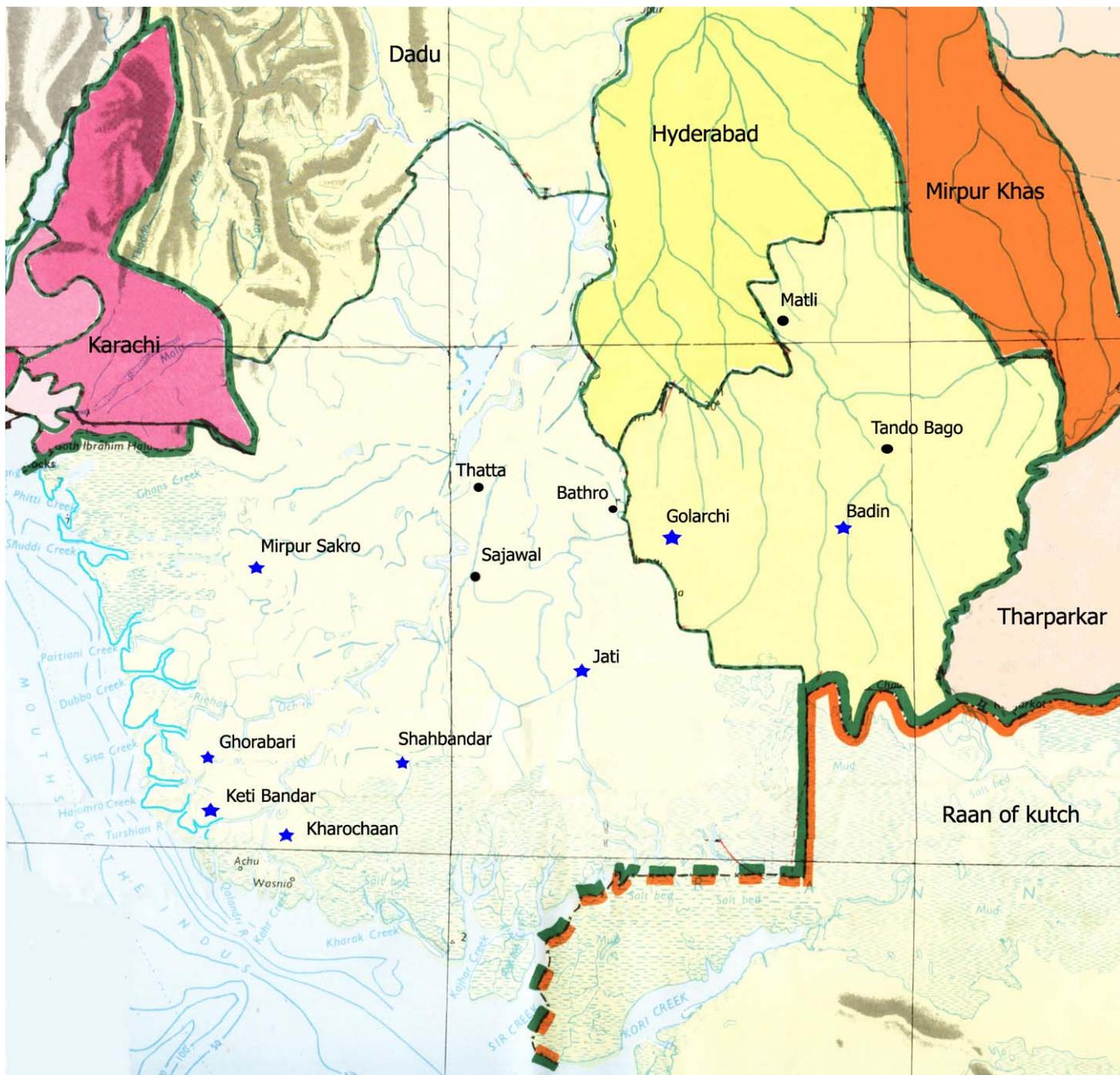


Figure 3: Socioeconomic survey was carried out in 8 Talukas marked with a blue star in the two districts.