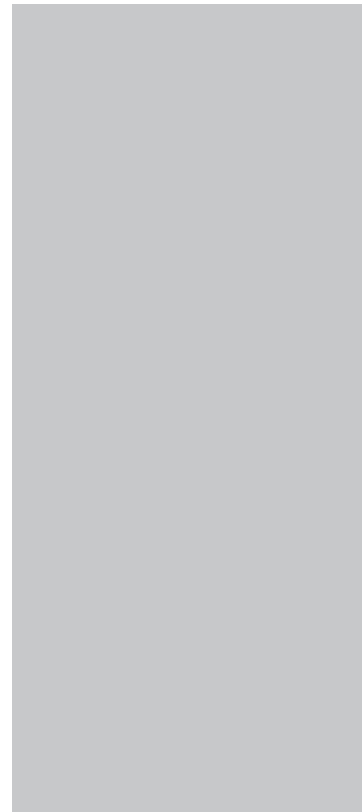
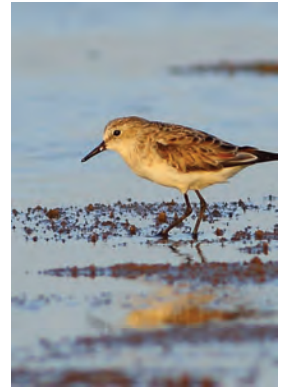




## Community Based Vulnerability Assessment: Kharo Chan, Keti Bunder and Jiwani



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## List of Acronyms

CARE	Cooperative for Assistance and Relief Everywhere
CCAP	Climate Change Adaptation in Coastal Areas of Pakistan
CVA	Community Based Vulnerability Assessment
DelPHE	Development Partnerships in Higher Education
DfiD	Department of International Development
FG	Focus Group
FGD	Focus Group Discussion
GIS	Geographic Information System
HU	Hermeneutic Unit
ICT	Information and Communication Technology
IDI	In-depth Interviews
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
OECD	Organization for Economic Cooperation and Development
SRS	Simple Random Sampling
TCCR	Trust for the Conservation of Coastal Resources

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## 1. Introduction

Different climate risk ranking systems developed by various organizations and institutions assess climate risks and vulnerability differently. While it is important that Maplecroft's Vulnerability Index ranks Pakistan at 16<sup>1</sup>, and German Watch's Climate Risk Index at 1 in 2012 and 3 in 2011<sup>2</sup> what is more important is that Pakistan is recognized as a vulnerable country. Indeed, reviewing recent weather related events such as a 4 consecutive years (2010, 2011, 2012, 2013) of flood related devastation in the country, changes in monsoon patterns, and the lack of coastal resilience to cyclones (Yemyin 2007, Phet 2011) and storm surges, it is clear that the Pakistan is immediately vulnerable to climate change and extreme weather events.

In recognition of this vulnerability, WWF - Pakistan with the generous support of the European Union launched its 5-year programme on Building Capacity on Climate Change Adaptation in Coastal Areas of Pakistan (CCAP, see: [www.wwf-pakistan.org/ccap](http://www.wwf-pakistan.org/ccap)). Project partners include WWF-UK and LEAD Pakistan. In the first half of its timeline, the project focuses on understanding community perceptions of climate change and identifying the multiple dimensions of community based vulnerability induced by climate change and variability in district Thatta, province of Sindh and district Gwadar, province of Balochistan.

The coastline of Pakistan, including the Indus Delta eco-region, contains valuable ecosystems, including agricultural, deltaic, and rangeland ones. It hosts the seventh largest mangrove forest tract in the world, located at the juncture of the Indus River and the Arabian Sea. This landscape, where mangrove forests stand as a natural buffer against coastal erosion and sea intrusion, is home to numerous fishing communities who eke out a living in its marginal lands and are at risk from threats from sea, land, and air. The dangers afflicting their existence are increasing because of human induced climate change.

This Community Based Vulnerability Assessment (CVA) report, relies on the detailed socio-economic baseline study conducted by WWF (described in section 2.3), and is a constituent element of the composite Deltaic Vulnerability Assessment (which includes a policy and institutional analysis; a GIS hazard mapping study; a study on current practices in adaptation; a climate data modeling study; and a study on sediment and environmental flows) conducted under the aegis of the Building Capacity on Climate Change Adaptation In Coastal Areas of Pakistan, reports can be accessed at <http://www.wwf-pakistan.org/ccap/>. The CVA report has been designed to

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<sup>1</sup>Maplecroft (2010) Big economies of the future - Bangladesh, India, Philippines, Vietnam and Pakistan - most at risk from climate change. Available at: <http://maplecroft.com/about/news/ccvi.html>

<sup>2</sup>Harmeling, S. (2012) Global Climate Risk Index 2012: Who suffers most from extreme weather events? Weather-related loss events in 2010 and 1991 to 2010. German Watch.

help inform the adaptation actions of the project. These will be implemented at the community level, and at the district, provincial and national levels. The composite delta-wide assessment and the CVA, in particular, will support the development of two local adaptation plans, it will inform governance and policy, and will pave the way for long-term adaptation strategies. Furthermore, the CVA will add to the general body of literature of climate and adaptation work, specifically to Pakistan's currently limited and nascent stores of knowledge on local vulnerabilities and threats of climate change.

This report attempts to highlight risks, community perceptions of these risks and identify any adaptation responses described by coastal communities that inhabit Jiwani (Gwadar District of Balochistan), and Kharo Chan and Keti Bunder (Thatta District of Sindh). Apart from identifying threats, this report will also list adaptation or actionable responses (section 4), in order to support multi-tier adaptation at the local, district and provincial level. Of necessity, given the diverse range of audiences for this report, these recommendations will be framed in broad terms to support their easy uptake. We hope that government officials belonging to the departments of; planning, environment, and alternate energy, agriculture, fisheries, forests and wildlife, and related authorities such as coastal development, and irrigation development will form a key subset of the audience of this report.

As part of WWF – Pakistan's project titled Building Capacity on Climate Change Adaptation in Coastal Areas of Pakistan, funded by the European Commission, this report attempts to present a brief overview of how climate change, even within a short span of 10-20 years, is causing irreversible harm to the Indus Delta Eco-region and its inhabitants. The voices of the Indus Delta's inhabitants will lead the way to a greater understanding of how this landscape is changing. It intends to serve as a clarion call to government officials, policy-makers, civil society organisations, donors, and concerned bystanders that the survival of the Indus Delta and its inhabitants, humans and animals, is at stake.

In this report, we will rely on testimonies from communities, their perceptions and understandings of climate change and variability and its perceived and actual impacts on their lives and livelihoods. The report will also examine adaptation imperatives at the local level. The CVA attempts to assess the picture at the micro level, relevant issues in the study include: seasonal changes, impacts of extreme weather events, migration patterns, and crop loss, among others. We hope that this will give the reader a clearer understanding of the threats and vulnerabilities challenging Pakistan's coastal zones and communities. And offer them a series of clear and actionable steps that can be taken to protect coastal communities and the Indus delta ecosystem.

The Community Based Vulnerability Assessment (CVA) has adopted an integrated livelihoods and ecosystem approach to understanding climate induced vulnerabilities. Furthermore, it has

adopted a socio-cultural approach to understanding vulnerability. This combined approach posits, “perceptions of and responses to risk and hazard are formed in the context of a range of social, cultural and political factors”<sup>3</sup>

The research perspective has benefited from the work done by other practitioners in the field of climate and adaptation<sup>4</sup>, including WWF- India, CARE, US-Aid, the World Bank, DfID, among others. The CVA has also been strengthened by research team’s experiential learning including opportunities to undertake collaborative research with a multi-partner (Dhaka University, the University of Oxford, IUCN – Pakistan and IUCN - Bangladesh, WWF – Pakistan and the Institute of Environmental Studies at Karachi University) project, funded by the Department of International Development’s (DfID) Development Partnerships in Higher Education (DePHE), focused on assessing priorities and protection strategies for unprotected coastal sites of high ecological value in Bangladesh and Pakistan. Unfortunately, there was little publicly available research on climate change and community vulnerability for Pakistan apart from Oxfam’s 2009 report on “Climate Change, Poverty and environmental crisis in the Disaster Prone Areas of Pakistan.” The methodology outlined in Oxfam’s report was useful in providing a different perspective on conducting participatory climate change and adaptation research in Pakistan.

### 1.1 Definition of Vulnerability

Vulnerability in connection with climate change and its impacts, at its simplest, is indicative of the degree of susceptibility experienced by people or landscapes to biophysical impacts. There are several definitions of vulnerability that encompass and focus on different themes including natural disasters, socioeconomic factors and livelihoods, physical and cultural protection, but common to all of them is the risk factor of a vulnerable population or ecosystem and the capacity or ability of the affected population or ecosystem, or both to cope with and adapt to climate stressors and impacts.

The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes.”<sup>5</sup> This definition has been adapted and extended by Glick, et al<sup>6</sup> as “the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes...the sensitivity of a

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<sup>3</sup>Bickerstaff, Karen. “Risk perception research: socio-cultural perspectives on the public experience of air pollution,” Environment International 30 (2004) 827–840.

<sup>4</sup>Some key influences on the research design include DfID’s (2002) Sustainable Livelihoods Framework (SLF), IISD’s (2009) Community Based Risk Screening Tool – Adaptation and Livelihoods, WWF – India’s (2010) report on “Sundarbans: Future Imperfect” and the World Bank’s (2010) study on “Evaluating Climate Change and Development” among others.

<sup>5</sup>IPCC, 2007

<sup>6</sup>Adapted from Contribution of Working Group II to the Fourth Assessment Report of the IPCC (2007).



particular system to climate changes, its exposure to those changes, and its capacity to adapt to those changes.”

The term vulnerability has often been used interchangeably with poverty, deprivation, marginalization and other types of risks. The use of the term vulnerability in the context of climate change and frequency of extreme weather events should involve the ability to increase capacities and reduce causes of vulnerabilities. It should not focus on passivity and suffering alone and should not be viewed as the opposite of resilience. People should not be seen as ‘victims’ with little recourse to coping or adaptation. Instead they should be seen as “as agents of change with the ability to cope and demonstrate resilience with their own resources” (2008: 1).

Coping strategies refer to the manner in which people use existing resources to achieve various beneficial ends during unusual, abnormal and adverse conditions of a disaster phenomenon or process (UNISDR, 2002). Adaptation strategies on the other hand, refer to the ways and means people utilize to reduce harm or take benefit of longer-term threats and benefits of climate change.<sup>7</sup>

According to Cannon (2008: 3), vulnerability is made up of several components: (1) livelihood strength and resilience which involves income-generating activities and a robust and adaptable income for greater resilience; (2) well-being and base-line status comprising good health; (3) self-protection in terms of protecting one’s home and assets; (4) social protection denoting mobility away from danger and to be able to restore livelihoods with ease; and (5) governance involving support for restoring or creating resiliency in these four elements. It is important to understand that these five components are linked and in combination affect levels of vulnerability and resilience.

Livelihoods and vulnerability are often inextricably related and inter-linked. For instance coastal communities, including the beneficiary communities the CCAP project works with, have “no other choice but to face and cope with natural hazards to sustain their daily needs. The difficulty of accessing sustainable livelihoods may further lead to environmental degradation which often materialises in increasing natural hazards; for instance, the need for firewood aggravates deforestation which in return exacerbates” threats of land erosion and impacts of floods (Gaillard, 2010: 222). The accelerating pace of natural resource extraction may force people to move to even more marginal lands and fragile ecosystems. This in turn exacerbates human and ecosystem vulnerabilities. When the five components outlined above break down or are weak, communities experience vulnerability, and the magnitude of vulnerability they experience also increases.

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<sup>7</sup>McGray, Heather. “Enabling Climate Adaptation” video, youtube, july 2009. World Resources Institute. [http://www.youtube.com/watch?v=U\\_c48qvxFqg](http://www.youtube.com/watch?v=U_c48qvxFqg) Accessed on August 25, 2012.

## 1.2 What is a Vulnerability Assessment?

A vulnerability assessment is essentially a method of understanding the dimensions of vulnerability i.e. biophysical and/or social (Brooks, 2003); ranking these priorities i.e. the type and range of climactic threats; and supporting the development of adaptation plans and strategies for specific vulnerable groups and areas.<sup>8</sup> A Community Vulnerability Assessment or CVA may be carried out to determine the strength of a community's (1) livelihood opportunities and resource base, (2) health, (3) ability to safeguard itself, (4) social protection net, and (5) governance.

It is important to recognize that while the concept of vulnerability is relatively static perceptions of vulnerability and responses to vulnerability are dynamic. Furthermore, experiences of vulnerability, including exposure to climate threats and change impacts, extreme weather events, and capacity to cope vary over time and space. Given these temporal and spatial variations, determining the type of vulnerability assessment carried out is vital.

Rapid and comprehensive longer-term vulnerability assessments provide information on differential dimensions and magnitudes of vulnerabilities and influence adaptation planning. In spatial terms, community and household level vulnerability assessments offer comprehensive analyses of vulnerability and climate shocks and stressors in specific locations; local experiences of vulnerabilities and responses; and provide insight into local level adaptation planning. Macro vulnerability assessments, on the other hand, generate information on a regional level, which is important for macro-level policy and planning decision-making, and for identifying regional priorities.

The community vulnerability assessment research has been evolving for the last several decades or so (Anderson and Woodrow 1989/1998; Blaikie et al, 1994; Twigg, 2001), and will continue to do so, as new threats and ways of managing vulnerabilities emerge.<sup>9</sup> Different organizations have developed various toolkits to fit their respective needs. These toolkits lend valuable lessons and best practices to each other, as in the case with WWF's CCAP CVA toolkit. This CVA has learnt lessons from, and progressed forward from Oxfam's CVA, also conducted in Sindh. For this reason alone, this report focuses at length on the methodology used by the CVA study, as it

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<sup>8</sup>Smith and Wandel., 2006

<sup>9</sup>Anderson, M.B and Woodrow, P.J. ( 1989/1998). *Rising from the ashes. Development Strategies in times of Disaster*. London: Intermediate Technology Publications (1998 edition)

Blaikie, P., Cannon, T., Davis, I. and Wisner, B. (1994). *At Risk: natural hazards, peoples vulnerability and disasters*. London: Routledge.

Twigg, J. (2001). *Sustainable Livelihoods and Vulnerability to disaster*. Benfield Greig hazard Research Center, Disaster Management Working Paper 2/2001.

forms an integral part of the toolkit for other organizations, and WWF itself, to learn from and to develop best practices through.

As Gaillard rightly says, “People’s capacities emphasise that those affected by disasters should not be considered as helpless victims whose risk perception should be changed from the outside. Instead, development policy should use people’s capacities to help the people themselves to rebuild and to reduce future disaster risk” (Gaillard, 2010: 223). In order to reduce risks, underlying vulnerabilities must be understood while simultaneously pursuing development needs. This builds resilience to existing vulnerabilities and future hazards, increases adaptive capacity against stressors and shocks of the uncertainty of climate change impacts (Schipper and Pelling, 2006: 27–28).

Central to the CVA study are the communities who participated in the research. Their time, willingness to participate in the study and forthright contributions generated rich ethnographic information. This information shaped the analysis and narrative of the CVA and will also contribute to adaptation design in the future. Furthermore, participants were not only viewed as sources of information but their input was solicited for the verification of results and, WWF-Pakistan intends to work closely with participants as it nears adaptation design and promote uptake across communities.

## 2. Methodology

### 2.1 Sampling Methods and Surveys by Season

There is no one standard approach to developing and carrying out a CVA. It is dependent on the type of information being sought, the community in question and the specific purpose of gathering this data. This CVA has been particularly designed with climate change, coping and adaptation strategies and poor, largely illiterate coastal communities in mind, who frequently experience extreme weather such as storm surges, cyclones and flooding.

The methodology in the present study is based on collection and analysis of primary data and its survey instrument was applied at the “community” level. This is an important distinction since survey instruments in the subject area of vulnerability and resilience research are variously administered also at the “household” levels. The CVA research used the local definition of household, wherein a household was viewed as a socioeconomic unit. Individuals were identified as part of the household, if they formed a unit in terms of housing, income generation and use regardless of blood or marital ties. “Village” and “Community” are used interchangeably in this report, meaning human settlements where the research took place.

Since most of the study participants depend on fisheries for their livelihoods, the study was

carried out during fishing and non-fishing seasons to gain a more integrated view of risks and vulnerabilities. Surveys were conducted at 3 sites, namely Keti Bunder, Kharo Chan and Jiwani. Each site was administered 2 field surveys, one for the fishing season (October 2011 – January 2012) and one for the non-fishing season (July 2012).

Each site targeted a yearlong total of 20 Focus Group Discussions (FGDs) and 20-10 in-depth interviews, depending on the site, with 10 FGs and 10 in-depth interviews planned for a single season per site. Focus groups participants ranged from as few as 5 to as many as 22 people. Actual numbers of responses obtained is discussed in section 2.3 below.

The size of the sample was selected to suit “FG” and “in-depth” interview formats, with numbers of such interviews standardly limited by our study budget. Composition of the sample took into consideration representativeness of respondents by livelihood source and geographic location, with deliberate sampling of women, elders and youth to support gender and intergenerational analyses.

Simple random sampling (SRS) was not used to create representativeness of our sample relative to some population total, e.g., Kharo Chan union-council’s total population of 33,058 (2011 CCAP estimate). We would have applied SRS had we wished to aggregate upwards to this population total and claimed representativeness of our sample. Instead, we attempt to present findings based on an analysis of detailed accounts presented in answer to single questions. These accounts relate to vulnerability of communities in the face of climate variability and change.

Questionnaires were administered to respondents in 5-6 villages at each project site. Due to cultural restrictions, joint male-female focus groups could not be carried out (e.g., at all sites many women refused to be photographed; also, at Jiwani, neither men nor women agreed to sit together). Based on these restrictions, as well as to obtain candid answers from either gender, the study uses both a male and female focus group team. Note the survey team leader, a female, was present at both female and male focus group meetings (something not possible for a male to do). Questions for females and youth are contained in section 7 of the questionnaires.

Criteria used to select villages at which to carry out FGs and interviews were mostly obtained through in-house WWF - Pakistan consultations on: village population sizes (taken from the raw data of CCAP’s socio-economic baseline survey), livelihood distribution, purposeful selection of communities that are under-served by WWF or other stakeholders’ interventions, and exposure to relevant climate variability factors and vulnerability factors relating to households’ geographic location and occupation (e.g., mix of creek and inland communities).

## 2.2 Survey Instrument Design

Our survey instruments for the 2 seasons are divided into the following broad modules: (1) general respondent information and household livelihood pattern, (2) energy sources and usage, (3) water and sanitation access and use, (4) household construction infrastructure, (5) adaptation practices, (6) role of women and children in adaptation, and (7) other adaptation concerns. Within these sections, specific questions covered relate to fishers' and farmers' adjustments or adaptations in response to perceived changes in rainfall and temperature, as well as their perceptions of declining renewable resources including forests, fish, and rangelands. Vulnerability is extracted from responses to these questions, as well as information obtained on asset ownership, household incomes, housing type, exposure to extreme coastal weather events, spread of disease and pests, availability of freshwater, and access to health facilities, among others.

As described earlier, the study was carried out by administering two different questionnaires, during the fishing and non-fishing seasons respectively. Marta Lang, Teaching and Visiting Research Associate, School of Geography and the Environment, the University of Oxford, co-designed the survey instrument for the non-fishing season in which DelPHE also collected primary data for their own analysis focussing on ecological values, human impacts on and interactions with species and habitats, ecological and species protection strategies and water quality.

More specifically in the non-fishing survey new exercises were introduced, such as seasonal calendars and community map exercises, and introduced questions that focused more intently on species of fish and shellfish catch, locations (sea and creek) where communities fish, sea and creek locations where fishing is focused, interaction with and exposure to other marine species, and overall awareness of ecological health and services, and conservation practices in the area.

A seasonal calendar is a participatory research tool. During the CVA it was used to explore seasonal changes in livelihoods, workload, income, expenditure and credit, availability of food and water, diseases and culturally important days, etc. Similarly the community map is another participatory research tool drawn by the participants. The map identified households, socially and culturally important sites, and any or all of the following, depending on their proximity to the village: nearby forests, water sources, agricultural fields, grazing lands, and fishing locations etc.

Throughout the modules a 10-year recall period is solicited for perceptions and practices. Interpretation of results in this regard is based on standard IPCC/OECD definitions of climate change as occurring after 10 years of consecutive climate variability. The second use of this time frame is to understand changes in both perceptions of climate over time and community based adaptation practices that may in turn, have affected livelihood practices. It also allows for a

generational difference to be taken into account. One of CCAP's studies, focussing on climate change models for the Indus Ecoregion based on data of the Pakistan Meteorological Department, provides evidence of a 10-year increasing trend in average country-wide area weighted mean temperature that is temporarily broken by a 2005 dip. It is an anomaly in an otherwise sharp rising trend in temperatures owed to the El-Nino phenomena.

The design of the survey instrument benefitted from the input of WWF-US and, as mentioned before, the University of Oxford's DelPHE project. In particular, early drafts of questionnaires were shared with WWF-US where Sarah Freeman, Water Resources Specialist with the Conservation Science Program, and Jonathan Cook, Climate Change Adaptation Policy and Governance Program, presented their joint research and shared their expert opinions at the early stages of our work.

While designing the questionnaire and agreeing the sequence of steps comprising the study, the CCAP team consulted work carried out by several other practitioners in the field of climate and adaptation. Some key influences on the research design include DfID's (2002) Sustainable Livelihoods Framework (SLF), IISD's (2009) Community Based Risk Screening Tool – Adaptation and Livelihoods, WWF – India's (2010) report on "Sundarbans: Future Imperfect", the World Bank's (2010) study on "Evaluating Climate Change and Development", Daanish Mustafa's (2011) paper "Pinning down vulnerability: from narratives to numbers", the CRISTAL Toolkit, "Scanning the Conservation Horizon" by Glick et al (2011), among others.

### **2.3 Approaches to Vulnerability and Methodological Steps**

The questions contained in the instruments recognizably follow ecosystem and livelihoods and socio-cultural approaches to understanding vulnerability. As is standard, the questions are addressed to women, children and elderly populations as they tend to experience hazards and livelihood risks differently than young or middle-aged male populations.

As regards research methods, the focus group (FG) and interview participatory approaches are intended to provide a record and interpretation of past experiences, current and anticipated vulnerability, climate risks, adaptive capacity and how these intersect with livelihood and socio-economic issues.

The CVA solicits local perceptions of climate risks and existing coping mechanisms, in doing so it departs from many traditional adaptation analyses beginning with 'climate scenarios'. The CVA has also generated enthusiasm among the CCAP team because tries to capture inter-generational experiences of climate and responses to climactic risks, as well as gendered perceptions of climate change.

Methodological steps of our study, in chronological sequence included:

- Literature review,
- Gap analysis,
- Preliminary/reconnaissance field visits and consultations,
- Delineation of survey sites and application of site selection criteria,
- Development of sampling methodology,
- Questionnaire design,
- Hiring and training of survey teams,
- Pilot testing and finalization of the questionnaire,
- Data collection and translation,
- Analysis of primary and secondary data using Atlas.ti software,
- Report writing and finalization of a “developing database” on Atlas.ti.

During the fishing season surveys, at Keti Bunder and Kharo Chan 9 in-depth interviews and a total of 20 focus group discussions were held, out of which 11 were attended by men only, and the remaining 9 were attended by women only; and 6 in-depth interviews and 10 focus groups discussions were carried out in Jiwani, 5 of these FGDs were attended by male participants only and the remaining 5 were attended by female participants only.

In some cases women were unable to fully complete a focus group session due to household responsibilities. In this situation the TCCR (Trust for the Conservation of Coastal Resources) researchers along with WWF- P staff ended the focus groups and, where possible, carried out in-depth interviews instead.

During the non-fishing season, 17 focus group discussions and 11 in-depth interviews were held in Keti Bunder and Kharo Chan of these FGDs 10 were attended by men only and the remaining 7 were attended by females only. While 12 in-depth interviews and 11 focus group were carried out in Jiwani, of these FGDs 5 were attended by males only while the remaining 6 were attended by women only.

Climate stressors, contribute to the perception and experience of vulnerability. We noted, even within the same location and community the perception and experience of vulnerability differs.

Women and men, children and youth, and older populations all experience and account for vulnerability differently. While such differences may not be significant or, even paramount, they are nonetheless interesting to record and analyse. The CVA offers an invaluable opportunity to examine these closely.

Focus group discussions were used as a means to understanding how “individuals discuss a certain issue as ‘members of a group’ rather than simply as individuals” (Bryman, 2004: 364)

and how participants responded to each other's views.

The focus groups allowed the researchers to note differences and similarities in the perception and experience of vulnerability across different groups. This acted as one verification method, which allowed the researcher to gain a more nuanced view of what community members think along with the socio-political dynamics at play. As a CVA research tool, the focus groups also helped populate the analytical framework with collective and individual perceptions and experiences of vulnerability, and adaptation (non) actions while demonstrating the social, cultural, and economic processes that help shape narratives of vulnerability and risk.

The CVA methodology emphasises interviewing women because they tend to feel more comfortable talking on a one-on-one basis, and are more likely to discuss social and household dynamics than if they were in a group. The role of women in local communities is multi-dimensional and the intergenerational interview tool helps account for differences in experiences and perceptions over a range of time. Women respondents help shed light on impacts of climate change risks and vulnerabilities on their responsibilities as primary caregivers and natural resource managers<sup>10</sup>.

Women, children and elderly populations also tend to experience livelihood risks and environmental threats and shocks differently than younger or middle-aged male populations. For example, an elderly villager may speak of an abundant or scarce fish stock and predict weather patterns, while a young villager may speak of employment problems, larger aspirations and lesser interest in fishing as compared to other means of income generation<sup>11</sup>.

During the analysis stage, the intergenerational interviews provided a means of tracing changes, if any, in the perception and experience of vulnerability within a single household over a larger span of time; changes in understanding of vulnerability; and adaptation responses and actions. Through in-depth unstructured conversation complicated relationships and slowly evolving events can be unravelled (Bryman, 2004). While it is true that interviewer bias may influence data collection and write-up, it cannot be argued that this method provides an “irreplaceable source of primary data” (1991: 92 in Cloke et al 2004: 125).

To compensate for any limitations and bias that may occur through the use of qualitative research methods during the CVA study, other studies carried out under this project provide a means of verification and triangulation. These include studies based on primary and secondary data collection on climate modeling, GIS based hazard mapping, political and institutional

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<sup>10</sup>Zaheer, K., Alesworth-Siddique, N. (2011) Community Vulnerability Assessment for Coastal Areas of Pakistan. World Wide Fund for Nature – Pakistan. Conference on ‘Climate Change Adaptation and Water Resource Management in the Asia Pacific Region’. COMSATS November 2011.

<sup>11</sup> Ibid.



analyses of climate readiness, and a full-fledged quantitative socio-economic baseline (SEB) and Needs Assessment study.

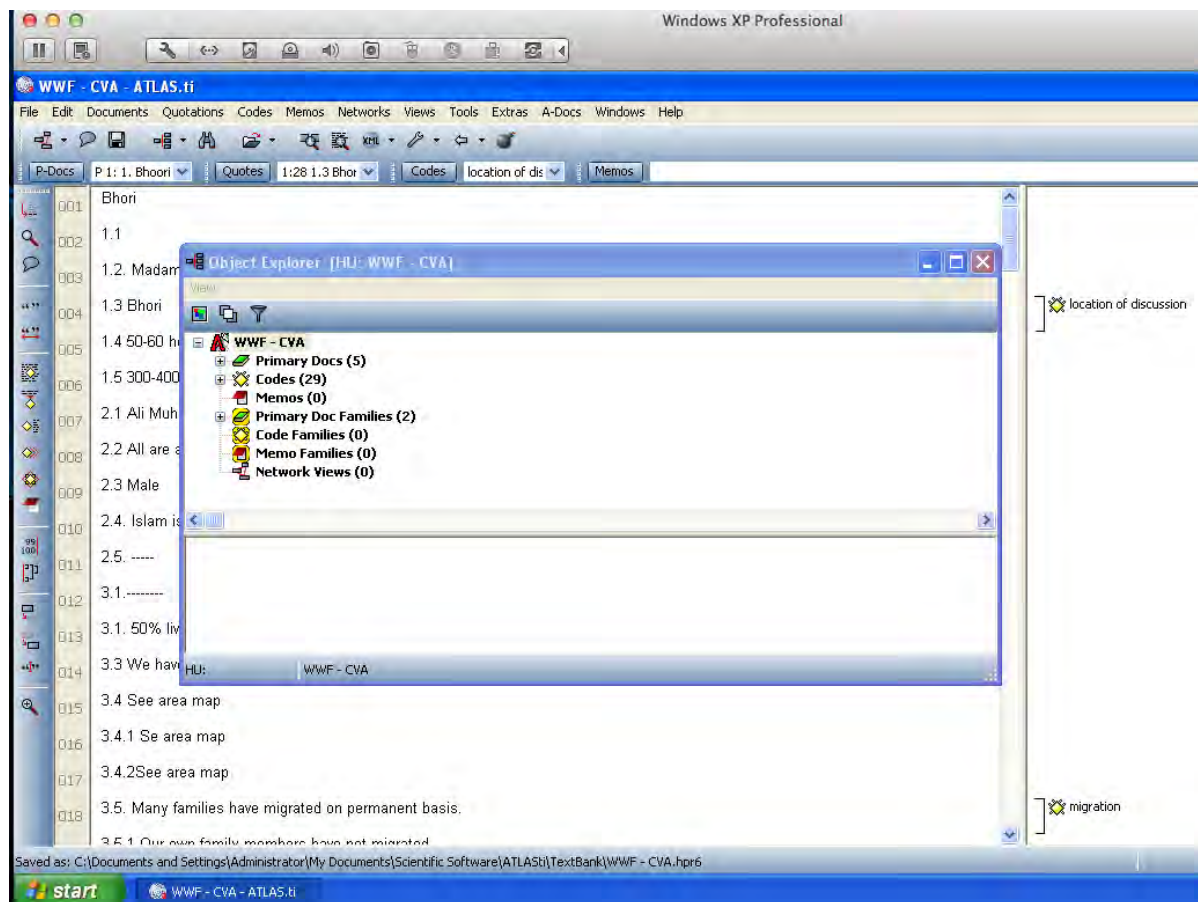
## 2.4 Data Analysis and Data Processing Steps

In terms of analysis, an iterative, rolling-wave research process was used. Put simply, this meant that after the completion of each phase the collected data (all recordings, completed notes) was reviewed by the research team before being transcribed. The transcribed and translated data was re-reviewed by the research team and initial thematic groupings and findings were collated.

Upon collation, the research team met with respondent communities to verify and share the initial results. The transcribed data was then uploaded to ATLAS.ti. ATLAS.ti is a qualitative data processing program that helps organize and interpret text data. Referred to as a “workbench” the program offers a way to engage with qualitative data in a hands on manner by providing a workspace where research material could be pieced together in a creative manner. The program provides the necessary tools to consolidate, organize and review, search and collate data, capture and visually outline findings.

During the CVA analysis the program was used to consolidate questionnaires, focus group and interview transcripts. During the collation and organization phase the data was uploaded to ATLAS.ti’s interface. The interface acts in the manner of a ‘container’ or a ‘pinboard’ that keeps track of all the data. This container is the ATLAS.ti equivalent of a project file and is referred to as a Hermeneutic Unit or HU for short. By uploading all available data to the HU the software allows the user to house the data in a central location and then categorise, extract, and link data segments – such as quotations, interconnected points of enquiry and thematic linkages across different sources.

A basic HU would include a list of primary documents, codes, memos, primary document families, code families, memo families and network views.

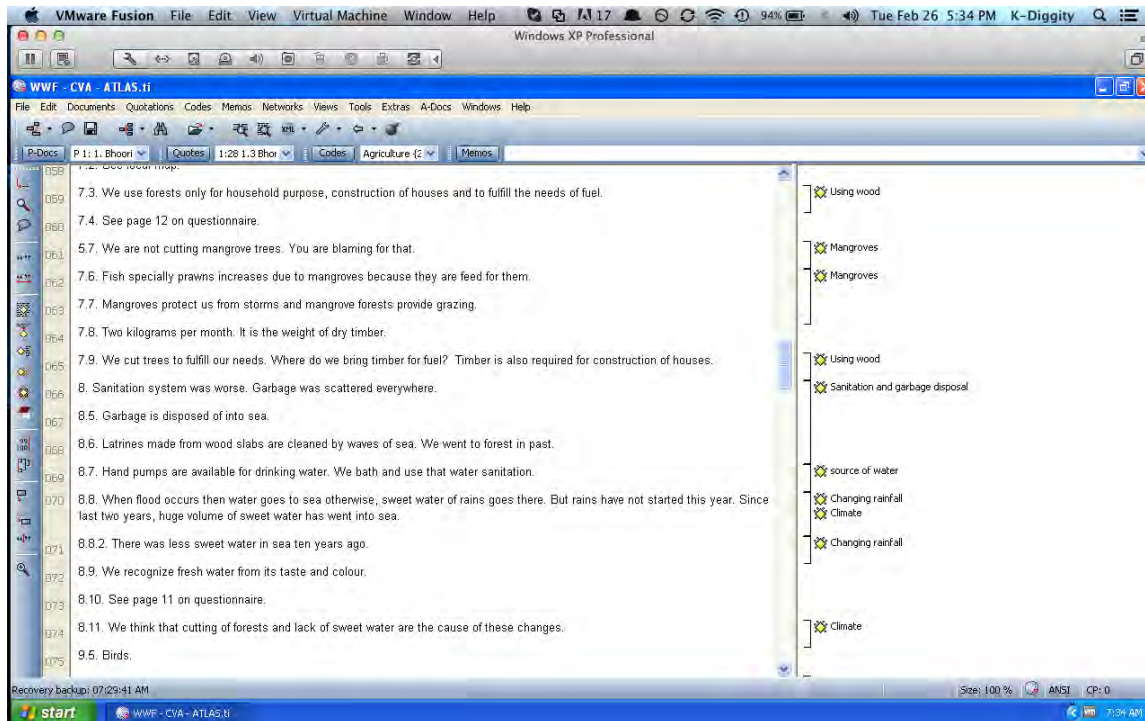


(Sample HU, with directory list)

- Primary documents refer to all textual, audio and visual data uploaded to the HU.
- Codes refer to the process of identifying themes and association across data (e.g. natural resources, migration, external initiatives, etc.).
- Memos refer to standalone analytic notes drafted during the data review and analysis process. If these are linked to particular data segments or primary documents during analysis they are referred to as ‘Notes.’
- Primary document families refer to the cluster of different groupings primary documents. For instance, transcripts of focus group discussions and interviews would be classified as different primary document families. Sub-families would include transcripts grouped

according to research phase, region, gender etc. and are only restricted by degree of utility.

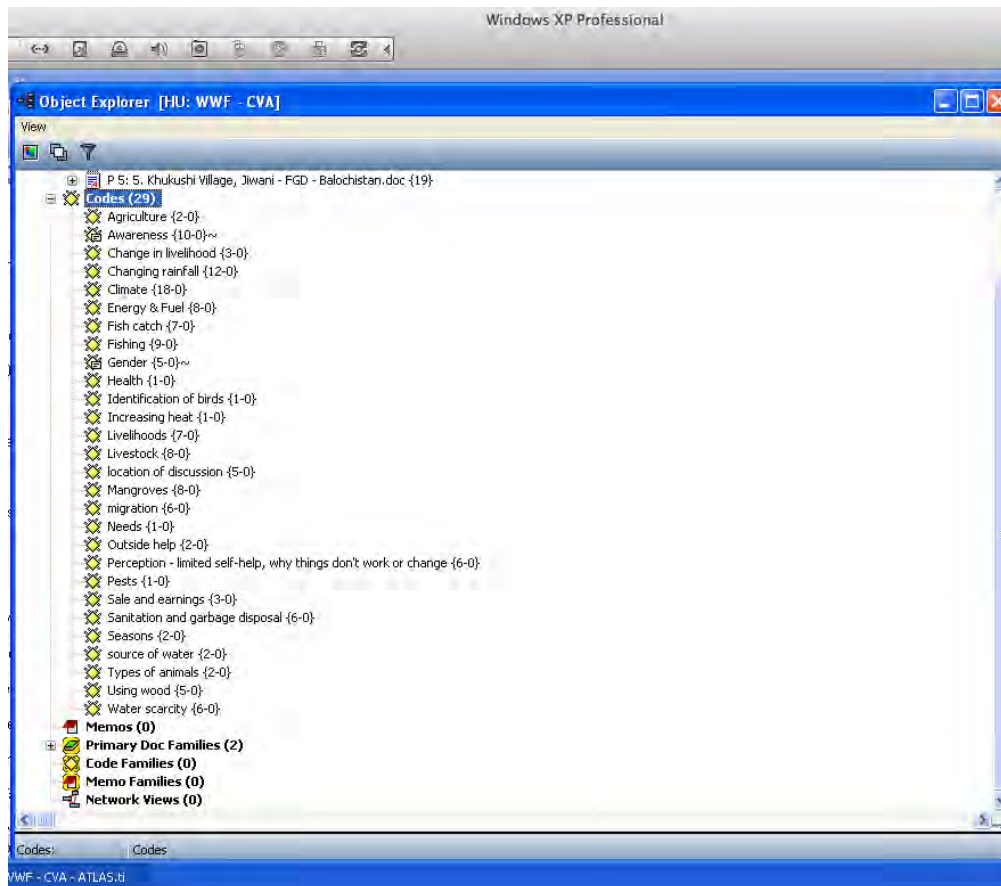
- Code families as the name implies cluster different themes (e.g. types of civic infrastructure  $\leftrightarrow$  health etc.) They may also be used to further subdivide a single theme for further study (e.g. livelihoods  $\rightarrow$  fisheries  $\rightarrow$  fish catch  $\rightarrow$  fish seasons  $\rightarrow$  etc.)



(Sample transcript with codes linked to quotes)

- Memo families group different memos to help advance analysis.
- Network views allow visual representations of textual data enabling the researcher to see linkages across different data segments.

During the CVA analysis, once all available primary documents were uploaded to the HU, the next stages involved extensive data review to identify thematic groupings, identification of sub-themes and flagging, subjective experiences and respondents' perceptions of their environment (both physical and socio-economic) as well as the emotions engendered by their circumstances and actions or lack thereof.



(Sample code list)

Using careful analysis, supported by code lists, the transcripts, memos, notes and quotations are pieced together to outline conclusions and create recommendations.

The CVA initial research findings were shared with community respondents mid-way through the study even before the comprehensive analysis had begun. While this was a resource intensive process, it was an important step in assuring that there were minimal data losses during data collection, data translation and transcription. Data analysis began shortly thereafter. It was also an important trust building measure.

Field research, requiring community participation, is fraught with power imbalances. Researchers have to balance their need for collecting information and data with the knowledge that more often than not communities, particularly disenfranchised communities, tend to believe that they have no right of refusal.

Research, in respondent eyes, tends to be invasive, and exposes, particularly in this instance, their fears for the present and worries for future survival, while challenging their continued modes of living without providing anything concrete in return, except a nebulous future concession of 'help' or the 'importance of research for its own sake.' The research team

understood this dynamic, which was reiterated by the local WWF staff. The team decided to return to the respondent communities even before the analysis was complete to demonstrate to respondents that the CVA research was a two-way process and that respondent communities were key stakeholders in the process.

### 3. Voices from the Community: Study Findings

In this section, study findings are reported. Responses given by participants are matched against their respective survey question. The questionnaires for both the fishing and non-fishing seasons are in Appendix 2 and should be referred to while going through this section of the report. We recount perceptions and experiences of these challenges as recounted by study participants. Many of the experiences shared, have significant impacts on people's lives and livelihoods; and exacerbate local climate vulnerabilities. In fact many of these issues are central to the adaptation responses proposed in section 4 of the study titled 'Looking Ahead'. Section 4 relies heavily on the discussion in this section.

WWF's past work in the Indus Delta and coastal Balochistan has reported congruent issues that can, for the most part, be divided into climatic and environmental impacts, on the one hand, and socio-economic impacts, on the other hand. The former include seasonal changes, unpredictable rainfall, increasing sea intrusion and coastal erosion, and heightened intensity and frequency of extreme events. The latter, which tie real incomes to natural resource use, include depletion in fish stock and changes in fishing patterns, deforestation of mangroves and changes in crops and agricultural practices. Overall, we may say that the CVA fieldwork on Keti Bunder, Kharo Chan and Jiwani emphasised the recurring nature of these challenges.

Please note that this distinction between climatic or environmental impacts and socio-economic effects has been made for analytical purposes only and is not representative of how the communities we spoke to understand and narrate these challenges.

When reviewing the discussion below, it is useful to understand the distribution of livelihoods across the villages in Thatta and Jiwani. Counting all three sites, fieldwork was carried out in a total of 16 villages during both non-fishing season and fishing season surveys (detailed breakup is annexed on pg.48). In Thatta of the 11 communities who participated in the study, 8 were exclusively dependent on fisheries, 3 on agriculture. In Jiwani, on the other hand, respondents demonstrated a more diversified range of livelihoods with 4 of the 6 participating communities dependent on a mix of agriculture, migrant labour and fisheries, and 1 village was dependent on fisheries only and the other on agriculture.

A union-council level percentage break up of our sample by primary income source is provided in the text accompanying (first pie chart on page). As noted in section 2.1 above, as we are not applying a simple random sampling method to obtain a representative sample of the respective union council population totals our break-up

should only be interpreted to signal relative shares. In a qualitative study like this one readers who are practitioners are invited to repeatedly consult table 3.1 above to identify villages corresponding to vulnerability findings. This will help them to ascertain where to provide interventions.

Table 1: Distribution of Primary Income Sources Across Villages

No.	Village name	Livelihood type
<b>Thatta (Kharo Chan and Keti Bunder)</b>		
1.	Ahmed (Karmi) Samoon	Agriculture
2.	Babeyo	Agriculture
3.	Sajanwari	Agriculture
4.	Tippun	Fisheries
5.	Bhoori	Fisheries
6.	MeeroDablo	Fisheries
7.	Keti Bunder Town	Fisheries
8.	Hajamro	Fisheries
9.	Haji QadirBuxBaloch	Fisheries
10.	Ali Utradi	Fisheries
11.	Abdullah Khatti	Fisheries
<b>Gwadar (Jiwani)</b>		
1.	Kargoshi	Agriculture
2.	Gunz	Fisheries
3.	Jiwani Town	Agriculture and fisheries
4.	Bandari	Agriculture and fisheries
5.	Okar	Agriculture and fisheries
6.	Panwan	Agriculture and fisheries

In what follows, reports by male and female focus group discussants are provided in text boxes with accompanying commentary helping to interpret communities' varied types of vulnerability in the face of climate change. The boxes are not intended in and of themselves to comprehensively relate study findings for a given topic or questionnaire module; instead the accompanying commentary elaborates resilience related recommendations that are stated concretely in the final part of this report. The reader accustomed to quantitative presentation of information in charts, graphs, histograms or similar, will need to be acclimatised to presentation of findings in this qualitative format.

Readers are invited to contrast and appreciate the complementarities between qualitative and quantitative analyses as commissioned by CCAP to guide the development of resilience interventions. In particular, a priority subject or a priority area in which to intervene can be derived objectively as well as subjectively. The socioeconomic baseline can help locate a priority village based on its level of household incomes relative to other villages. Assignment of priority in this sense is an attempt at objectivity that is defensible should selection criteria be questioned, for example. However, the assignment of priority is partial and is complemented by respondents' subjective testimonies. Such testimony cannot be analyzed by a series of word-for-word quotations alone. Rather, it needs placement in context, with the frequency of topics across a sample interpreted as belonging to a class of vulnerability concerns by the researcher, who also interprets dimensions that only qualitative studies offer such as acuteness of a predicament.

The recommendations drawn from such studies are oftentimes not accompanied by quantitative analysis. This study makes an effort to relate qualitative findings to quantitative ones present in CCAP's 2011 socioeconomic baseline. This sets a benchmark for other studies that propose as we do to guide on-the-ground interventions, in this case for a WWF - Pakistan site office and its staff based year-long right alongside villagers of Kharo Chan and Keti Bunder.



### 3.1 Seasonal Changes

This section refers to questions on:

1) Changes in frequency of weather patterns (see question 3.12 under Appendix 3), for rain, wind and flooding, at present and 10 years ago. (Our analysis used a seasonal calendar exercise to determine these changes and looks at four different types of flooding: (i) tidal flooding, (ii) unexpected flooding (rain), (iii) flooding of village, and (iv) flooding of house. This breakdown is based on data gathered through survey I of the CVA and the socio-economic baseline).

#### **Box 1. Increasing Uncertainty: Changes in Weather**

“About 10 years ago it used to get very cold, but now it seems as if there is very little winter and the heat has increased. In the last 3 years, it has rained very heavily so it is possible that this year it might get cooler.” – Female interviewee, Keti Bunder.

“We have been very unsuccessful because rain does not occur. We are selling our livestock. We do not know how to face climate change. Dam water has been reduced. People are drinking dirty water. Grazing fields have become barren due to scarcity of rainwater. Cattle are dying. Akhori dam has become empty and people are worried. What will happen?” – Male FGD, Bandri, Jiwani.

“River water is not coming here. We are worried. Fish has declined. Warming is increasing. Agriculture has finished after the building of Ghulam Mahammad Barrage (Kotri Barrage). Sweet water was there, which is now not the case. Our social life has changed...Poverty has increased. We are thinking to migrate from here. Sea is advancing towards us very fast.” – Male FGD, Kharo Chan.

“Due to rise in temperature crops shrink.” – Female interviewee, Kharo Chan.

2) Questions on how seasonal changes (if any) have affected farming practices and the types of crop grown, now and ten years ago (see question 4.2.5 under Appendix 3).

3) Question 8.6(Appendix 3) “health of household members” refers to impacts of seasonal changes on health, now and 10 years ago. This question uses data from the CVA and also the socio-economic baseline study to determine the cost of illness through the analytical method of triangulation.

4) The different coping methods and adaptation practices adopted in the face of seasonal changes were elaborated on through Questions 10.4(Appendix 3) “coping strategies” and 10.5(Appendix 3) “strengths of and hurdles faced by coping strategies”.

The following key findings emerge from our analysis of seasonal changes (and should be read in conjunction with box 1 above and the socioeconomic baseline):

- Almost all (99%) the focus group participants and the in-depth interviewees (IDI) in Sindh and Balochistan agreed that the seasons have been changing over the last 10 years and in some instances over the last 25 years.
- Interestingly, these changes in weather have been characterised by peaks and troughs of hot and cold weather. Almost all participants agreed that summers have become longer and hotter.
- The different focus group participants and in-depth interviewees, on the other hand experience changes in the winter season, differently. Some participants characterised the winter months as shorter but colder, while for others, there is no appreciable difference.
- However, what remains certain is that for people living along the coast, and those dependent on fishing for their livelihoods, these changes in weather and in temperature make it difficult to predict the weather, which in turn challenges their certainty of the natural world and their interaction with it.
- Women, in particular, distinctly linked fluctuations in temperature with a rise in

#### **Box 2. Illness and Rising Medical Expenses**

“There is malaria, diarrhoea, typhoid, itching, fever, and allergies. Over a period of 6 months we visit the doctor 5- 6 times...hospital is free but medicine can go up to PKR 500. If we get more ill we go to Gwadar where [it is] PKR 1,000 for transport and PKR 1,000 for medicines. If we get even more ill then [we go to] Karachi, PKR 15,000 for transport.” - Female FGD, Jiwani.

“There’s a lot of fever as well as colds and flu. When we fall really ill then we go to the doctor. Sometimes when we go to Keti Bunder, it costs about PKR 200. If you go to Gharo or Karachi then it costs about PKR 3,000 to 5,000.” – Female FGD, Kharo Chan.

“Stomach problems, vomiting and fever, constipation, and body ache has increased. When we get too ill, about 2-3 times a month we go to the doctor. When we go to Keti Bunder it costs PKR 1,000. This is only for transport. Doctor’s fee and medicines are separate.” – Female interviewee, Tippun, Keti Bunder.

illness. Nearly half of all female focus group respondents and almost all female respondents in Thatta described illnesses such as heat stroke, dehydration, viral flu, respiratory problems, diarrhoea and water-borne diseases and various skin diseases and rashes.

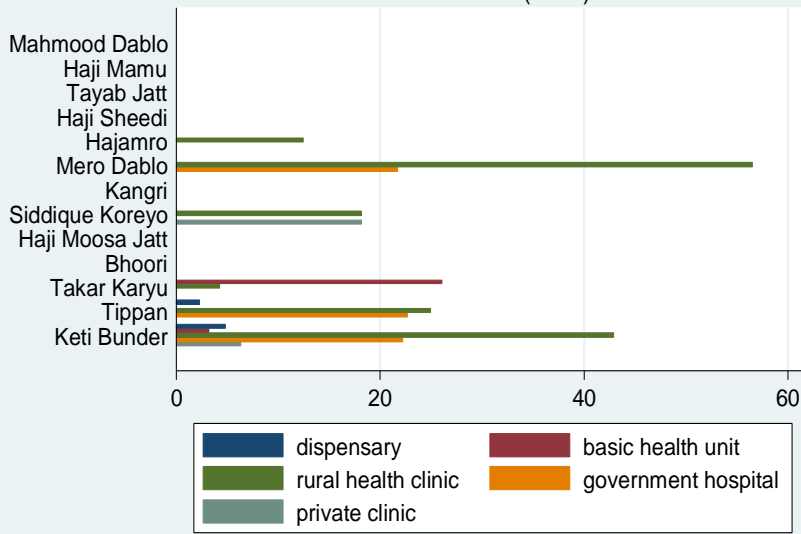
- Many of women claimed that they do not visit the doctor unless they absolutely must because it is too expensive and it takes too much time.
- For communities who have to travel 2-4 hours by foot, boat and bus to reach the nearest functional medical facility and who have to pay between PKR 3,000-4,000 for each visit – these illnesses and their treatment can have devastating economic results.
- During the CVA, we discovered that health issues, spending on health and medical expenses emerged much more strongly in conversations with female participants in Keti Bunder and Kharo Chan. (An observation that is also supported by the Socio-Economic Baseline study data, which found that a greater number of women in Keti Bunder reported consulting with public doctors than at Jiwani).

The fears and perceptions in the second last bullet above are borne out by answers given by respondents in section 4(questions 4.8.3-4.8.5), section 7(question 7.3) in the fishing survey under appendix 2 and the detailed Social-Economic Baseline Assessment study carried out by WWF-Pakistan in these locations. While the socio-economic baseline provides additional insight into health constraints and costs, it is useful to mention some of its findings here.

According to the Socio-Economic Baseline study Kharo Chan and Keti Bunder face higher levels of poverty and illiteracy than Jiwani. Nearly 50% of the sampled households in Kharo Chan and 40% in Keti Bunder fall below Pakistan's poverty line. Access to health facilities is represented in figures 3.1 and 3.2 below:

Figure.1

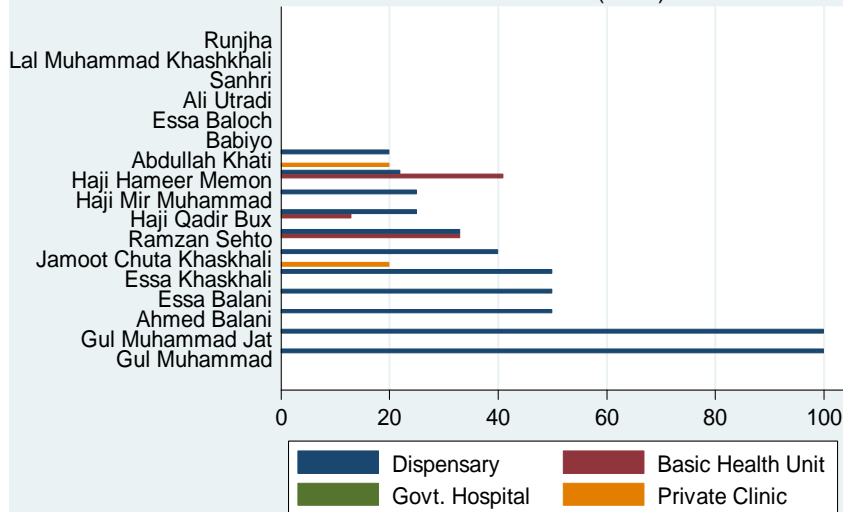
Fig 4.3: Health Facilities  
Keti Bunder (2011)



Source: WWF-P, CCAP Socioeconomic Baseline Needs Assessment (7-12 Oct 2011)

Figure.2

Fig 3.16: Availability of Health Facilities  
Kharo Chan (2010)



Source: WWF-Pakistan, Indus for All Programme, Phase II Socioeconomic Baseline(28-31 December 2010)

Women's perceptions on resource constraints in this case are particularly important. This is so, among others, because they do not participate in income generating activities outside the household but are nonetheless responsible for managing household resources and ensuring the well-being of their families, including making difficult decisions around healthcare.

### 3.2 Unpredictable Rainfall

This section on 'Unpredictable Rainfall' is an important indicator of how climate change may impact food security and fresh water stocks. See questions under Appendix 2 non-fishing survey: 3.12(frequency of various types of weather), 4.2.4(measures taken to maintain/enhance agricultural yield), 4.2.5(changes in temperature affecting crops), 4.2.7(changes in rainfall affecting crops) and 4.2.8(steps taken by farmers to cope with or respond to these changes).

While most of the respondents who participated in this study depend on coastal and marine fisheries, 3 communities in Thatta, and 5 communities in Jiwani also practice subsistence agriculture. Of the 5 communities in Jiwani, only one was solely dependent on agriculture, while the other 4 practiced a mix of fisheries and agriculture. Two different systems of agriculture are prevalent in district Thatta(in Sindh) and district Gwadar(in Balochistan). The former depend on irrigation water and some rainfall to support farming, while the latter rely almost entirely on rain-fed agriculture, also known as barani.

Both sets of farmers tend to cultivate single crops. In Thatta, crop types range from pulses/lentils to banana plantations to vegetables and betel leaf; whereas in Balochistan crops range from sorghum to lentils to watermelon<sup>12</sup>. However, what remains constant is a perceived shift in rainfall patterns and intensity.

The following key findings emerge from our analysis of unpredictable rainfall (and should be read in conjunction with box 1 above, box 3 below and the socioeconomic baseline):

- Respondents from both Thatta and Gwadar complained that water scarcity; soil infertility and shifting rainfall make it difficult for farmers to determine when crops should be planted and how to plan harvest times.

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<sup>12</sup>Dehlavi, A. and I.H. Adil. 2012. *Socioeconomic Baseline of Pakistan's Coastal Areas*. World Wide Fund for Nature - Pakistan

- Furthermore, crops that have been successful in the past are difficult to cultivate. Input costs in farming, such as water charges, seed costs, fertilizers and pesticides are increasing while crops are increasingly at risk from variable seasons.
- There are no guarantees of return on investment. Subsistence farmers increasingly face greater indebtedness and loss of lands and livelihoods loom large. This has a direct impact on livelihood and food security.

Detailed information on changing temperatures and rainfall can be drawn from WWF-Pakistan’s most recent scientific study on ‘sub-regional weather data’ developed in association with the Chief Scientist at the Pakistan Meteorological <sup>13</sup> (please see [:http://www.wfpak.org/ccap/images/pdf/ccap\\_climatechange.pdf](http://www.wfpak.org/ccap/images/pdf/ccap_climatechange.pdf)). In terms of adaptation responses, we discuss the possibility of alternative systems of cultivation drawing from Better Management Practices in Agriculture, cultivation of different varieties of crops, mainstreaming current weather information and real-time decision-making, and investing in livestock ownership as another means of safeguarding against shocks.

**Box 3. Variable Rainfall: Fears of Drought and Floods**

“[Problem is] the non-occurrence of rains. Due to this the dam is empty and people are drinking dirty water. Due to non-occurrence of rains, grass has not grown here. We are selling animals because drought is increasing.” – Male FGD, Okar, Jiwani.

“Due to non-occurrence of rainfalls, grass does not grow in forests and fields. Therefore they [goats] go to graze at other places also. But there did not exist such situation in past and greenery was seen everywhere. Now only barren lands are seen and we are very much worried.” – Female FGD, Gunz, Jiwani.

“Non occurrence of rainfall is causing drought. People and cattle are dying.”  
– Female IDI, Kargoshi, Jiwani.

<sup>13</sup>Rasul, G.2012. *Climate Data Modelling and Analysis of the Indus Ecoregion*. World Wide Fund for Nature - Pakistan

### 3.3 Impact on Fisheries

Respondent communities in Thatta and some in Gwadar rely heavily on fisheries as a livelihood. This section looks at how fisheries are affected by climactic changes (if any). See questions 4.3 “seasonal fishing calendar”; 4.3.5 impacts of weather – temperature, tides and rainfall on fish catch; 4.3.6 number of fishing trips now and ten years ago; 4.3.8 dependency on fisheries as a livelihood, under Appendix 3. Relevant answers were also recorded from fishing survey questions 2.6, 2.6.1, 2.6.2, 2.6.3, 2.6.4, 2.6.5, 2.6.6, 2.7, 2.8, and 2.9 under Appendix 2.

Fishing is the most common means of livelihood in coastal Thatta, and all participants from 23 focus groups in Thatta whose livelihoods were fisheries-dependent reported a decline in fish catch as a serious concern. According to the Socio-Economic Baseline study, in Keti Bunder 67% people are exclusively dependent on fisheries as a source of income, as opposed to 53% at Jiwani or 48% at Kharo Chan. At 53%, fishing is clearly an important means of livelihood in Gwadar as well but the study participants indicated that due to Balochistan’s connection with Iran and the proximity of a national highway, a number of people engage in transporting goods by sea and road as a more regular and less natural resource dependent means of livelihood.

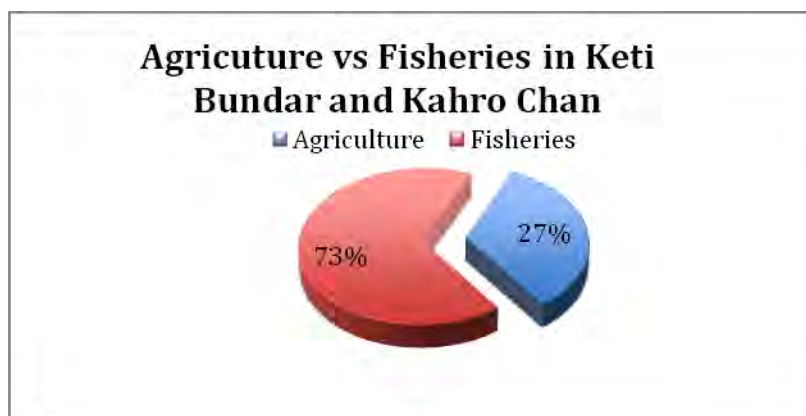


Figure 3. Relative Shares of Primary Income Sources of Respondents

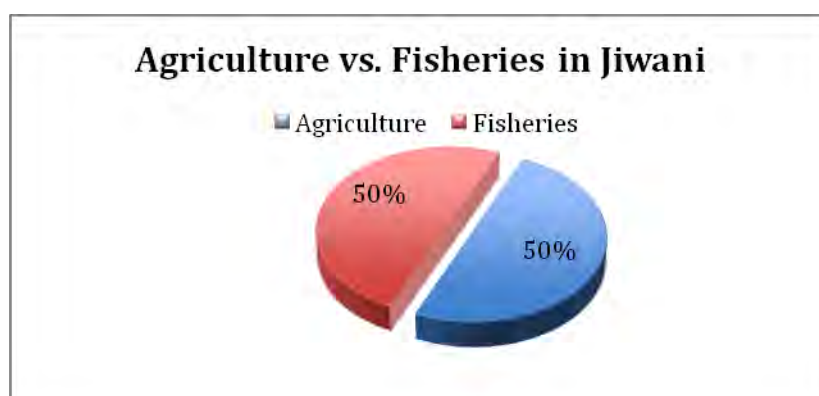


Figure 4. Relative Shares of Primary Income Sources of Respondents

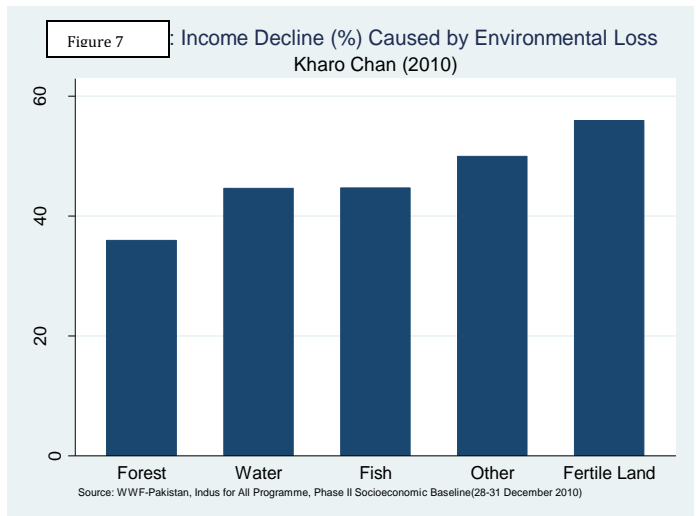
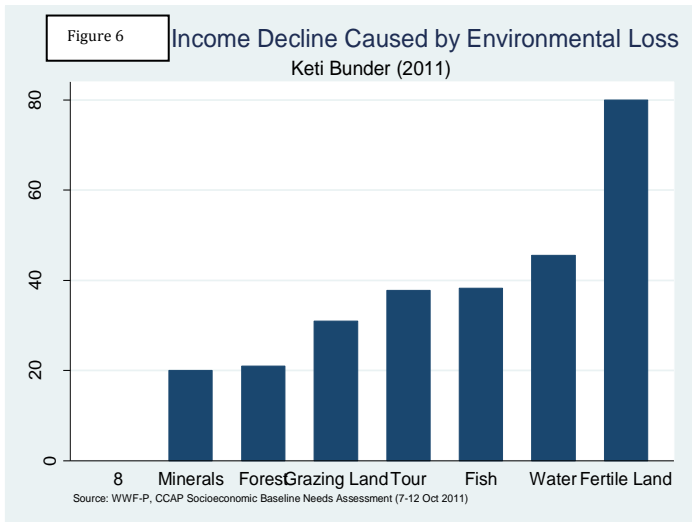
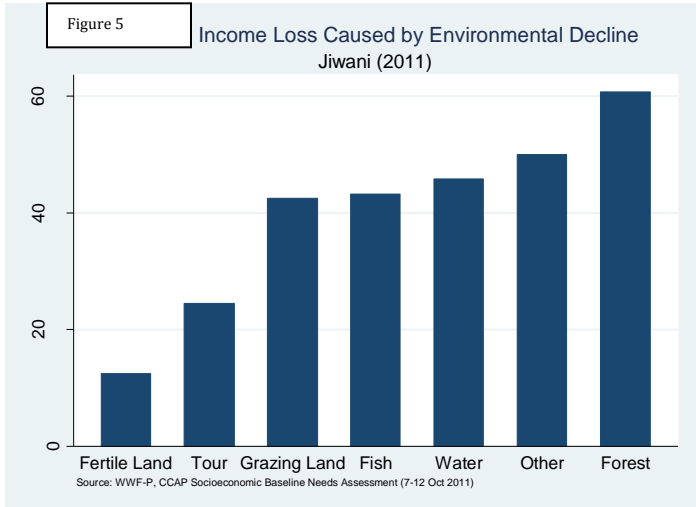
The following key findings emerge from our analysis (and should be read in conjunction with Box 1 above, Box 4 and 5 below, and the socioeconomic baseline):

- All those who participated in the focus group discussions commented that fish catch had declined dramatically in recent years, and they anticipated lower still volumes in the future.
- Decline in fish stocks was attributed to many different factors by community members, reasons given included rising sea temperatures which force fish further afield, increasing number of boats and trawler harvesting coastal fisheries, use of fine mesh nets which capture fingerlings and small fish, poor quality of water, deforestation of mangrove forests, and decline in fresh water flows downstream (especially true for union councils in Thatta) which inhibit fish breeding.



- For the non- fishing season survey of the CVA, both the DelpHE Project and WWF-Pakistan jointly revised the research instrument, we discovered interesting information about the decline in particular types of fish species.
- Local communities attributed decline in fish catch to increase in sea temperature and increase in salinity which has induced the migration, and arguably, virtual disappearance, of particular fish species.
- This decline in fish catch and consequently insecurity in income generation is a significant indicator of vulnerability.
- Coupled with high levels of poverty, lack of fish cleaning and storage facilities, and market access, all of which affect earning opportunities and income, it seems unlikely that fishers in these locations will be able to earn enough to invest in either savings or undertake conservation practices with a view to managing fisheries resources for the future.

These considerations pose serious challenges to designing and implementing effective adaptation initiatives at different levels. Diagrams below are taken from CCAP's Socioeconomic Baseline. These study findings show how income generation is being impacted by the environmental decline of fish stocks.



#### **Box 4. Disappearing Fish Species and Declining Fish Catch**

“10 years ago, or even before that there used to be a lot of fish that was caught. I don’t know the kg weight for it but we do know that they used to have pickups full of fish, which would be transported. But now when they go for fishing sometimes they’re able to get some fish and [sometimes] not. We depend primarily on fish for our food and sometimes it even happen that we can’t catch any for our own consumption.” – Female IDI, Keti Bunder.

“Before 3 months at a time we used to be at sea, now we don’t go for 4 months at a time. The waves with the wind is eroding the coast which is why there is a weather change and fish catch is reducing. Hot season has increased affected fish stock, which has reduced. 10 years ago there were more fish. Fish hide in the heat. 10 years ago the weather was different to now” – Male, older group, FGD, Jiwani.

“10 years ago, in the winter, there were a lot more seasonal fish such as heera, mushka, dangri and in the summer season, palla, mangra and other smaller fish like chowdi, mori, etc, but now these have reduced... We used to fill up cars and then send them to be sold, but now even though I don’t know about the weight, it seems like we don’t catch very much fish at all. It used to be before that we would catch the dangri fish and then we would cut it up and cook it and then distribute it among our neighbours, but in those days it would cost about PKR 15 a pao (about 300 grams), but now this fish is so expensive it sells for about PKR 300 a pao.”\* – Female IDI, Keti Bunder.

“Because of no water from Kotri [different types of] ... fish have reduced, especially Palla and Sehri and Dhangri too. But this year, with more sweet water, there are also more fish.” – Male FGD, MeeroDablo, Keti Bunder.

### **3.4 Sea Intrusion and Coastal Erosion**

This section is important for understanding land loss, land reclamation and land use management. While there are no direct questions, it was a recurring theme in all FGD and IDIs that was brought up by the community in conjunction with soil salinity and agricultural livelihoods, fresh water stock contamination by intruding sea water and a lack of fresh water flowing into the sea, potentially contributing to changes in temperature and marine life breeding, but certainly affecting health and crops. Answers in this section are drawn from sections 8(questions 8.7-8.10), and section 10(question 10.3) in the non- fishing season survey(Appendix 3).

Most of Keti Bunder and Kharo Chan are low-lying mudflats interspersed with narrow and meandering sea channels. With the decline in fresh water flows downstream of Kotri Barrage, the region has become highly affected by sea intrusion and coastal erosion.

Locals, including everyone who participated in the focus group discussions argue that the decline in freshwater flows in the Indus River is the primary reason behind sea intrusion and coastal erosion. So much so, as study participants reported witnessing, the force of the sea is carrying away healthy segments of mangroves because there is no opposing force to resist the momentum of water.

**Box 5. Changing Landscapes: Sea Intrusion and Coastal Erosion**

“We don’t know much about cyclones, but before there was a lot of rain and the sea waves are now faster. Waves are stronger and have started intruding because of which 60 boats, 30 houses and a masjid have been destroyed.” – Female FGD, Jiwani.

“The groundwater has become salty which is why we can’t use it. The sea has intruded and contaminated the water.... The sea is coming closer. It’s causing these changes.... Sometimes though, when the wind blows, the seawater comes up to the houses and we think a cyclone has come. This didn’t happen before.”

– Female interviewee, Hajamro, Keti Bunder.

“In the past we did not go to sea for 3 months but now do not go for 4 months. Due to the winds, the tides rise high and erode the sea banks. This causes a change in weather patterns and fish catch has declined.” – Male FGD, Jiwani town.

“Natural conditions are changing in a way that sea is advancing and has come in to a great extent.” – Male FGD, Okar, Jiwani.

The following key findings emerge from our analysis (and should be read in conjunction with Box 5 above):

- Most of the study participants referred to sea intrusion and coastal erosion in the same breath, and for the most part, these two issues were treated in a conjoined fashion.
- The impact of sea intrusion and coastal erosion has two dimensions. In the first instance, more and more land is lost to the sea and the size of landholdings decreases, and people lose their homes and their livelihoods, including the marginal grazing lands they possess and the small plots of cultivable land. This puts enormous pressure on livelihoods, and increases their risk and vulnerability levels.

- Second, the lost land includes healthy mangrove forests and inhabited creeks, which reduces the stock of fuel wood and energy supplies that local communities rely on, and also reduces the ability of mangrove forests to act as breeding grounds for fish and shell-fish, which in turn exacerbates livelihood risks and vulnerabilities.

There is an ongoing losing battle in the Indus Delta between local residents and the sea to stop large tracts of land from being subsumed by the sea, and creeks once capable of supporting households and villages now are uninhabited or worse, submerged.

WWF-Pakistan has long been documenting through ecological and GIS studies the changing landscape of the Indus Delta as it is continually reworked and reshaped by the Arabian Sea and Environmental flows.

### 3.5 Extreme Weather Events

This section is integral to understanding climate variability and climate change. It is assessed through non-fishing survey questions 3.12 (extreme weather frequencies), 8.10 (changes noted by the community in the physical environment) and what they think has caused these changes (8.11) and all module 10 (adaptation to climate change).

Cyclones Phet (2010) and Yemyin (2007) were two of the most dramatic and serious of the climatic disasters to have recently hit districts Thatta and Gwadar. These were followed by two years of floods. The resulting human and environmental disasters exacerbated by poor planning and management, are consequences that communities of the Indus Delta and coastal Balochistan are still recovering from.

### Box 6. Fear of Extreme Events

“Before there were cyclones, but after the 1999 cyclone we live in perpetual fear as there has been an increase in the number of cyclones. We live in fear.” – Male FGD, Keti Bunder town.

“There weren’t so many cyclones before. And now it comes with a blast like a bomb the cyclone comes and destroys our houses. Before they would come and go. Now they cause damage, like a blast. One minute our house is there, the next it’s gone.” Male FGD, MeeroDablo, Keti Bunder.

“A very powerful storm had hit about 6 years ago. The sea rose very high and boats standing on the shore collided with each other and were destroyed. Many people were injured. The winds were so powerful that we could not see each other. There was so much rain that all people were afraid and came out of their homes.” – Female interviewee, Bandri, Jiwani.

“[There was a] storm 2 or 3 years ago which was very dangerous. Seawater had risen high. Rainfall poured in along with the storm and boats on the bank collided with each other and were destroyed. *Kachha* houses also collapsed. All nets were swept away by the sea.... When I heard about the storm, I told my husband that he should strengthen the house; otherwise it can collapse during the rainfall.” – Female interviewee, Jiwani.

The following key findings emerge from our analysis (and should be read in conjunction with Box 5 and 6 above):

- All focus group participants and in-depth interviewees unanimously agreed that storm incidences are on the rise, both in terms of frequency and intensity. What has not kept pace however has been people’s ability to cope with these threats.
- The communities we spoke to feel entirely incapable of coping with these challenges and believe that their lives and livelihoods are increasingly at risk.

### 3.6 What are communities doing?

Having outlined concerns articulated by the people who participated in the research, it is equally important to identify what actions communities are either aware of or are taking in response to climate related vulnerabilities. During focus groups and interviews, participants were asked about ongoing or previously existing adaptation actions, and further, conservation actions (such as mangrove plantations and protection of mangrove forests). It is extremely interesting that across all focus groups and interviews carried out during the CVA, there were only a very few mentions of either adaptation or conservation actions. This is a significant omission given the scope of challenges described by communities.

#### **Box 7. Responses to climate variability and change**

“We have not made any efforts nor do we have any information. There is no awareness campaign running here. And no one has taken any steps. We don’t have information about it either.” Male FGD, Keti Bunder Town, Thatta

“We have not obtained any information about climate change. Then how should we work out strategies?” Male FGD, Jeewani

“I do not know about these [climate] things. Maybe the men will know?” Female, interviewee, Bandri Goth, Gwadar

“IUCN is planting mangroves and there are Wetland officials who visit us. No one else is working. Both of these organizations are planting mangroves. They do not do any other work besides this in our area.” Female FGD, Panwan, Gwadar

Taking a step back from individual responses and given the overall uncertainty associated with current and future climate variability and change, it is reasonable to suggest that there are limits to adaptation. Limits, for the purposes of this report mean, social, cultural, economic, financial, and cognitive constraints that limit constrain a community’s ability to both cope with climate risk and adapt to vulnerabilities caused by climate variability and change. These limits are subjective and depend on the context, and values of the different groups. However, for the purposes of this report, based on the information we have collected, there are two pre-existing barriers to adaptation: (1) Lack of empowerment and uncertainty in the face of climate risks, and (2) financial constraints.

(1) Lack of empowerment and uncertainty: Throughout this report, we have emphasized the importance of perceptions of vulnerabilities. The subjective reality of vulnerability and how communities perceive themselves as advantaged or disadvantaged plays an integral role in determining the scope of adaptation choices, and influencing adaptive decision-making. In short, communities who perceive themselves as disadvantaged, or victims of inequity and social injustice, and who are also vulnerable to current and future climate risks may also by virtue of these perceptions limit their own adaptive actions.<sup>14</sup> This may be despite the fact that they may have some capacity and resources to adapt. This finding is borne out by the fact that almost all of the focus group participants and interviewees failed to mention existing and/or previously implemented adaptation and/or conservation actions. Existing literature on uncertainty<sup>15</sup> and psychological dimensions of climate related decision making<sup>16</sup> support our finding that “a divergence between perceived and actual adaptive capacity is a real barrier to adaptive action.”<sup>17</sup>

(2) Financial constraints: Financial poverty, economic insecurity, and lack of viable alternative livelihoods also constrain adaptation actions at the local level. In our focus groups, fishers and farmers have cited lack of adequate financial resources as a significant factor constraining their adaptation actions. Matters are further complicated when immediate worries, or worry about one type of risk increases and reduces worry about other risks. For instance, some worries or risks acquire paramount importance such as declining fish catch, securing livelihoods, hunger, disease etc. and may overshadow other concerns such as vulnerability to climate variability and change. This means that from the limited pool of financial resources and emotional energy resources are allocated to risks that are seen as more ‘serious.’ This type of thinking logically leads to low priority and commitment to adaptation actions.<sup>18</sup> Communities and households can, therefore, exhibit time-inconsistent preferences and may find it difficult to evaluate risks and benefits over a longer period of time. This can lead to prioritizing short-term risks

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<sup>14</sup>Satterfield, T. A., C. K. Mertz, and P. Slovic. 2004. “Discrimination, vulnerability, and justice in the face of risk,” in *Risk Analysis*. 24, 115-129.

<sup>15</sup>Moser, S. 2005. “Impacts assessments and policy responses to sea-level rise in three U.S. states: an exploration of human dimension uncertainties,” in *Environmental Change*, 15, 353-369.

<sup>16</sup>Grothman, T. and A. Pratt, 2005. “Adaptive Capacity and human cognition: the process of individual adaptation to climate change,” in *Global Environmental Change*. 15, 199-213.

<sup>17</sup>Adger, W.N., S. Agrawala, M.M.Q. Mirza, C. Conde, K. O’Brien, J. Pulhin, R. Pulwarty, B. Smit and K. Takahashi, 2007: Assessment of adaptation practices, options, constraints and capacity. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, p. 734

<sup>18</sup>Hansen, J., S. Marx and E. U. Weber. 2004. The role of climate perceptions, expectations, and forecasts in farmer decision-making: The Argentine pmpas and south Florida. IRI Technical Report 04-01. International Research Institute for Climate Prediction, Palisades, New York. [<http://iri.columbia.edu/outreach/publication/report/04-01/report04-01.pdf>]



and needs over longer-term interests.<sup>19</sup> As a result, more immediate and more tangible impacts may take precedence over future, yet more serious, outcomes. In the context of the CVA, this type of thinking may result in little to no action being taken to respond to uncertain impacts of climate variability and change; and deferring adaptation decisions.

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<sup>19</sup>Kahneman, D. 2011, *Thinking, Fast and Slow*, Allen Lane, New York.

## 4. Looking Ahead

Climate change response and adaptation efforts in Pakistan are still in their infancy. CCAP's political and institutional analysis study- one of the Deltaic Vulnerability Assessment studies suggests that provincial and local tiers of government have largely failed to capitalise on the impetus provided by the National Climate Change Policy, 2012. As further suggested by this study, initiatives have been fragmented, and have failed to demonstrate a single coordinated strategy, since some policies predate the existing national policies and are not aligned in accordance to newer elements of the policy. This disconnect may be attributed to a number of factors such as the difficulty in translating global climate models to local contexts and determining key entry points for adaptation actions, lack of conceptual clarity, access to adaptation funds, and inadequate government support in adopting and up-scaling 'successful' adaptation initiatives.

In Pakistan's case the thematic areas that are most affected by climate change such as agriculture, fisheries, water management, coasts and deltas, forests, health, urbanisation etc. Departments such as forests and wildlife, fisheries, agriculture, revenue and coastal zone management authorities are also further hampered by turbid policy measures, and institutional behaviour. The situation is further complicated by the existing arrangement of political and economic elites, who tend to privilege their own access and control over resources and opportunities.

These are significant obstacles since ill-conceived adaptation interventions that fail to take the broader national and local development spectrum into account can engender even greater poverty, and social inequity rather than guide communities towards greater resilience. However, despite these systemic challenges, there is room for transformation and focused action, provided that key policy pointers and messages are embraced.

## 4.1 Key Messages

### 4.1.1. We Can Reduce Vulnerability Through Adaptation Now

While translating global climate change scenarios into local contexts continues to be an imperfect science, it need not hold us back from what can be done now. Adaptation actions such as wide-scale awareness of climate impacts and shocks, and disaster response actions can be promoted; storm shelters can be built; fisheries communities can be trained in sustainable fishing; inland farmers can be introduced to new crop varieties; water harvesting and storage can be introduced; civic and infrastructure amenities can be improved to help build resilience and reduce vulnerability among communities.

Box 8 below shows respondent answers to section 6(6.13, 6.16, 6.17) in the fishing survey and section 10(10.6-10.7) in the non- fishing survey.

#### Box 8. Immediate Vulnerabilities and Proposed Solutions

- ✚ *“Bund will help us, good doctors should be here, there should be good infrastructure and there should be a fish market.” – Male FGD, Keti Bunder*
- ✚ *“By making a small dam for us for storing water and a bund to stop the sea water. When we need water we’ll make a cut in the walls and use it. We can use this for farming.” – Male FGD, Keti Bunder*
- ✚ *“There are many difficulties to handle. No rainfall, drought, decline in grazing fields, no water. We do not have economic resources to face this situation. Government is also not supporting us.” -- Male FGD, Gunz*

### 4.1.2. Conservation Alone is Not Enough

A household’s or a community’s ability to cope with climate shocks and uncertainty is determined by a variety of economic, social, environmental and political factors. Therefore, any efforts to reduce vulnerability to climatic variability or change needs to take these factors into account. This means that adaptation actions must include: (1) a recognition that fundamental issues such as community ownership and acceptance of both initiatives and climate related information, community empowerment, governance, physical and livelihood security are central to effective adaptation planning; and (2) an understanding that adaptation planning and actions are long-term endeavours and cannot be scaled to traditional success-failure yardsticks used by development and donor partners.

#### 4.1.3. Community Ownership is Not the Panacea to All Ills

It is widely accepted that communities play an important role in managing their natural resources, such as fisheries and forests. However this does not mean a complete withdrawal of state regulation and oversight. Involving communities in management of local resources is a valuable and important action, however it does not, by itself, ensure efficacy nor does it ensure sustainability. It must be located within an enabling environment supported by government action whether in the form of climate and adaptation related information access to credit and financial services to support livelihood efforts, training to support natural resource management or government oversight and advice etc. Community management of natural resources is influenced by the characteristics of the communities and their livelihood dependencies. It is further shaped by how informed communities are on these issues, and their level of engagement with such initiatives especially when weighed against their legitimate livelihood and household security concerns. Lastly, it also depends on the decision-making structures in place and the assurance of democracy and participation.

##### Box 9. Ecosystem Services

- ✚ *“When we plant the trees then some people dig up the young trees and dry them. When dried they are sold and used as firewood.”* – Female FGD, Keti Bunder
- ✚ *“We use timber for cooking food and use charged lights for light. We used kerosene lamps before but not now. There is no alternative for energy here.”* – Male FGD, Haji Nadir BuxBaloch
- ✚ *“We have done nothing yet because no one listens to us. What will happen if we do something?”* – Female FGD, Okar

Answers below were taken from section 7(7.1-7.5) in the non-fishing questionnaire

#### 4.1.4. Move beyond Pilot Projects: Interventions Should be Replicated and Up-scaled

As a relatively new field characterised by uncertainty and limited large-scale examples, adaptation efforts tend to be restricted to multiple small-scale pilots scattered across the country. While this is unsurprising it nonetheless means that there is little effort being made to learn from and up-scale existing successful initiatives. This transition from pilot to program requires implementing partners, donors and government to be receptive to the

idea of replicating pilots through longer-term projects rather than taking a narrow view of the situation.

#### **4.1.5. Problems are Multi-faceted and Complex**

Currently planned and future adaptation building initiatives may not be able to account for all relevant cross cutting issues such as communication, gender, community empowerment, biodiversity, conservation, equity and social justice, in their entirety. However responses at the policy level must accept this complexity and actions taken by responsible government institutions must reflect it. Serious thought should be put into not only exploring, but also revisiting existing institutional structures and behaviours. Government departments should move beyond isolationist and resource hoarding mind-sets and embrace genuinely collaborative working relationships to respond to multi-dimensional climate challenges.

##### Box 10. Lack of Climate Change Awareness



*“When no one has come and told us about climate change, how can we take action?” – Male FGD, Jiwani*

#### **4.1.6. Responses to Variable Challenges Require Flexible Design and Implementation**

Since climate threats and impacts are characterised by uncertainty, responses to these challenges should reflect flexibility in design and responsiveness to changing needs. Communities can best adapt with the support of programs that empower them to work together, build their collective adaptive capacity, and promote flexibility in terms of adapting to existing and future uncertainty.

#### **4.1.7. Communication is Key to Effective Adaptation.**

Partners, stakeholders and audiences need to understand climate variability and change. Vulnerable communities, especially rural and isolated communities, need to understand the risks and threats to their homes, livelihoods, and social networks. They need to know what they can do to not just cope with climate shocks but also adapt to climate variability and change. In short, if adaptation actions are to empower communities, become home-grown and effective, then climate change and variability needs to be communicated to people using different communication media including radio, television and face to face interaction.

## 5. Adaptation Options

Adaptation interventions must be situation and context specific is understood and accepted. However, the fact that this is rarely reflected in intervention design is for largely pragmatic reasons. In the case of climate variability and change threats this situation is made more difficult by the uncertainty in predicting the time-scale, effects and scope of climate shocks. Bearing this challenge in mind, we have discussed a series of adaptation options in this section. These are based on community needs and perception grounded in broader environmental, economic and social concerns; and a review of broader adaptation literature.

### 5.1 Fisheries and Coastal-Zone Management

Fisheries management is a long-term, time and resource intensive process. However, in order to safeguard the livelihoods of thousands of community fishers, and protect the coastal fisheries sector, it is imperative that appropriate fisheries management plans are made and resources are earmarked for investment.

There are a number of adaptation options that were investigated during the focus group discussions in Keti Bunder and Kharo Chan almost all the fishers we spoke to are following a dangerous adaptation response: intensification of fishing in order to cope with reduced yield. This can mean increasing the time spent at sea, fishing in increasingly deeper waters, using fine mesh nets to capture greater yield, or fishing during breeding season. This adaptation response clearly has negative long-term consequences and must be inhibited by exploring other more sustainable adaptation options.

Responses to changes in fish species and stock distribution etc. can also include adjusting fishing level efforts to yield levels. This can be attempted through long-term actions such as standard assessment and management measures as well as co-management approaches. For small coastal fishers adaptation actions may include diversifying livelihoods and strengthening market access, investing in insurance and early warning systems to the more extreme action of, abandoning fisheries for alternative occupations.

This section on proposing fisheries adaptation actions is not exhaustive or comprehensive as WWF already has expended substantial expertise, time and resources in promoting better fisheries management, fish stock and sustainable yield management, fish catch storage and processing, and has launched campaigns against the use of fine-mesh nets. Relevant materials can be accessed at: <http://www.foreverindus.org>.

## 5.2 Storm Protection

Typically, people are not concerned about hazards, or a particular hazard, if they have not personally experienced it. However, in Keti Bunder, Kharo Chan and Jiwani this is clearly not the case. People feel, on a personal and communal level, the potential impacts of climate change. The difficulty, however, is that they feel helpless in the face of these changes. During both surveys, non-fishing and fishing seasons, of the study, FGD and IDI participants commented that they had experienced the impacts of cyclones and storms but beyond trying to protect their lives and safeguarding their belongings there was little more that they could do.

While storm protection shelters<sup>i</sup>, and elevated houses, are expensive to build and their maintenance is an on-going process they are, nonetheless, the best option for the protection of coastal communities. Essentially an elevated semi-pyramidal building designed to withstand storm surges; storm shelters must accommodate people and livestock. Ideally, a storm shelter should accommodate between 800-1200 people with separate rooms for men, women and sick people, as well as toilet facilities, a water tank, solar panels, a generator and a loudspeaker. And should be built within a 1.5 km distance of the community to ensure greatest use. This has been successfully proven in Bangladesh and several coastal districts in India.

## 5.3 Early warning and Evacuation systems

These systems play an important role in saving lives. These warnings, as has been done to some extent by the Government of Pakistan, should be broadcast through radio, televisions, mobile phone carriers, local mosques and newspapers. However, the forecast must be precise, especially in identifying landfall locations and submersion depths.<sup>ii</sup> Inaccurate forecasts spreading over a large coastal area may lead to unnecessary panic, repetitive emergency response and evacuations, and loss of faith in the early warning system. Regular and repeated trainings and drills in early response, emergency response and evacuation should also accompany these early warning systems. It is also important to mitigate psychological trauma that comes with repeated cyclone and storm warnings, as was apparent amongst many interviewees.

## 5.4 Crops and Cultivation

Subsistence agriculture, in the areas where CCAP works, is an important source of food and income for poor and vulnerable communities. Since agriculture is highly sensitive to climate variability and change, it is a key area of adaptation. These key points should

stimulate greater urgency in addressing vulnerability among poor communities in coastal Sindh and Balochistan.

Subsistence and small-scale farmers may be encouraged to adopt suitable varieties of crops and grasses. Crop and grass varieties that are better suited to saline soil, and are drought and heat tolerant. The grass varieties could be used to bring into cultivation (for foraging and grazing) land not under cultivation, particularly in coastal areas where land is lost to aggressive sea intrusion and rising sea levels. Another aspect to consider would be the introduction of crop varieties that mature earlier in order to shorten the growing period and thereby reducing the risk coastal farmers run of extreme weather events. Farmers may also be convinced to introduce a mix of crops to cope with changes in temperature, rainfall and cropping seasons.

Farmers can also be encouraged to reduce the risks they face by adopting crop insurance geared towards farmers and by familiarizing them with farmer insurance and other low-cost micro-finance schemes. However, this option consists of two parts. One is the development and promotion of low-cost farmer insurance schemes and the second is to support farmer access to such financial services.

## **5.5 Water Management and Irrigation**

As communities living in coastal areas, and elsewhere, face changes in temperature, rainfall patterns, and depletion of freshwater supplies, improving water storage and making irrigation water supply and use efficient becomes paramount. While these changes will threaten productivity in irrigated areas, areas such as Jiwani will become even more vulnerable to drought and changing precipitation patterns.

For communities, who have no access to piped water, or freshwater from wells, households may need to be trained in rainwater storage and conservation, and use other techniques of water harvesting. For coastal communities this may also mean building the necessary enthusiasm, interest and capacity in water desalination and filtration at the household level.

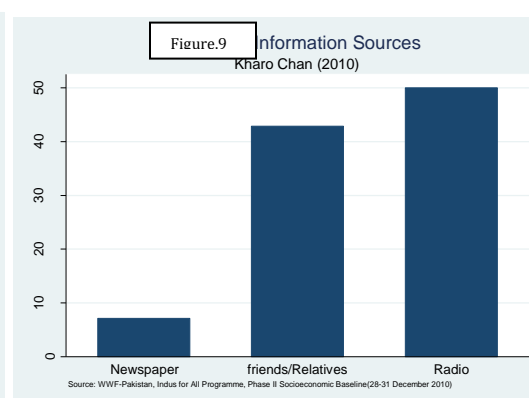
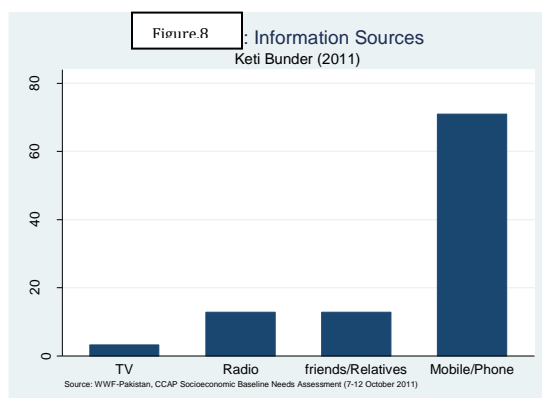
Among farmer communities, introducing drip and ‘matka’ irrigation as an adaptation effort is another option. However, it should be accompanied by efforts to improve water efficiency and usage. In areas with no irrigation, water conservation and harvesting may be the only options farmers have.

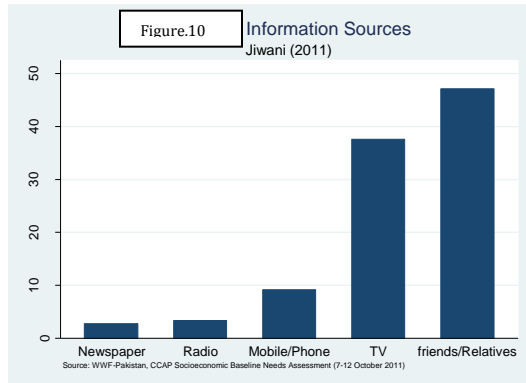


## 5.6 ICT and communication

Information and Communication Technology (ICT) and media have a great potential for communicating climate change information, and encouraging adaptive behaviour among audiences i.e. vulnerable communities and people. ICT can be used to record data and information, transform data and information into shareable knowledge, and communicate this knowledge in easily comprehensible and appealing ways. Effective use of ICT does not rely on vast capital or investment outlays. In fact, the main part of adaptation activities can be realised at a small scale, with little investment, and can be built on existing communication systems.

During the CVA research, we discovered that almost all the male participants of the focus group discussions had access to mobile phones. Subsidies offered by the Government of Pakistan ensure that mobile phone carriers can easily penetrate rural and remote areas. This is a tremendous advantage when conceptualising ICT use for adaptation. However, key to effective ICT usage are familiarity and ease of use. When deploying ICT projects in areas where communities are poor, illiterate and vulnerable, the technology must be both commonly used and widespread. Mobile phones, in this instance, would be the most effective means of communication. The only innovations for the community would be the training to use mobile handsets effectively including familiarity with SMS and radio services; and in a way that facilitates disaster response and early recovery, productivity and market access, and longer-term resilience. The diagrams below are taken from CCAP's Socioeconomic Baseline, the graphs show the main sources of information at each of the target sites.





In addition to providing vital weather and early warning information to farmers, fishers and local communities, ICTs can also be used for other resilience building measures. For instance, farmers can be provided with phone contacts of agricultural extension workers and livestock health workers to access advice and support on treating crops and livestock, seed varieties, planting times and methods. Market access for fishers and farmers can be improved by providing them with phone contact lists of traders from nearby markets so that they can inform themselves on market rates for their products, and can negotiate better prices.

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<sup>i</sup>Islam, Syful (2012)*Resilient homes to help coastal Bangladeshis withstand cyclones* AlertNet. January 17.

<sup>ii</sup>The World Bank Development Research Group Environment and Energy Team. (2010) *Vulnerability of Bangladesh to Cyclones in a Changing Climate: Potential Damages and Adaptation Cost*. Policy Research Working Paper 5280. April 2010.

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# Appendix 1

## Breakdown of villages and participant numbers

### Legend:

Cr: Creek

In: Inland

Co: Coastal

HHs: House hold

IDI: In-depth Interview

CVA- First Survey Instrument (Fishing Season)							
#	Village Name	Location	# HHs/village	# of Participants/ Focus Group		# IDI Conducted/ Village	Livelihood
<b>CVA Participating Villages in Keti Bunder and Kharo Chan</b>			<b>Total # of households located in Thatta study site: 2655</b>	<b>Total # of participants:</b>		<b>Total # of interviews conducted: 9</b>	
				<b>Male</b>	<b>Female</b>		
				<b>117</b>	<b>100</b>		
<b>1</b>	Tippun	Cr	112	7	0	2	Fisheries
<b>2</b>	Bhoori	Cr	400	9	9	0	Fisheries
<b>3</b>	MeeroDablo	In	86	5	6	0	Fisheries
<b>4</b>	Keti Bunder	In	310	9	10	2	Fisheries
<b>5</b>	Ahmed (Karmi) Samoon*	In	900	11	16	0	Agriculture
<b>6</b>	Babeyo	In	500	22	11	1	Agriculture
<b>7</b>	Hajamro Creek*	Cr	100	9	9	0	Fisheries
<b>8</b>	Haji Qadirbuxbaloch	Cr	68	15	17	2	Fisheries
<b>9</b>	Ali Utradi	Cr	100	7	11	0	Fisheries
<b>10</b>	Abdullah Khatti	Cr	53	8	0	0	Fisheries
<b>11</b>	Sajanwari	In	26	15	11	2	Agriculture
<b>CVA Participating Villages in Jiwani</b>			<b>Total # of households located in Gwadar study site: 3562</b>	<b>Total # of participants:</b>		<b>Total # of interviews conducted: 6</b>	
				<b>Male</b>	<b>Female</b>		
				<b>34</b>	<b>52</b>		
<b>1</b>	Kargoshi	Co	120	0	0	0	Agri& Fish
<b>2</b>	Jiwani town	Co	2345	10	13	0	Agri& Fish

3	Bandri	Co	200	7	11	2	Fisheries
4	Gunz	Co	404	7	8	2	Agri& Fish
5	Okar	Co	82	5	11	2	Agri& Fish
6	Panwan	Co	411	5	9	0	

### CVA- Second Survey Instrument(Non- Fishing Season)

#	Village Name	Location	# HHs/village	# of Participants/ Focus Group		# IDI Conducted/ Village	Livelihood
<b>CVA Participating Villages in Keti Bunder and Kharo Chan</b>			<b>Total # of households located in Thatta study site: 2655</b>	<b>Total # of participants:</b>		<b>Total # of interviews conducted: 11</b>	
				<b>Male</b>	<b>Female</b>		
				<b>108</b>	<b>91</b>		
1	Tippun	Cr	112	7	0	2	Fisheries
2	Bhoori	Cr	400	9	9	0	Fisheries
3	MeeroDablo	In	86	5	6	0	Fisheries
4	Keti Bunder	In	310	9	10	2	Fisheries
5	Ahmed (Karmi) Samoon	In	900	11	16	0	Agriculture
6	Hajamro Creek	Cr	100	0	0	2	Fisheries
7	Babeyo	In	500	22	11	1	Agriculture
8	Haji Qadirbuxbaloch	Cr	68	15	17	2	Fisheries
9	Ali Utradi	Cr	100	7	11	0	Fisheries
10	Abdullah Khatti	Cr	53	8	0	0	Fisheries
11	Sajanwari	In	26	15	11	2	Agriculture
<b>CVA Participating Villages in Jiwani</b>			<b>Total # of households located in Gwadar study site: 3562</b>	<b>Total # of participants:</b>		<b>Total # of interviews conducts: 10</b>	
				<b>Male</b>	<b>Female</b>		
				<b>41</b>	<b>54</b>		
1	Kargoshi	Co	120	0	9	2	Agriculture
2	Jiwani town	Co	2345	10	13	0	Agri& Fish
3	Bandari	Co	200	7	8	2	Agri& Fish
4	Gunz	Co	404	9	7	2	Fisheries
5	Okar	Co	82	7	9	2	Agri& Fish

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6	Panwan	Co	411	8	8	2	Agri& Fish
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\*Ahmed Samoon is located outside the truncated project area

\*Initially only 10 villages were to be visited for the administration of the first CVA questionnaire. However due to ease in accessibility, and to further enhance the scope of the study more participants were included in the survey instrument. Participants convened at an impromptu meeting in Keti Bunder, participants were residents of Hajamro Creek, representatives included villagers from Siddique Dablo, Khariyoon, and Phirt (in the table total HH population is given for these 3 villages). The villagers visit Keti Bunder in the morning hours to buy supplies (groceries, fishing gear, etc) which they then take back to their respective villages later in the day. Unfortunately this meeting was not re-held during the administration of the second CVA questionnaire, instead 2 in-depth interviews were conducted.