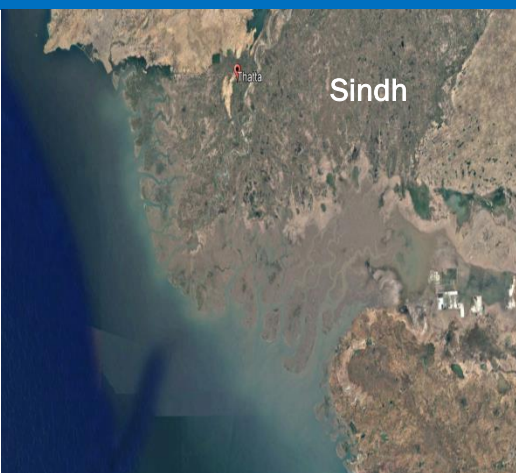


Impacts of Climate Change in Vulnerable Communities in Sindh, Pakistan: Voices from the Community



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ACKNOWLEDGEMENTS

This study was supported by the Population Council's Population, Environmental Risks and Climate Change (PERCC) initiative. Dr. Gul Rashida managed the study in the field and provided oversight and quality assurance to the data collection and ensured that the study was done following Population Council Internal Review Board (IRB) standards and Covid-19 procedures.

The authors wish to thank Maqsood Sadiq, Program Manager, and Muhammad Khalil, Senior Program Manager (ICT), for data analysis to help identify the most vulnerable and exposed populations in Sindh. We are also grateful to Amna Yasin, Rafia Siddiqui, Bansi Malhi, Anoosha Ali, Lajwanti Kumari, and Imtiaz Mirani for conducting the field research, and to Dr. Ameer Ali Abro and Fatima Azeem for assistance in analyzing transcripts.

Suggested Citation:

Khan, K., Khan, M., Parveen, T, and Hussain, S. (2021). *Impacts of Climate Change in Vulnerable Communities in Sindh, Pakistan: Voices from the Community*. Working Paper. Population Council, Islamabad: Pakistan.

September 2021

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INTRODUCTION

Pakistan ranks among the ten countries worst affected by climate change in the world (Eckstein et al. 2019), and within the country, the province of Sindh is one of the hardest-hit regions. Changing trends in temperature and precipitation have increased the frequency and severity of hazards such as flooding, droughts, and heatwaves, among a host of other environmental stresses. The evidence of climatic change and associated events is widely available in existing research (see, for example, Rasul et al. 2012; Chaudhry 2017; Ahmad, Iqbal and Khan 2013; Dehlavi et al. 2015; Sathar et al. 2018).

Studies indicate that women in Pakistan are bearing the brunt of climate change repercussions, and are affected more than men in both urban and rural areas (Hayat 2019). Women's vulnerability has increased due to decline in agricultural productivity resulting from climate change (Fitriani et al. 2019; WFP 2018). Those residing in the highlands in the northern part of the country, who are already isolated and dependent on natural resources, are becoming even more vulnerable to climatic stresses (Gioli et al. 2014; Nizami and Ali 2017). Similarly, in the coastal areas of Sindh, women's economic opportunities are shrinking due to the adverse impact of climate change on fishing-related livelihoods (Ghaus and Ahmed 2013). The women's cultural and social dependence on men increases their vulnerability manifold (Abbasi et al. 2019). They are typically underpaid and overworked (Iqbal et al. 2015). When men migrate away from remote or rural communities, women's security and well-being may be further jeopardized (Tacoli 2009). In addition, malnutrition is a major threat: a study in the drought-affected regions of Sindh found 37% of pregnant women and 26% of lactating women to be severely malnourished (Food Security Cluster 2016). In the Thar Desert, which experienced severe drought from 2013 to 2015, there are elevated rates of malnutrition (Kunbher et al. 2017).

The present qualitative study was conducted to scope out the specific ways in which the impacts of climate change are gendered among rural communities in Sindh that have the highest exposure to hazards arising from climate change. We examined how climate change is impacting livelihoods in the communities, and attempted to identify how vulnerability is deepened, not only from the direct effects of environmental stress and resulting economic loss, but also from the coping measures adopted by affected people and the interactions of these changes with existing gender norms and roles.

METHODOLOGY

Location. The study probed the perceptions and experiences of men and women in a total of five communities in two districts of Sindh, Umerkot and Thatta. In terms of agro-ecological features, this region is classified as "Southern Irrigated Plain." Climate data indicate that some of the largest temperature increases and rainfall declines have occurred in this part of Pakistan (Faisal and Riaz 2019).

Umerkot is situated west of the Indus. Its northeastern area segues into the Thar desert. Thatta, a coastal district, lies west of the Indus River. Both districts are facing increased frequency of heatwaves, monsoon flooding, and intense rainfall events. In addition, drought is a major issue in parts of Umerkot, while cyclone risks and sea intrusion are key environmental stresses in Thatta. At the same time, social and living standards data indicate that the populations of Thatta and Umerkot are the sixth and second most vulnerable in the province, respectively, in terms of multidimensional poverty (PBS 2021).

Two communities, one irrigated and one non-irrigated, were selected for study within each district. In Thatta, these included the farming community of Izzat Khan Lashari, and a fishing village, Miroo Dablo, in the coastal *taluka* of Keti Bander. In Umerkot, the non-irrigated community, Bodar Farm, was selected from the eastern part of the district which borders the Thar Desert and often faces drought. We had planned to select the other community from the irrigated western part of the district. Due to difficulties in arranging meetings with both men and women in a single irrigated community, we ultimately selected two irrigated communities from this region, including Viklokar for discussions with women, and Kanbhar Badha for discussions with men. The communities are adjacent and share the same socio-cultural characteristics.

Methods. The study primarily comprised of focus group discussions (FGDs) aimed at obtaining a mirror comparison of responses from men and women from the same settings to capture the key differences in their responses. The questions related to perceived signs of climate change, effect of climate change on livelihoods, common coping strategies, and the ultimate impact of these changes on individual and family well-being, with specific reference to health and nutrition, work burdens, living standards, and psychosocial wellbeing.

A total of eight FGDs were conducted, each with 6–8 participants, distributed as shown in Table 1. A socioeconomic profile of the respondents is presented in Appendix A.

Figure 1: Map of the study districts

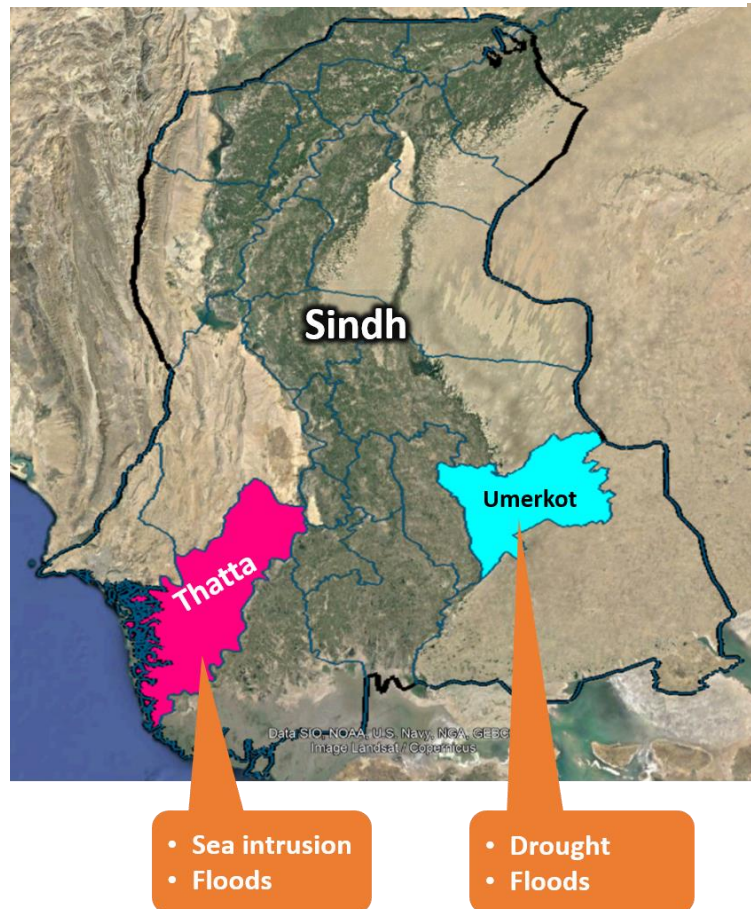


Table 1: Breakdown of focus group discussions

District	Thatta		Umerkot	
Type of Community	Non-irrigated (Fishing)	Irrigated (Farming)	Non-irrigated (Farming)	Irrigated (Farming)
Name of Community	Miroo Dablo	Izzat Khan Lashari	Bodar Farm	Kanbhar Badha/Viklokar
Women	1	1	1	1
Men	1	1	1	1

Male and female interviewers were recruited to conduct the FGDs with men and women, respectively, using a guideline prepared by the research team. The study was conducted in compliance with ethical guidelines of the Population Council's Internal Review Board. Informed consent was obtained from each participant before conducting discussions and no compensation was provided. All discussions were conducted in Sindhi, transcribed in the field, and translated in English. The findings were analyzed using a thematic framework.

FINDINGS

Perceived Changes in Climate

There is a consensus across male and female respondents from all five communities that weather patterns have changed. Table 2 summarizes the climatic changes directly or indirectly mentioned by men and women in each community.

Across the five communities, all respondents agree that summers have become hotter and longer. At the same time, the rainfall pattern has become less predictable and more intense, with longer dry spells in between. When it falls, rain is destructive for crops, trees, and soil. Lightning storms have also become more frequent, threatening the lives of people and their livestock. Both farmers and fishermen complained that unpredictable weather makes it difficult to make livelihood-related decisions, such as when to sow certain crops and when to sail out for deep sea fishing.

Winter used to start in October but now it is delayed. There is no autumn or spring now. As soon as winter ends, summer starts. And it goes on for months. (Man from Kanbhar Badha, Umerkot)

We used to be happy when it rained but now rainfall is so catastrophic that we become fearful when it starts.... Our children used to play with joy in the rain but now they get frightened. (Woman from Miroo Dablo, Thatta)

Respondents from Umerkot said they are affected by both floods and drought. In Bodar Farm, they were distressed by prolonged dry spells as well as the protracted periods for which flood water stands on their land, while in Kanbhar Badha and Viklokar, men and women said categorically that, despite the intensity of some past monsoon floods, their real problem is drought. In addition, scorching summer winds can set their crops on fire, which sometimes also burn down homes and livestock.

Table 2: Climate changes perceived by respondents

Perceived climate change/hazard	Umerkot				Thatta			
	Bodar Farm, Women	Bodar Farm, Men	Viklokar, Women	Kanbhar Badha, Men	Izzat Khan Lashari Women	Izzat Khan Lashari Men	Miroo Dablo Women	Miroo Dablo Men
Slow Onset								
Hotter and longer summers	•	•	•	•	•	•	•	•
Heavier rain	•	•	•	•	•	•	•	•
Scorching winds	•	•	•	•				
Changed wind pattern		•				•	•	•
Unpredictable weather	•	•			•	•	•	•
Colder winters		•	•			•	•	
Increased fog						•		
Increased dew						•		
Dry spells/drought	•	•	•	•				•
Seawater intrusion					•		•	•
Sudden Onset								
Lightning storms		•		•	•	•	•	•
Floods	•	•	•	•	•	•	•	•
Crop fires			•	•				
Storm surges								
Cyclones						•	•	•

In Thatta, men from Izzat Khan Lashari mentioned colder winters, increased dew and fog, and pollution, especially due to pesticide contamination. Their village is prone to floods and was hit by a devastating cyclone in 2010. Women from the community were particularly concerned about floods.

On the other hand, seawater intrusion represents a major environmental stress for the fishing village of Miroo Dablo. One of the respondents said that the sea was once about 70 kilometers away from their village but is now only 3 kilometers away. The men all agreed that Keti Bander has seen massive loss of land, estimating that two thirds of the original area has been swallowed by the sea. They attributed this to reduced freshwater flows in the delta from the Indus River.

The men spoke of the increased risks to their lives and living from unpredictable weather, unexpected wind patterns, and lightning storms at sea. Cyclones are also a threat, and although their village has never been hit, storm surges have caused fishermen to drown, flooded their homes, swept away their livestock, and sunk their boats.

In general, men gave more detailed and analytical accounts of climatic changes than women. The women's responses often focused more on associated disaster aspects.

Impact of Climate Change on Livelihoods

Respondents from the four agricultural communities (excluding Miroo Dablo) emphasized that their economic well-being relies almost entirely on agricultural livelihoods, which have been impacted negatively by climate change.

All of the respondents spoke about a **decline in crop yields and quality**. In Bodar Khan, women discussed the impossibility of growing anything when it does not rain during the growing season. The men spoke especially about the reduced quality and production of red chili, for which the region is famed. Similarly, women from Viklokar and the men of Kanbhar Badha mentioned, respectively, that they were no longer able to grow sufficient vegetables and millet to eat.

In Izzat Khan Lashari too, men expressed frustration and even hopelessness at the havoc environmental stresses are wreaking on once thriving agricultural productivity. They described how heavy and untimely rain, increased heat, strong winds, seawater intrusion, increased dew, and pollution have reduced yields of rice, wheat, maize, tomato, and okra; reduced quality of the chili crop; and made it impossible to cultivate watermelon and sunflower.

While male respondents spoke in more detail about crops, women respondents placed more emphasis on the **damage to livestock**. In Bodar Farm, they mentioned that floods and also shortage of water during protracted dry periods

leads to hunger and death among livestock, which comprise the only source of livelihood for some families, and also the only asset to sell during hard times. In Viklokar, women mentioned sickness among livestock and among their children in the same breath; they were worried about the shortage of fodder due to decreased crops, and described how hard it is to carry goats when they faint from the heat. Similarly, in Izzat Khan Lashari, women frequently mentioned risks to their livestock from excessive rain and floods, especially due to lack of fodder and shelter.

The weather has become too bad here. Whatever we try to cultivate in this weather, it is useless. It is not growing at all. (Man from Izzat Khan Lashari, Thatta)

When livestock die, poor families suffer a lot because these animals are the only source of livelihood for them. If one of us gets sick, that is our resource. We sell our livestock and get medical treatment for our children. (Woman from Bodar Farm, Umerkot)

Respondents attributed these challenges directly to the changes in climate that they had identified, especially untimely and intense rain or dry spells, floods, and changes in temperature and season lengths. However, in addition to these individual climate stresses, they also underscored that weather variability itself has fundamentally **disturbed the calendar of agricultural activities**

and farmers are no longer sure what to cultivate, when, and whether they will profit. Men from Bodar Khan and Izzat Khan Lashari also referred to reduced availability of land for cultivation due, respectively, to longstanding flood water and increased soil salinity.

The other key issue highlighted by respondents from all communities in Umerkot was **proliferation of pests**. In Bodar Farm, men said that their crops are further threatened by mites and other insects, especially locusts, which have increased due to the heat. Women from Viklokar spoke about the devastating impact of locusts and rats on their crops, as well as the danger from scorpions and snakes in summer. Male respondents from

The agricultural schedule has been completely disrupted and the cycle of crops is also disturbed. Now we can't figure out in which season to grow different crops, and if landlords do grow some crops, they are not sure whether they will earn a profit or not. (Man from Bodar Farm, Umerkot)

Kanbhar Badha particularly highlighted this issue. They said rats have proliferated in their area and eat up any fodder they store. Ticks from the rats also afflict their livestock, forcing their premature slaughter. Moreover, the population of snakes, which prey on rats, has boomed far beyond the levels usually seen, with great risks to people. In addition, their community too was affected by a recent locust attack which destroyed their crops. In contrast, while men from Izzat Khan Lashari referred to the damage caused by pests and new crop diseases, they did not elaborate, and women did not mention the problem at all, indicating that it might not be as pronounced as in Umerkot.

All respondents acknowledged that these adversities have had a **major negative impact on incomes and financial health**. Men from Bodar Farm observed that the decline in agricultural productivity and uncertainty about future outcomes have reduced the earnings of local people, and made it impossible for them to save anything or even survive financially. Women from the community spoke about the fear and uncertainty that farmers face as they wait for the seasons to pass each year, hoping that untimely dryness or rain will not dash their hopes of earning. They narrated how disease and death among livestock due to disasters, pests, or inclement weather deprives their households of the only insurance they have, and how the lack of both agricultural and non-agricultural work during disasters contracts the incomes of both women and men.

Likewise, men from Kanbhar Badha shared that very limited livelihood opportunities exist in their community, mostly related to agriculture. Therefore, floods and droughts have a huge negative

In 2019, we had to face a locust attack on our crops. It was the time when we were about to reap our crops but then locust attacked and spared nothing for our livelihood. In 2020, there was a large number of rats that ruined everything, especially our crops. We, the people of Thar, rely mostly on livestock. Rats ate most of the fodder. Ultimately our livestock died from hunger. In my opinion, all this destruction are is due to climate change. (Man from Kanbhar Badha, Umerkot)

impact on their earnings and assets. When disaster strikes, they may be out of work for many months, as even labor jobs become scarce. When crops and livestock suffer, the only remaining source of income is the women's sewing and embroidery work. Even that, women from Viklokar said, can be hard to find during drought.

Men from Izzat Khan Lashari said it has become so unprofitable to invest in crops that people have "lost hope in the fields" and are looking to other economic opportunities where bad weather, price fluctuations, and lack of support will not drive them into debt. One respondent gave his own

example of being able to harvest only 160 kilograms of wheat after investing 75,000 rupees in a 2-acre field. As another man put it, where a farmer could once expect to reap 80 percent of potential yield, he now only manages 30 percent. The men explained that there is no question of savings in this situation; rather, farmers fail to repay their loans, are at risk of losing their lands, and live hand-to-mouth, spending daily whatever they can earn. While women from the community did not give as many details, they too mentioned that the prices chili and tomatoes fetch do not cover their costs, and that it is impossible to save: whatever is earned gets spent first on survival, then on health costs, and finally on salvaging crops.

Men and women from the fishing community of Miroo Dablo also shared that their incomes have shrunk in recent years, in part because their **catch of fish, crabs, and prawns has become smaller** over the years. The women shared that people typically work for one season (mainly winter) and live off the earnings in the next, but good work opportunities had evaded them over the past two years. Among the reasons for this, they cited sea pollution and heavy rainfall, along with loss of boats at sea. The men from the community elaborated that due to unpredictable wind, rainfall, and lightning patterns, it has become more dangerous to fish in certain weather conditions; the risk of accidents and boat loss discourages them from sailing out as frequently as they used to.

Notably, the men attributed their financial troubles more to the **exploitative middlemen** with whom they work than to the effects of climate change. They explained that people from their area originally used to own their own boats and sell fish directly to markets, with links to the government's Fisheries department. However, some years ago, traders from outside their community arrived in their area and gave them loans for better boats at high interest rates. When they failed to repay the loans, they eventually had to accept a business arrangement where they only provide the labor of fishing, and are forced to sell their catch to the middlemen ("sea lords") who own their boats and pay them much smaller sums than what they would earn in the market.

Coping Strategies

Adaptation of Existing Practices

A few measures to adapt existing farming or fishing practices were reported by male respondents. Men from Kanbhar Badha said they have changed cropping patterns, but yields remain lower than before. In Izzat Khan Lashari, men expressed concern that new pesticides and contaminated seeds are being used without guidance from the government, not only reducing yields but also degrading the soil. In Miroo Dablo, the men said that they have developed ponds for crab and fish farming. However, none of the respondents indicated that these measures have made a large positive difference in the general downward trend in incomes.

Alternative Local Work for Men

Respondents generally emphasized the lack of alternative local jobs for men. In Bodar Farm, Kanbhar Badha, and Izzat Khan Lashari, respondents said that when agricultural work becomes scarce, for example due to floods, men primarily work as daily wage laborers or migrate to nearby areas or more distant cities, especially Karachi. In addition to such work, men from Izzat Khan Lashari were also reported to sell milk in a nearby town, and to sometimes resort to cutting trees to earn small sums of money, leading to deforestation and disappearance of some local fauna.

Men in Miroo Dablo particularly emphasized their lack of occupational mobility, stating that fishing is the only possible source of livelihood for them and for their children because nobody in their community is educated and they do not have any other skills to offer. Even the small grocery shops in their community are owned by outsiders, usually members of the Thakur and Memon castes.

If they are unable to find work locally, men often migrate in search of work to nearby agricultural areas, or to towns and cities.

Increased Earning by Women

In all communities, financial stress was also reported to lead to

greater reliance on women's earnings. Key income-generating activities of women include agricultural work (except in Miroo Dablo, where women do fishing-related work) and sewing and embroidery.

I do embroidery and sewing and earn some money, like Rs. 2000. I now support my husband. We work together and face the circumstances with mutual support. (Woman from Izzat Khan Lashari, Thatta)

In the four agricultural communities, women are heavily involved in work in the fields, especially at labor-intensive stages, and for certain crops, such as chili cultivation. In Izzat Khan Lashari, women shared that the household typically spends the earnings of men for day-to-day needs, while some women are able to save a portion of their earnings for emergencies, or when men migrate.

The woman has to perform household chores. In addition, she makes quilts, does embroidery, and sews clothes for income because she knows it will get difficult if she does not work to earn. (Man from Bodar Farm, Umerkot)

Men in Bodar Khan pointed out that women usually do not participate in earning activities in educated households. Among less educated households, however, they can play a large role in agricultural work, at times doing more work than their husbands. In Miroo Dablo, men reported that women, in addition to their domestic work, commonly participate in income generation. Some

accompany their husbands or fathers on fishing boats to clean and dry the catch. Others fish alone, or find jobs cleaning fish or providing other labor.

Women in all communities were engaged in sewing, embroidery, cap-making, and/or quilt work. Those in Miroo Dablo said they increase this work with assistance from their daughters when income from fishing becomes hard to earn. Similarly women in Viklokar said that the income men earn is often not enough, and they have to supplement through earnings from sewing and embroidery work. When men are unemployed, it falls to them to support the family alone with this work. Men from Kanbhar Badha also shared that earnings from women's sewing and embroidery work, especially Sindhi caps, are a very useful supplement to the household income, although they were concerned that these products are not currently fetching a fair price in the market.

On the other hand, in Izzat Khan Lashari, men shared that women in their area are doing embroidery work on a well-established commercial footing since 1999 through linkages with a social entrepreneur in Karachi. This was the only community where women were also reported (by men) to be working as teachers, Lady Health Workers, and non-governmental organization (NGO) workers.

Notably, the men of Bodar Farm also shared that some women have resorted to sex work in towns to make ends meet. Some women are also engaged in the practice of brewing and selling *tharra*, a local alcoholic beverage.

Taking Loans and Selling Assets

Two main strategies reported by all respondents for coping with financial problems brought on by climate change were taking loans and selling assets such as livestock and jewelry. Key sources of loans were reported to be landlords (or sea lords in the case of the fishing community) and local shopkeepers. In addition, women from Bodar Farm and Izzat Khan Lashari also mentioned banks, while men from the latter community mentioned "brokers," and men from Kanbhar Badha mentioned relatives as a source.

Men from Bodar Farm and Kanbhar Badha mentioned that loans are not always easily available; at times land lords refuse because they are also experiencing hard times or because people lack capacity to repay. Sometimes men have to mortgage themselves to secure a loan.

Interestingly, women were reported by both male and female respondents to play a prominent role in obtaining loans and also selling assets in all communities. In Bodar Khan, men said that women go to landlords to ask for help. Women from the community spoke in greater detail than men about selling assets, such as their own jewelry, household items, and livestock.

Men from Kanbhar Badha also said it is a common practice for women to borrow money for household needs from relatives when their husband is away, working outside the community. Sometimes, they also make decisions about when to sell livestock. The women of Viklokar spoke about an established seasonal pattern of borrowing in summer and winter, and repayment after the rainy season, when the whole family can find work. Likewise, in Thatta, the women of Izzat Khan Lashari said they take loans from shopkeepers, while those in Miroo Dablo considered borrowing money for food a part of a sensible woman's contribution to the household, even if it sometimes involves getting scolded for begging.

Nearly all groups mentioned that they have to repay loans taken with interest, especially to banks and to shopkeepers. Women from Izzat Khan Lashari and men from Miroo Dablo particularly mentioned that the amount of interest accumulated is often substantial, and as they are not literate or less educated, they sometimes have to take their creditors' word regarding the amount due.

When loans are insufficient or cannot be repaid, people sell any assets that they own. Some households have jewelry to sell, but most have to let go of their main productive asset—livestock—and sometimes even land. Another measure, reported by men in Bodar Farm, is the disturbing practice of 'selling' daughters to repay loans.

There was a universal complaint across all respondents that when they are forced to sell assets, especially during disaster situations, they receive only a small fraction of the actual worth of their livestock or land. Desperation forces them to accept these low prices. Men in Izzat Khan

Lashari explained that selling land is a last resort to repay loans, tantamount to slaughtering the

During a cyclone, two years ago, our ships were broken, and many sank, so we took loans, thinking that these are not big, and we will pay back easily. But after they loaned the money, they (the creditors) became cruel, and then they robbed us. We took a loan of Rs. 20,000 and now it has become Rs. 80,000. (Man from Miroo Dablo, Thatta)

They try to overcome the loss by selling domestic animals and taking loans. When an animal is fully grown, they sell it in the market and use that money for their survival and also for returning their loans. (Man from Bodar Farm, Umerkot)

We don't get a good price when we sell our livestock during drought. For example, I may have purchased a cow for Rs. 100,000, but when I will go to sell that cow in the market, I will hardly get Rs. 40,000-45,000. This is a huge loss. That is why we prefer to take a loan rather than selling our livestock. (Woman from Izzat Khan Lashari, Thatta)

goose that laid the golden eggs. Once a farmer loses his land, he has no guarantee that he will be invited by the buyer to work on it.

Migration

As mentioned earlier, respondents frequently reported that men migrate when local livelihood opportunities shrink. In Izzat Khan Lashari, the men mentioned several migrant destinations including Nagarparkar, Thatta, Karachi, Kohistan, Sakro, Makli, and Gadani. Men typically work in mills and factories, or provide labor as truck loaders and stone breakers. They may work as security guards, or if a young man is educated, he may find an office job. Women also mentioned that men work at factories and shops and as hawkers. In Miroo Dablo, the men said migrants from their community head to Rehree, Thatta, Malir, Khokhrapar, among other places, and usually provide daily wage labor. Some also migrate to get an education and eventually find white-collar jobs.

The question of who migrates elicited different and mixed responses from men and women, possibly because some respondents were referring to seasonal migration, while others had more lasting economic migration in mind. Women from Bodar Farm indicated that group migration is more common, and sometimes mothers leave behind infants and toddlers with older women of the family. (Possibly, they were referring to movements within the area for temporary seasonal work.) Women from Izzat Khan Lashari also said the seasonal migration is undertaken by the whole family, along with livestock.

Across all communities, it was reported that mainly boys and young men, married or unmarried, undertake individual migration. Girls are not allowed to go alone. Married men typically leave their families behind to avoid the higher costs and risks of taking them along. According to the men of Kanbhar Badha, the tendency for individuals to migrate in search of livelihoods has increased over the past ten years, while the trend of entire families migrating has dropped. It is more common for the entire family to migrate among Hindu households than Muslim families.

In Bodar Khan and Izzat Khan Lashari, men mentioned that land-owners generally do not leave, or do so only temporarily while maintaining some arrangement to oversee their land.

Marriage

Men and women from Bodar Khan and men from Kanbhar Badha no

ted that delaying their children's marriages is also a strategy they have been forced to adopt due to increased poverty and inability to provide wedding dowries, although households with migrant members may be able to afford weddings even during droughts.

Our children are getting old because we cannot afford to host their weddings or afford dowry for our daughters. (Man from Bodar Farm, Umerkot)

It takes money to arrange marriages. We do not have any marriages of our daughters during drought. We postpone the marriages to the next year. (Man from Kanbhar Badha, Umerkot)

Other respondents discerned no impact of climate change on marriages, although the COVID-19 pandemic was reported as contributing in delays in Bodar Khan and Izzat Khan Lashari. Another influence mentioned by women in Bodar Khan is recent legislation in Sindh against early marriage and NGOs' awareness raising efforts. Families are afraid they might face criminal prosecution if they marry their children too early.

Women from Viklokar said practices are shifting towards later marriages in their community but did not directly relate this to climate change or coping strategies. Similarly, in the two communities in Thatta, respondents said they typically do not marry their children young, and climate change has not had any pronounced effect on this pattern.

Family Planning

They think about family planning for a bit but don't take it up. Lack of awareness is the major reason for not practicing family planning. People mostly think about their income rather than about family planning. (Man from Bodar Farm, Umerkot)

Although many respondents agreed that family planning should be part of the actions taken to cope with climate change, most said this is not currently the case.

Male respondents from Bodar Farm generally acknowledged a need for family planning to help households cope with increasing financial stress,

but said it was not practiced widely due to lack of awareness, norms discouraging use or restricting women's access, and also poor service delivery. Climate change has not affected family planning practices in any way. However, women from the community indicated that use of family planning is increasing, albeit not very fast. Among reasons for increased family planning, they mentioned greater awareness about family planning through NGOs, and also financial pressure from inflation, especially food inflation.

Responses from the women of Viklokar suggest that family planning is a contentious subject in the community. While some couples do use family planning to avoid large families and especially the cost of deliveries, they can face criticism for doing so from others who believe it is wrong to avoid the "gift" of children. Some increase was reported in family planning use, but no respondent linked it directly with pressures from climate change.

God is the one who gives us children and we raise them. We don't use family planning. (Woman from Miroo Dablo, Thatta)

Likewise, in Izzat Khan Lashari, both men and women acknowledged that use of family planning is increasing due to financial pressures. Although they did not associate this change with climate change, there is clearly an indirect link since climate change is increasing financial pressures. While the women elaborated the health benefits of birth spacing and economic benefits of smaller family

size, the men emphasized that the trend of family planning use is low in rural areas, even among educated people.

In Miroo Dablo, only one man admitted that he had used family planning. All the other respondents laughed and said there was no trend of family planning use in their community. The women's responses suggest that fertility and child mortality are quite high, although women do turn to contraceptives after being weakened by excessive childbearing.

Impact on Well-being

Access to Water

An issue commonly reported across the communities is shortage of clean drinking water; however, it was only linked to climate change by men in Kanbhar Badha and women in Viklokar. In Kanbhar Badha, the men termed water scarcity a major issue in their area, and noted that longer dry spells have worsened this problem. The quality of water available for drinking has also deteriorated. Women from Viklokar also considered water scarcity the main problem in their area, and expressed concern about the lower water level in wells during the summer.

While men in Bodar Khan mentioned that they have access to only contaminated groundwater for drinking, rather than climate change, they attributed this shortage to poor water storage and management capacity in the country. Shortage of clean drinking water was also reported from Izzat Khan Lashari, who were concerned about general environmental contamination, whereas in Miroo Dablo, men said that drinking water is brought to the area by tankers.

We need pure water for drinking and also water for other purposes like washing clothes and for livestock. We need at least two persons to fetch water from the well. One person is needed to revolve the donkey cart while the other carries out water from the well. It costs us Rs. 200 per day. (Man from Bodar Farm, Umerkot)

Food Security

Men and women from all five communities acknowledged that hunger and food insecurity have increased due to climate change. In Umerkot, the main cause is drought. In Bodar Khan, respondents said that after a good harvest, they can eat wheat, lentils, potatoes, chili, and sometimes vegetables. Households that have livestock can also have milk and dairy items. However,

I used to eat less because I had to spare the food for my children. If I didn't do so, my children would have become weak. (Woman from Izzat Khan Lashari, Thatta)

when their earnings plummet due to crop failure, disasters, or lack of agricultural work, families suffer from hunger and depend on assistance from the landlord to survive. The need to sell food stocks to repay loans can exacerbate this issue.

Similarly, in Kanbhar Badha and Viklokar, men and women mentioned that vegetables, fruit, and milk become hard to access during droughts. Most meals comprise a curry of chili or yogurt with

bread, and as food scarcity worsens, it becomes difficult to provide more than one meal a day. Lack of food leads to deaths among the elderly and mothers remain stressed by their hungry children's incessant demands for food. According to the men, better-off people in their area used to store grain (especially millet), fodder, and other essentials, but this has become increasingly hard due to dwindling crop productivity. The proliferation of rats has also made it difficult to retain such stores.

We [just] eat chili as a curry with roti (flatbread) the whole year. We wait to eat seasonal vegetables, but when the season for vegetables arrives, the hot air destroys our crops and we can't have any vegetables to eat. (Woman from Viklokar, Umerkot)

In Izzat Khan Lashari, food insecurity is most acute during the rainy season. However, the women's responses suggest that this insecurity arises not so much from low availability of food, as from inflation and resulting unaffordability; road damage from rain which hampers access to markets; and lack of fuel for cooking. Hunger is a relatively new phenomenon in the community—women say they never had to go without meals before—but it is associated more with growing poverty than lack of food availability. Men from the community also complained about inflation, in addition to widespread food adulteration.

We never had shortage of food but now it's difficult for us to arrange one meal a day. There is no gas and sometimes even firewood is also not available to cook food. (Woman from Izzat Khan Lashari, Thatta)

Men and women from Miroo Dablo also acknowledged that they face severe food shortage from time to time. Typically, they have fish to eat, along with lentils, vegetables, tomatoes and fruit, but when money becomes scarce—which is increasingly the case—they rely

entirely on any small fish the family can catch for meals. Children cry for food, while mothers pray for help. In these desperate times, women said, people “fill their stomachs by eating anything they can get,” which could be why malnourished children are sometimes fed *Multani mitti* (Fuller's earth).

Access to Shelter

In addition to reduced access to water and food, respondents from all communities reported more frequent loss of homes due to heavy rainfall, floods, or cyclones.

In Miroo Dablo, women said people live in wooden huts. Every time the sea level rises due to rains or storm surges, seawater floods the residential area, filling homes and washing away belongings and any livestock. Infrastructure such as a bridge in their community is also at breaking point, implying greater risks to lives in future disasters.

Similarly, in Izzat Khan Lashari, women pointed out that they live in adobe huts that get damaged or destroyed by heavy rainfall. Livestock can drown in the deluge, and women and children are left literally without a roof over their heads in the midst of terrifying lightning storms. With kitchens

destroyed and water everywhere, it is impossible to cook meals for a time. Men from the community agreed that this is an especially trying time for women.

In Umerkot as well, women from Viklokar mentioned that they have to rebuild their adobe homes after heavy rain and floods. The most desperate situation was described by respondents in Bodar Khan. In the aftermath of floods, men admitted that women—especially those who are pregnant—suffer greater hardship in cooking and caring for the children, whether they stay in their flooded homes or evacuate to roads, where their problems are exacerbated by lack of privacy. Women from the community were visibly sad when they spoke on this subject: they said large numbers of people and livestock die in the process of displacement and asked what could be worse than having no place to live. Men from the community reported that some people have started constructing homes on higher ground to survive floods.

Health

When asked whether they thought climate change is in any way affecting their health, respondents in each community enumerated a long list of health issues that have either arisen or grown worse in recent years. As Table 4 shows, some complaints were common across all communities, specifically malnutrition, anemia among women, increase in delivery complications, and more frequent deaths among newborns and young children. Most respondents described a clear chain of causation linking these issues to climate change, beginning with poverty, followed by food insecurity and malnutrition, leading to anemia, especially among pregnant women, which in turn they associated with birth complications, stillbirths, and weakness among newborns. Malnutrition was also linked, possibly correctly (Sommer 1987), to widespread night blindness in the community by men in Kanbhar Badha.

We do not get proper nutrition. We do not even get vegetables and drinking water. This leads to malnutrition and anemia in women and children. (Man from Izzat Khan Lashari, Thatta)

Our villages are submerged in water. We have no safe place to live. We don't even have a place to keep our livestock. There is no fodder available for livestock when heavy rains hit our area. (Woman from Izzat Khan Lashari, Thatta)

Women from poor families have to live in homes with almost 2-3 feet of standing water. They have to live there and do all the household work. (Man from Bodar Farm, Umerkot)

If the family has to evacuate then women suffer a lot, as they have to face difficulties both during and after the move. Men can live anywhere but women suffer [more] on account of insecurity and [lack of] privacy. (Man from Kambhar Badha, Umerkot)

Several respondents mentioned that climate change is also hampering physical access to health facilities, either through bad weather (flooding or torrential rains) that make roads inaccessible, or by forcing men to migrate, leaving

women to navigate the difficulties of reaching health facilities and paying for services without their support.

Hospitals are far away and we cannot reach them during heavy rains because all the roads get blocked due to rainfall. The hospital is one kilometer away, but we have to carry our patients in our arms. (Woman from Miroo Dablo)

During heavy rainfall, ambulances can't reach villages and many women are more likely to die due to their unavailability. (Man from Bodar Farm, Umerkot)

Table 4: Health issues mentioned by respondents

Health issue mentioned	Umerkot				Thatta			
	Bodar Farm Women	Bodar Farm Men	Viklokar Women	Kanbhar Badha Men	Izzat Khan Lashari Women	Izzat Khan Lashari Men	Miroo Dablo Women	Miroo Dablo Men
Child Health								
Heat illness (fatigue/dizziness/raised body temp.)	•	•	•					
Diarrhea	•	•	•	•	•			
Malnutrition	•	•		•	•		•	
Anemia	•	•					•	
Measles	•							
Gutka (chewing tobacco) addiction								•
Child mortality	•	•	•		•	•	•	•
Women's Health								
Malnutrition	•	•	•	•	•		•	
Anemia	•	•	•	•	•		•	
Delivery complications	•		•	•	•	•	•	
Maternal mortality			•				•	
General Health								
Heat illness	•	•		•				
Hepatitis C		•						

Health issue mentioned	Umerkot				Thatta			
	Bodar Farm Women	Bodar Farm Men	Viklokar Women	Kanbhar Badha Men	Izzat Khan Lashari Women	Izzat Khan Lashari Men	Miroo Dablo Women	Miroo Dablo Men
Diarrhea	•	•		•				
Vomiting			•					
Malaria	•				•			
Night blindness				•				
Malnutrition				•				
Tuberculosis				•				
Heart disease						•		
Blood pressure issues						•		
Skin problems						•		

Increase in diarrhea cases, especially among children, was also reported in all of the agricultural communities. This was linked primarily with lack of clean drinking water, due to both lack of rain and recharge of wells, and contamination, presumably from increased pesticide use and seawater intrusion in Thatta.

On the other hand, some of the problems reported appear to be associated with the specific environmental stresses that have emerged in the communities due to climate change. For example, symptoms of heat illness, such as dizziness, exhaustion, and raised body temperature, were only reported from the three communities in Umerkot, probably related to greater increase in summer temperatures. Similarly, increase in mosquitoes and malaria cases was mentioned only by women in Bodar Farm and Izzat Khan Lashari, where complaints about flooding and poor drainage were most frequent, and heart disease and blood pressure problems were mentioned only by men in Izzat Khan Lashari, where seawater intrusion is increasing salinity. These men also mentioned skin diseases, which they believed to be associated with contaminated water and strong winds. Measles and tuberculosis were mentioned only by women of Bodar Khan and men in Kanbhar Badha, respectively, but there are international studies linking these diseases with changes in weather, especially among displaced and seasonally mobile populations. Such possible associations need further technical investigation to be confirmed.

The only 'manmade' problem reported was addiction to *ghutka* (chewing tobacco): men from Miroo Dablo reported this to be endemic in their community, with children as young as two in the habit of using, Women did not mention this issue at all, perhaps because they did not associate it with climate change.

Both men and women acknowledged that it is mainly women and children who face the brunt of health challenges, primarily due to malnutrition and women's reproductive role. However, in one respect—heat illness—men were reported to be more vulnerable because of the longer time they spend outdoors.

Some differences in the perspectives of men and women are also noteworthy:

- Women in Izzat Khan Lashari expressed concern that doctors tell them they are anemic, but they are not able to resolve the problem. In this regard, sometimes husbands advise their wives to not take the doctor too seriously. One woman respondent felt this was due to men's inability to bear expenses of protracted treatment.
- In general, women spoke in much greater detail than men about the effects of malnutrition on maternal and child health. Men from the two communities in Thatta did not comment on this link, although they did speak about challenges in transporting women to health facilities during labor.
- Overall, women are more aware of the rising trend in delivery complications than men. In the two more fragile communities, Bodar Farm and Miroo Dablo, women said that complications in deliveries have increased. However, men in Bodar Farm did not mention this issue, while men in Miroo Dablo said that birth complications are uncommon. Similarly, men in Kanbhar Badha were of the view that women's active lifestyles reduce the risk of delivery complications, while women in the comparable community of Viklokar said complicated cases are on the rise.
- Perhaps due to the above difference, some men seemed to be more satisfied with existing reliance on local midwives and were relatively less concerned than women about the absence of health facilities in their community.

An increase in maternal and child (especially newborn) mortality was reported across all communities. Most respondents attributed this change to malnutrition, anemia, and labor complications, but men in Bodar Farm also linked it with decline in use of antenatal and postnatal care services. These respondents, along with women from Miroo Dablo, also directly linked increased mortality with disruption of road access to health facilities due to heavy rain. In Izzat Khan Lashari, women narrated a harrowing story of a woman in labor who started her hours-long journey to the hospital on a donkey cart through pouring rain in the middle of the night. Although an ambulance did get arranged midway, she arrived at the hospital to find she had to wait for the doctor, who was not available on duty. Similarly, men in Miroo Dablo confessed that while they try to help women, and arrange transportation to other cities when complications are expected, the usual means for reaching hospitals is by walking, which can be hard on women. Even aside from weather-related disruptions, risks from delays due to lack of local health facilities and transportation challenges have attained greater proportions with the rise in delivery complications.

In addition to distance, the costs of reproductive healthcare services and of transportation were also mentioned as prohibitive by several respondents. Again, increase in delivery complications is exacerbating the situation by raising prospects of C-sections, which are much more expensive. Men in Izzat Khan Lashari referred poignantly to the pressures of deciding where to take women for emergencies in the middle of the night with little money in hand. They also said that all of these challenges are raised a notch further for the wives of men who have migrated out of the community to work, especially if there are no other male relatives to arrange the money and ensure they are safely escorted to health facilities. In the context of dwindling livelihoods and incomes, financial access to health services may be assumed to have declined further.

There was a delivery in my family day before yesterday. Her husband was not at home. We arranged a vehicle for her for Rs. 4,000 and Rs. 10,000 was paid to the doctor and it was a stillbirth. We are just helpless. We pay a huge amount of money and even after that we are left empty-handed (as it was a stillbirth). If there was a health facility nearby, it might not have happened. (Woman from Viklokar, Umerkot)

Finally, it is noteworthy that several respondents from Thatta alluded to issues related to the quality of care at health facilities. In Miroo Dablo, both men and women spoke about the need for free medicines at public health facilities because they cannot afford to purchase them from pharmacies. The men also said there should be doctors available who conduct proper check-ups. In Izzat Khan Lashari, women were more vocal about these complaints, saying hospitals often announce that medicines are available for free, but then fail to provide them to patients, claiming supply bottlenecks. They also complained that doctors are inattentive, even to educated patients; make them wait long periods while they neglect their duties; and offer only minimal treatment, even in dysentery cases. They felt a need for stronger monitoring of doctors by the government.

On this subject, one of the men from the community alleged that there is an unregistered hospital with fake doctors in the area, where a woman was told to undergo a C-section in the eighth month of pregnancy, even though she had experienced no pain. The baby was lost because no incubator was available. The respondent said such incidents are not uncommon in the area.

Burden of Work

A number of questions were asked of both men and women in each community to gauge whether they perceived any shifts in the work burdens of men and women that can be attributed to climate change. Describing the 'normal' situation, respondents from all communities shared that cooking, child care, and other chores performed within the house are all women's responsibility, while men's role is to earn and provide for the family. Interestingly, both men and women indicated this simple division of roles at first inquiry, but when they were probed, this somewhat automatic response was modified and nearly everybody admitted that women are playing a large and significant role in earning livelihoods as well. In fact, men in Bodar Khan went so far as to say that some men waste

their time in leisure activities and rely on their wives do the bulk of the income generation work in addition to housework.

Most respondents acknowledged that women's work burdens have grown heavier in recent years due directly or indirectly to climate change. One of the most frequently mentioned reasons was their **involvement in income-generation**, especially long hours of arduous agricultural work, which leaves less time to take care of children and to manage housework and livestock. Women from Viklokar said that they work alongside their husbands in the fields during the four-month rainy season. Men in Kanbhar Badha acknowledged that women work on agricultural lands most of the time, and not occasionally. Women in Bodar Khan were also stressed about the long hours they have to spend in the fields, especially in chili and onion cultivation, which clash with their child and livestock care responsibilities. In some cases, they are not even paid a separate wage from their husbands. Men from the community acknowledged that women shoulder an unfairly large share of the work burden of households.

The burden of work for women has increased in a way that she has to work in fields as well as at home. Women work as peasants in the field and return home to do all the household chores. We get mentally tired after working all day long. (Woman from Bodar Farm, Umerkot)

Similarly, in Izzat Khan Lashari, women complained about the long hours of work in chili fields, during which they sometimes do not even have water to drink. They did not consider involvement in agricultural work a new burden, but explained that their work has become almost unbearable due to increased heat. On top of this, men have started to shift some of their earlier agricultural duties to women, in part because of increased heat, but largely in response to dips in the prices and expected revenues from their crops. In such cases, while women have to continue to work in fields, men restrict their roles to selected activities like pesticide and fertilizer application, watering and threshing. These women also shared their anxiety at not being there for young children, or when the children return home from school. Although they typically arrange for female relatives to babysit in their absence, they feel their own presence is necessary for the children to be properly cared for.

The other major reason for increase in women's work burdens, cited by both male and female respondents, is **men's migration**. When the husband migrates, it falls to his wife to do the work he used to do, including his share of the work in fields, grazing of livestock, gathering firewood, and fetching water for the family from wells or ponds that may be far away. In addition, women also need to buy the groceries, escort children to school, and arrange medical care for the household and livestock if the need arises. Women's role in financial decision-making clearly increases when men migrate: they need to address any shortfalls in money by increasing their sewing work, or arranging

When men of the family migrate, all the responsibilities ultimately fall upon women. (Man from Kanbhar Badha, Umerkot)

loans and selling assets (usually in telephonic consultation with husbands). Not surprisingly, some women are forced to involve children in some of the work.

Except for Miroo Dablo, where no current migration was reported, men in all communities recognize the increased pressure on women in their absence. In Kanbhar Badha, men said that community-owned transportation arrangements are in place which can take women safely to health facilities, accompanied by their brothers, relatives, or other women. This alleviates some of the challenges in accessing health facilities when a woman's husband is away, especially for delivery cases. No such arrangements were reported by men in Izzat Khan Lashari, who admitted it becomes a major challenge when men are away and women or children need to go to hospital. Women in Bodar Khan also said it is a challenge for women to go to health facilities in the absence of men. Interestingly, even as they acknowledged the increased hardships they must endure when their husbands are away, some women said they acted stoic to give their husbands the confidence to migrate.

In the event that the entire **family migrates or has to be displaced**, men usually have the task of finding work, while women dismantle and build homes, pack and unpack belongings, and carry out routine domestic tasks like cooking, childcare, and washing. Their new surroundings may afford uncertain living conditions and less privacy and security. While women from Izzat Khan Lashari said men do not allow them to work in fields at new locations, for their security, the men of Kanbhar Badha and Bodar Khan said women do participate in earning incomes when they migrate with their husbands through seasonal field work and sewing.

While women's role has expanded to include income generation, and nearly the entire role of men when they are away, men's participation in the domestic domain remains limited. Women in Bodar Khan did say that—thanks to the work of NGOs in their area—some men in their community have become more responsible and started helping women in the roles traditionally assigned to them, particularly in fetching water, cutting grass, feeding the livestock, and gathering firewood. Men also help them to repair homes after floods. Notably, however, these responsibilities are generally being performed by men in other communities without the urging of external organizations. It appears that women in the community are so conditioned to accept men's lack of involvement in any household work that any assistance from them is perceived as an improvement. Interestingly, men from the community did not clearly touch on such changes in their own role.

In the irrigated agricultural communities—Viklokar and Kanbhar Badha in Umerkot, and Izzat Khan Lashari in Thatta—men were reported to have no role in domestic duties, although they do fulfill external responsibilities like fetching water. When they are unwell or need an extra hand, women from Viklokar said they rely on female relatives to help them cope. The same was reported from Izzat Khan Lashari, where women said men flatly refuse to work around the house, pleading tiredness.

Only in the fishing village of Miroo Dablo did women say that men do help at home when they fall sick. This was confirmed by the male respondents who shared—amidst much laughter in the group—that they do the cooking and housework when women won't.

Women's attitudes about the increase in their work burden differed across communities. There were almost no complaints from the women in Miroo Dablo, possibly because they do not have to cope

with men's absence for protracted periods, and the division of work between men and women is relatively more equitable. In the other fragile community of Bodar Khan as well, women did not complain about men's lack of help, even though they are clearly more burdened than those in other communities. However, in Viklokar and Izzat Khan Lashari, women candidly expressed their frustration at being overburdened, especially when men migrate. In Viklokar, women were additionally stressed that it is solely their job to get their daughters' dowries ready, to save up for their children's weddings, and to stitch the children's clothes for special occasions. These women also voiced concern about the lack of security in the community for women and girls, which affects their mobility. In Izzat Khan Lashari as well, women were concerned that their school-going children get neglected when they have so much to do.

Although most respondents acknowledged the heavier burdens of women, some respondents, particularly women from Bodar Khan and one woman from Izzat Khan Lashari, also spoke about the hardships men endure when they migrate to cities, such as long work hours; inadequate meals; and mental stress. Possibly, discussion on this subject was limited among men by the fact that male respondents in the study were not migrants themselves.

Only in Izzat Khan Lashari did some men deny that women are more burdened than men. In their view, climate change has increased everybody's responsibilities. Men are under strain because most of them are farmers, and the ruination of their land and crops has made it much harder to fulfil their responsibilities to provide for the family, run their homes, and educate their children. These men acknowledged that women's lives have become more difficult because homes get destroyed and household work becomes harder, especially when men migrate, but felt that men too are struggling to earn for the family in a vastly changed environment.

Education

Men and women were asked whether they feel climate change is affecting their children's schooling in any way. Responses to this question were especially mixed because some parents were sending their children to school and many were not.

Poverty was reported to be a key factor in not sending children to school, or pulling them out of school prematurely. Poor households try to increase helping hands by involving children in work. Women from Bodar Farm mentioned that children help their parents with their work, with boys typically being sent out to graze livestock and gather firewood, and girls accompanying their mothers or parents to fetch water. In Kanbhar

When we experience drought, most of us take our children out of schools as they have to go to work with us. We can't bear the expenses of education. We only have Rs. 3000-4000. It is difficult enough to get food in this limited amount—how could we bear the expense of education? (Man from Kanbhar Badha, Umerkot)

Badha, men said that most people take their children out of school to work with them during droughts. Children's role in household work also increases when the men in their family migrate to

find alternative work, leaving women behind to manage both their own and their husbands' or fathers' workloads. When the entire family migrates or is displaced, children's education is in any event disrupted.

Similarly, in the fishing village of Miroo Dablo, respondents said that boys typically go fishing with their parents, while girls are sent to learn to read the Quran. One woman respondent whose son had attended school said he had been unable to find a job afterwards; similarly, men commented that little children like to catch crabs, and one crab can earn four to five hundred rupees.

Respondents from Viklokar and Izzat Khan Lashari did not say that children are involved in earning activities. However, they did talk about the difficulty of affording an education. Even in public schools, the costs of fees, books, uniforms, and other necessary materials can be difficult to foot, especially in families with already limited and uncertain incomes. Men from Kanbhar Badha emphasized that it was unthinkable for

If I want to get my children enrolled in a school, I have to pay, and when they appear for exams, I have to pay again. The poor cannot afford all this and that is why the future of our children is dark. This is why people remain uneducated and unaware. (Man from Izzat Khan Lashari, Thatta)

households earning only 3,000-4,000 rupees, barely enough to afford food, to consider any additional expenses of education. Men in Miroo Dablo conveyed a similar hopelessness of being locked in a cycle of debt, due to which progress is out of reach.

We may conclude from the above that climate change is indirectly affecting children's schooling by contracting incomes, forcing individual and family migration, and increasing labor needs due to stresses such as droughts. Moreover, men in Kanbhar Badha said that children are too frequently sick to go to school. Another reason mentioned by men in Izzat Khan Lashari and Bodar Khan was reduced ability to reach schools due to heavy rains and floods.

The two other main reasons mentioned by respondents for a decline in children's schooling were not related to climate change. One of these was the COVID-19 pandemic, which has forced protracted school closures in Sindh. Men and women of Bodar Khan were worried about this, with women concerned that their children's mental development is suffering. Similarly, women in Izzat Khan Lashari were concerned about their children's time being wasted. Most of them said online schooling is available in their area but not an option because they are too poor or have too many children to arrange mobile phones for each child.

Finally, a major reason for not sending children to schools, cited in several communities, was lack of schools offering quality education. In Bodar Khan, men said schools are not available within walking distance, especially at higher secondary level, and governance is poor, with teachers and schools often existing on paper but not actually available. Women in Izzat Khan Lashari said there used to be a school in their community for boys, but its building has been destroyed and authorities have not rebuilt it despite requests. Teachers only visit the site twice a year. Similarly, no school was available

in Miroo Dablo; women said there is only one school in the nearby town of Keti Bandar, and the teaching quality there is poor, so they are not sending their children.

In general, even where parents are not sending their children to school, they are aware that this not an ideal situation. The women of Bodar Khan acknowledged that the right place for their children is school. Moreover, they feel uneasy about the risk of harm to children when they go out to perform tasks like grazing and firewood gathering. However, they see no other option for poor households to cope with the volume of work.

On the other hand, a woman in Viklokar said that even though her husband is unemployed, she manages to save some money so her children can attend school. Children want to be educated. Similarly, men in Izzat Khan Lashari associated education with being “sensible,” and the women said attitudes in their community have changed to recognize that girls have the same right to education as boys; girls are now sent to school, albeit only those that are close by.

Of all the communities, the least interest in education was expressed in Miroo Dablo. Women were relatively more positive than men. They said education did not use to be a priority in their community, but some organizations have been working in the area to change this mindset. In response, religious education was initiated in the community about three years ago, with girls and little boys attending. The women recognized that there should be a proper school where their children can develop the capacity to do better jobs, although, as mentioned earlier, one woman did point out that her educated son has not been able to secure a job.

In comparison, men from the fishing village seemed more close-minded about the possibility or use of education. Along with women, they were skeptical that uneducated parents can successfully support their children through school. They were of the view that “children of fishermen do not study,” and if books were given to their children, they would toss them into the river.

Psychosocial Well-being

In view of the above impacts of climate change on their lives, it is not surprising that respondents reported high levels of anxiety in their routine life, which sometimes leads to quarrels and violence in the household, and at times to even more drastic measures like crime and suicide.

One of the most frequently mentioned issues underlying this stress was hunger. In Bodar Khan and Kanbhar Badha, men mentioned that hunger in the household causes mental disturbance that can culminate in violence. Women in Miroo Dablo also said couples fight when the family is suffering from hunger.

Couples fight when they have to suffer from hunger. (Woman from Miroo Dablo, Thatta)

The other source of anxiety is how to make ends meet. Men in Miroo Dablo said they get tense when they cannot catch fish, buy groceries, or suffer any loss; sometimes a man can lapse into depression

and become susceptible to all kinds of illnesses. Women also said that men's lack of earning leads to increased worries for couples. In Izzat Khan Lashari, women said couples start quarrelling when they cannot obtain or repay loans, while men pointed out that making less money than usual makes it difficult for men and women to perform their normal tasks of bringing groceries and cooking meals (respectively), naturally leading to blow-ups. This latter source of stress was also mentioned by women of the same community and of Bodar Khan.

In Kanbhar Badha, men also spoke about the mental pressure on men who migrate to work, not knowing when they will be able to find a job, eat, or send money home.

In the matter of financial worries, a very interesting finding from village Miroo Dablo is that couples are quarrelling over the use of the monthly stipend of Rs. 12,000 being provided to women under the government's Benazir Income Support Program. This issue was only mentioned by men, who joked that women spend the money on clothes and makeup, and refuse to share with husbands. However, neither the men nor the women spoke about physical violence, except where a man poked fun at another respondent, claiming he is beaten daily by his wife.

Among women, their increased work burden, especially when husbands migrate, is a huge source of anxiety, as detailed earlier. Apart from the fatigue and social and economic uncertainties associated with their expanded work roles, many women are concerned about their inability to pay proper attention to their children, provide them sufficient food, respond to their demands for treats or pocket money, or protect them from the negative impact of watching their parents fight. They are also distressed about the effect of climate change on their children's health.

Situations of actual or impending disaster from events like cyclones or floods can push most of the above-mentioned problems to breaking point. In Bodar Khan, male respondents spoke about the severe mental anguish of men who cannot find any work to provide for their families. In Miroo Dablo, women spoke about being stuck in flooded areas with no possibility of evacuation during cyclones, and also couples' fears while sailing further out to sea as to what would become of their children if they were to drown.

Physical violence was mentioned more frequently in responses from Bodar Khan and Kanbhar Badha, although there was some reference to it across all communities. In Viklokar, women said domestic violence is increasing by the day.

In the responses of men from Bodar Khan, there were also hints that desperation is driving people to crime. As already mentioned, some women from the community are engaged in sex work and *tharra* brewing. In addition, men mentioned that desperation and lack of food can force a man to steal, and that the worst impact is on children, who become so insecure that they resort to crimes like robbery.

Strangely, women from the community did not refer to any of these issues. However they did speak at length about the rising incidence of suicide, which they associated with the pressures climate change has introduced in lives. Men in Izzat Khan Lashari also mentioned that unemployment and inability to grow crops has driven “many people” to attempt suicide.

Many people also attempt suicides due to unemployment...when they cannot grow the crops, they attempt suicide. (Man from Izzat Khan Lashari, Thatta)

DISCUSSION AND CONCLUSIONS

Responses in this study indicate that women and men in vulnerable communities in Sindh have moved far beyond mere awareness of climate change in their region; they recognize it to be one of the foremost challenges in their lives, tangibly and significantly corroding their physical safety, livelihoods, food security, health, and general well-being. By virtue of their dependence on natural resources for livelihoods, they share a direct and finely attuned connection with their environment and can identify changes and trace their origins and interrelations. Their reports of increased heat, longer summers, longer dry periods, and more intense rainfall incidents are all consistent with analyses of meteorological data (see, for example, Faisal and Riaz 2019). The respondents’ more detailed observations, for example, of increased dew, more rats, and more frequent lightning storms, also find support in studies of climate change elsewhere in Pakistan or in other parts of the world.

Faced with climate changes and unpredictability, and the emergence or worsening of environmental stresses like water shortage, soil degradation, and pest attacks, residents are finding it impossible to maintain the levels of productivity that previously sustained them. Studies indicate that farmers in Pakistan generally lack the resources and know-how necessary to adapt; they are hindered not only by their own poverty and lack of education, but also by the failure of the state to provide support such as extension services and insurance. In all of the five communities we studied, respondents reported drastically reduced earnings and increased unemployment, and only limited efforts to adapt existing practices.

In addition to socioeconomic factors, the fall-out of environmental and financial stress is mediated both by the strategies adopted to cope and by gender norms and roles. Our findings generally corroborate those of earlier studies that women are under greater strain. The specific areas of higher risk for them are listed below:

- **Nutrition** – In the context of climate change-related food insecurity, women face higher risks of malnutrition and anemia than men, which respondents largely link with their reproductive role. In addition, some women respondents mentioned that they limit their own meals to spare extra food for their children. Memon and colleagues (2018) similarly found it is customary for women in some communities to sacrifice their own food to ensure other family members have enough to eat.

- **Health** – Delivery complications and maternal mortality were reported to be rising in all communities, due not only to malnutrition, but also reduced access to health facilities due to inclement weather or migrant husbands' absence. Men were reported to be at higher risk of heat illness, but as women's role in outdoor responsibilities increases (due to men's widespread migration), their exposure to this risk is also rising.
- **Increasing work burden** – In the communities studied, domestic and child care work remain squarely in the work domain of women. In addition, women are working in fields, sometimes for pay and increasingly in an unpaid capacity as men migrate or seek other more lucrative work. Men's migration also leaves women responsible for time- and energy-consuming tasks like fetching water and gathering grass and firewood. On top of these activities, women are expected to help address increasing shortfalls in men's earnings through their own work in fields and underpaid sewing work.
- However, even though only women bear a double work burden, it is important to remember that our respondents were more aware of challenges among those left behind (mostly women), and did not elaborate in as much depth on the work burden, privations, or stresses of the men who migrate. Men and women did speak of higher risks of hunger, sickness, and even death among those who migrate, and as men in Izzat Khan Lashari pointed out, men's burden of work has also increased from the need to find and navigate new sources of livelihood. If this missing piece were added to the analysis, it might emerge that, on balance, both men and women face an increased work burden. That said, in communities such as Bodar Farm, where it is something of a norm for men to "do nothing," there can be no doubt that women are at higher risk of increased workloads due to climate change.
- **Gender-based violence** – For the most part, the responses of both men and women conveyed a sense of teamwork and mutual cooperation to meet the challenges imposed by climate change. At one point or another, respondents of both sexes expressed sympathy and concern for the challenges of the other. Women sounded quite at ease on the subject of quarrelling with their husbands over issues like their failure to bring home groceries. Even where violence in any form was mentioned against women or girls, respondents hastened to explain that it was not condoned or common among more educated people, and usually arose from acute hunger or financial stress.
- Nevertheless, it is important to acknowledge some of the various forms of gender-based violence that were mentioned or implied:
 - In nearly all communities, respondents admitted that the risk of domestic violence increases during times of hunger, which have become more frequent.
 - Outside the home, women who are displaced or migrate seasonally may face greater security risks in unfamiliar surroundings. Men and women in Bodar Farm were very concerned about

the plight of women who have to evacuate to roads, while women of Izzat Khan Lashari said their men prevent them from working outdoors in such situations.

- In all communities, women were reported to play a prominent role in obtaining loans from shopkeepers, and sometimes even from landlords (in Bodar Farm). This finding is somewhat jarring in the context of patriarchal gender norms that otherwise hinder women's interactions with the outside world, including traveling alone for health needs. It may be speculated that women's direct interaction with creditors, especially powerful landlords, and in times of growing financial desperation, increases risks of sexual harassment or exploitation.
- More directly, men in Bodar Farm mentioned that significant numbers of women from their area have become involved in sex work to make ends meet. They also mentioned that at times, daughters are "sold" to pay off the loans households cannot return. This outright commodification of women and girls could arguably be seen both as the ultimate form of gender power imbalance, and as an anomaly within the very same patriarchal norms that hold women back on the pretext of protecting honor. Either way, it highlights the disproportionately higher risks precipitated for women and girls by climate change.

Notwithstanding the higher strain on women and the greater risks to their health and well-being, it is important to recognize that, predominantly, women in this study saw themselves not as victims but as equal fighters to men in the battle for survival against climate change. In stark contrast to statistics that show abysmally low levels of female labor force participation in Pakistan, this study revealed almost every woman to be an earning member of her household, even if her financial contribution goes unnoticed in the chaos of financial stress. It is men who migrate, but their overworked wives who give them the confidence to do so.

Vulnerable communities in Sindh are in urgent need of guidance to adapt agricultural practices and diversify livelihood sources. Efforts to assist them should of course target men, who are stressed sometimes to the point of suicide by the immense difficulties of carving out a living, which remains their primary gender role but is no longer simple. But interventions must also include a strong focus on women and the potential to transform their hard work into paying opportunities that elevate their recognized status to that of equal breadwinners.

Education and family planning are related areas that require attention. Our findings suggest that, in addition to the obvious need to improve access to quality education, it is vital to make education itself relevant to the struggles of rural households to diversify incomes. Unless schooling opens doors to better vocations and jobs, parents will continue to see labor as a more productive pursuit for their children. Demand for smaller families and family planning will also remain low.

Finally, health and nutrition interventions must be intensified in the poor communities that are hardest hit by climate change. Malnutrition among mothers and children must be addressed on a war footing, and family planning promoted at least as a spacing device to maintain maternal and

child health. Increased investment is needed in public health research and communications to identify and minimize the risks emerging or intensifying due to climate change.

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Appendix A: Socioeconomic characteristics of FGD respondents

	Gender of respondent			
	Male		Female	
	%	n	%	n
Age (years)				
Less than 30	30	9	33	11
30-34	13	4	18	6
35-39	3	1	9	3
40 or more	53	16	39	13
Marital status				
Married	87	26	94	31
Unmarried	13	4	6	2
Educational attainment				
No schooling	37	11	67	22
Primary	17	5	12	4
Middle	3	1	9	3
Secondary	7	2	0	0
Higher	37	11	12	4
Employment status				
Employed	93	28	6	2
Unemployed	7	2	94	31
Occupation of spouse				
Unemployed	40	12	0	0
Self-employed	53	16	94	31
Government job	7	2	6	2
Mean number of children		5	5	
Total	100	30	100	33

