

Floods Impacts on the Socio-Economic of Livelihoods in Paktia Afghanistan

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ABSTRACT

This study investigated the impact of floods on the socio-economic status of livelihoods for the people of Afghanistan's Paktia province and the livelihoods of those who live there. The research team used both quantitative and qualitative approaches in their work. Discussions were held with key stakeholders at the provincial and community levels, as well as with randomly selected households, as part of the study. The information was gathered through the use of quantitative Household Questionnaires and qualitative Key Informant Interviews. People's socioeconomic livelihoods and critical aspects such as agriculture, health, education, housing, water and sanitation, and property were found to have been negatively impacted by floods according to the findings of the study. As a result, any negative impact on livelihood would result in lower household incomes and lower purchasing power for households.

In Paktia, as in many other parts of Afghanistan, there has been extensive deforestation. In recent years, devastating floods have resulted as a result of this.

The following are the most important recommendations made:

- Since communities have expressed a desire to relocate permanently to higher ground, the government and key stakeholders should engage them in the process of relocating permanently to higher ground. Their relocation should be accompanied by the provision of all necessary social amenities, such as schools, hospitals, infrastructure, water, and agricultural support, for a period of three (3) years to allow the households to settle in the new location. It should also be taken in the newly established settlement area.
- A deliberate policy should be implemented to compel communities, particularly in rural areas, to construct houses out of durable materials and away from flood-prone areas, which would be beneficial.
- Communities should be encouraged to expand the area under cultivation on upland land in order to improve food security and household income.
- Both non-flooding and flood-prone areas should be clearly delineated by the appropriate authorities. During floods, the non-flooding areas can be used as a makeshift temporary shelter for the settlements.
- Construction of dams should be considered as a means of capturing the surplus water. This could be used to irrigate the garden.
- Consideration should be given to the construction of canals into the main Kurrama River.

Keywords- Flood, Socio, Economic, and Livelihoods.

I. INTRODUCTION

Natural disasters have become more frequent over the years, resulting in the death of people, the destruction of property, and the devastation of the environment. The number of people at risk is increasing year after year, and the vast majority of them live in developing countries with high levels of poverty, making them particularly vulnerable to disaster.

For centuries, floods have been a regular feature of people's lives in various parts of the world, recurring with varying magnitudes and frequencies to which people have become accustomed over time. In many parts of the world, these floods are both expected and welcomed because they enrich the soil and provide both water and livelihoods for those who depend on them. Typically, a flood is defined as an overflow of water that submerges land, low-lying villages, and towns, or an unusual condition caused by the inflow of water from the ocean. It is possible for flooding to occur as a result of an overflow of water from a body of water, such as a river or lake, the sea, or large natural water basins, or it may occur as a result of an accumulation of rainwater on saturated ground, as in an aerial flood.

Flooding caused by extreme hydrological and meteorological events and occurring in unexpected magnitudes and frequencies, on the other hand, can result in the loss of lives, livelihoods, and infrastructure in disparate circumstances. According to the findings, floods are the most destructive natural disaster on the planet, causing extensive damage to both the built and natural environments, as well as devastation to human settlements all over the world. Economic losses as a result of damaging floods have increased significantly around the world [3, citing the World Bank].

Natural disasters have become more frequent over the years, resulting in the death of people, the destruction of property, and the devastation of the environment [6]. In addition to the tragic loss of life, flood losses reduce the assets of households, communities, and societies through the destruction of standing crops, dwellings, infrastructure, machinery, and buildings. Extreme flooding can have a devastating impact, not only on the individual household level, but also on the entire country in some instances [5]. The Fourth Assessment

Report of the Intergovernmental Panel on Climate Change. According to the Intergovernmental Panel on Climate Change, "heavy precipitation events, which are very likely to become more frequent in the future, will increase flood risk." [4] These floods will have a negative impact on human settlements in all areas, including floodplains, coastal zones, river deltas, and mountains, as well as their way of life and livelihood. Increased flooding is also occurring in urban areas, posing a serious threat to the lives of poor and vulnerable people.

The situation is more serious in the Asian region than it is in the developed countries. Fluvial disasters in North Asia are primarily caused by the region's unique hydro-meteorological and monsoonal influences. In the region, there are two monsoonal windows that are active: the southwest monsoon that follows the summer months and the northeast monsoon that follows the winter months. The southwest monsoon, which typically occurs from June to September and accounts for nearly 70-80 percent of the rainfall in this region, is the dominant weather pattern. For its part, the melting of glaciers in the Paktia province region as a result of visible climate change impacts may result in an increase in flash flooding in mountainous areas and areas at the foothills of mountains in the province region.

The number of people at risk is increasing year after year, and the vast majority live in developing countries such as Afghanistan, where poverty levels make them more vulnerable to disasters [6]. As a result of high poverty levels, Grunfest claims that people have become more vulnerable to disasters because they live in hazardous areas such as flood plains of a river and over an embankment [1]. A recent estimate suggests that 35 percent of the country's total population now lives below the poverty line and has difficulty meeting their nutritional requirements. [8]

People in rural Paktia province do not have access to adequate nutrition, housing, or health-care facilities, and the majority of them live in poverty. Because of natural disasters and calamities that occur on an annual basis, the poverty situation deteriorates even further. Flooding and riverbank erosion frequently cause the dislocation of cultivable land and human settlements, as well as the massive destruction of crops, as well as the disruption of road connections and the country's communication infrastructure. As a result of this precarious situation, displaced people and victims of natural disasters are confronted with a wide range of environmental issues. When it comes to adapting to changing conditions of many sociopolitical, economic, and cultural strategies, they have failed in the majority of cases, leaving them unable to survive in the face of an overwhelming number of problems.

Many aspects of these environmental issues in Paktia province have remained understudied from an academic perspective, which is unfortunate. According to this viewpoint, there are few studies on flood and its secondary effects, such as riverbank erosion

displacement, from the perspective of livelihood. It is even possible that we do not understand the causes of the flood in the study area. There has been very little research into the flood, as well as the secondary causes of the flood and the effects of the flood on the community's livelihood assets. Consequently, data on flood and riverbank erosion (as a secondary cause of flood) displacement as well as the consequences of this on the livelihood of the study area have been collected as a result of this research. Paktia is a mountainous province with the majority of its population residing in the central valley that stretches from Ahmad Khel in the east down through Zormat and into neighbouring Paktika province. This research specifically generated data on Paktia. The research, which is based on a field study, provides contextual socio-economic and cultural information at the experiential level. The overall goal of this study has been to collect information on the impact of flooding on people's lives and livelihoods in general, as well as the displacement caused by riverbank erosion and the impact of these events on the socio-economic status of those affected. The research question and objectives are to determine whether or not people will survive in two different flood-prone areas of the country.

Rainwater and some rivers in these areas cause flooding every year during the rainy season, which occurs during the rainy season. The population of the riverside has increased year after year, despite the fact that the flood destroyed their lives and livelihood. As a result of the flood, they were able to return to their original location. However, this does not prevent it from having an impact on their livelihood, as well as social and economic factors in general.

II. METHODOLOGY

Both quantitative and qualitative approaches will be used in this research. In accordance with Strydom, Fouche, and Delport [2, qualitative data collection methods frequently make use of measuring instruments]. It is the process of describing abstract concepts in terms of specific indicators by assigning numbers or other symbols to the indicators that is referred to as measurements. In qualitative research, on the other hand, the researcher's decisions and actions will determine the design and strategy. As previously stated, the study used both quantitative and qualitative approaches in order to triangulate its findings. Three data sources, three investigators, and three methods are used in the process of triangulation, with the assumption being that any bias inherent in a particular data source, investigator, or method will be neutralised when the data sources, investigators, and methods are used together. In order to collect information, the following methods will be used:

1. Sampling Technique

To ensure that the researcher had sufficient data to allow for the generalisation of major findings, both probability and non-probability sampling techniques were

used in the study's data collection. Out of 14 districts in the province of Paktia, seven were randomly selected for the study, and from each district, a total of 15 farmer people were chosen at random for the interview in collaboration with the village's chief.

2. *Quantitative Household Questionnaire*

Questionnaires are probably the most widely used of all the instruments. Primary data will be obtained in this particular study by directly interviewing the interviewees at the household level in order to obtain extremely reliable and accurate information. Personnel interviews will be conducted with members of a randomly sampled household from each district in Afghanistan's Paktia province in order to gather information. Households will be interviewed in the comfort of their own homes.

The following topics will be covered by the questionnaire for the household:

- Household demographics
- Livelihood Patterns
- Flood Impact on:
 - Agriculture
 - Health
 - Infrastructure
 - Education
 - Water and Sanitation
 - Housing and Property
- Underlying causes of vulnerability
- Coping Strategies

3. *Key Informant Interviews with a Qualitative Approach*

On both the district and community levels, qualitative approaches will be used to conduct interviews with key informants using a checklist. It is the composition of key informants that is important because it includes all of the critical players who have a role to play in the flood management process. Among the notable organisations and individuals operating at the provincial level were those listed below:

- Agricultural Extension Officers and Field Officers of Paktia province.
- Non-Governmental Organizations (NGOs)
- Province Meteorological Agency
- The Ministry of Agriculture Irrigation and livestock, respectively [7].

The key informant and focus group discussions at province and community levels cover the following topics:

- Main Livelihood patterns
- Main Sources of income
- Main sources of food
- Rainfall performance and its effects
- Impact of floods on:
 - Agriculture
 - Health
 - Infrastructure

- Education
- Water and Sanitation
- Housing and Property

- Coping Strategies
- Development options to deal with the problem of floods.

4. *Research Design*

In research design, we are talking about the "framework or plan for a study that guides the collection and analysis of data." In a typical company research design, the following issues are attempted to be resolved:

- a) Decide on the data collection design.
- b) Decide on the data collection methods.
- c) Identifying and evaluating data sources
- d) Determining the primary data collection methods to be utilised.
- e) Creating Surveys and Questionnaires
- f) Making a decision on a sampling strategy

4.1 Design of Exploratory Research: Exploratory studies are carried out in order to gain a better understanding of the problem. They aid in the proper definition of the problem, as well as the development of a specific hypothesis that will be tested later by more conclusive research designs. Its fundamental goal is to identify the factors that are at the root of a problem and to determine which of these factors should be further investigated through the use of rigorous conclusive research designs.

4.2. Conclusive Research Design: The design of conclusive research studies is more formal and is carried out in order to elicit more precise information for the purpose of making marketing decisions.

Experimental or descriptive studies are two types of studies that can be conducted. As a result, it was a combination of both exploratory and conclusive research design tools, which is to say, it was a hybrid of the two.

5. *Data Analysis and Interpretation*

The categorization, ordering, manipulating, and summarising of data in order to obtain answers to research questions is referred to as analysis. Aims of the analysis include reducing data to a form that is understandable and interpretable so that the relationships between research problems can be investigated, tested, and conclusions drawn [9].

A quantitative and qualitative analysis of the data collected for this study will be carried out after it has been processed and analysed. The quantitative data will be analysed with the help of the IBM SPSS Statistics Software version 21 and the Microsoft Excel Software, which will be used to perform both descriptive and inferential statistics on it. To analyse the quantitative data, statistical tools such as frequency distributions, percentages, cross-tabulations, Chi-square tests, and trend equations and graphs will be employed. In addition, the qualitative data will be analysed using a three-tiered analytical framework consisting of transcription, classification, and interconnecting procedures.

III. RESULT AND DISCUSSION

1. Introduction

This section contains a discussion of the findings of the research, which is based on the primary and

secondary data that was gathered. Furthermore, it includes a discussion of household demographics, livelihood patterns, and the impact of floods on various aspects of life, including health, agriculture, and livelihood. The results of this discussion are presented in the table below.

Table1: Socio-economic impact of flood in the study area

Years	killed	Injured	livestock loss	Farmland destroyed (ha)	Damaged houses	Road (m)	Intakes (m)	retaining walls(m)	Shops	Affected Families
2008	6	16	234	345.7	602	0	89	256	132	3215
2009	1	13	223	465.9	20	231	235	176	123	3210
2010	2	18	237	865.3	647	0	172	0	0	564
2011	5	12	153	424	775	276	291	87	101	4564
2012	6	3	130	1007.6	292	320	860	1880	0	7859
2013	11	11	552	1074.6	932	7030	1500	3485	20	7738
2014	7	2	370	450	471	120	380	730	0	3941
2015	2	19	354	1324.6	1004	3000	730	2484	112	10759
2016	7	13	270	440	670	0	300	0	71	6744
2017	3	14	231	340	598	79	243	157	0	2381
Total	50	121	2754	6737.7	6511	11056	4800	9255	559	50975

2. Flood Impacts on Lives and Livelihoods

During the monsoon season, flooding is a frequent occurrence. The study area has seen an increase in the amount of land that is being inundated and flooded over the last ten years, according to the findings. Physical assets and social assets have been damaged as a result of the flooding, which has been subdivided into two categories. According to people who live in the study area, there is an increasing trend in the number of different secondary effects caused by floods in the area under investigation. Explain the flood's impact on various non-productive but extremely important aspects of social life in this section of the report. It is clear from Table 1 that approximately 50975 families were affected by floods in the study area, and 559 businesses were completely destroyed. Focus Group Discussions (FGD) and Key Informant Interviews (KII) revealed that flooding regularly damages physical infrastructures such as houses, schools, roads, culverts, shops, gabion embankments, and other similar structures. Flooding also has a negative impact on agricultural land and livestock that can be harvested for profit.

2.1 Impacts on Housing: It is more obvious and noticeable when it comes to the damage to houses. Roof and wall structures play a role in the extent of the damage to the houses. Roofs with CGI sheets, on the other hand, did not leak water after a period of continuous rain, according to the findings. In addition, it has been reported that mud walls that soak up water are prone to crumbling. Despite its craziness, this house has a very limited ability to protect itself from flooding. In order to prevent this from happening during the monsoon season, continuous rainwater is pumped into the house wall. Thatched houses

are severely damaged by flooding, whereas houses with cement pillars, brick walls, and concrete structures are only partially damaged by the floodwaters. " Floods have had an impact on housing, as shown in Table 1, which shows that from 2008 to 2017, approximately 6511 houses in the study area were damaged by floods.

2.2 Impacts on Agriculture: In the study area, agriculture is the economic backbone of the region. It is estimated that agriculture provides a source of income for nearly 85% of the world's people. Due to the small size of the majority of people's landholdings, there is very little surplus land available to them. The flood has swept away or rendered unproductive a large area of agricultural land, and only a small number of well-off farmers have switched from domestic to commercial farming. This is due to river erosion, sedimentation, and inundation, all of which have resulted in the loss or destruction of agricultural land. Observations have revealed that river erosion affects primarily the villages along the river and in Bhatsala Beel's lap while flooding, inundation, and sedimentation affects the villages further afield. There was a total of 6737.7 ha of farmland destroyed in the study area between 2008 and 2017, which has a significant impact on people's livelihoods as well as the socio-economic sector of Paktia province, as shown in Table 1. According to reports, the flood has harmed four major crops: paddy, maize, wheat, and vegetables. It is the paddy crop that suffers the most damage, while vegetables suffer the least.

Crop production has been gradually decreasing in recent years, according to an estimate 25 made by the community, when compared to the production level of about ten years earlier. It is estimated that the paddy

production on the flooded land has been reduced by more than 40%, according to the researchers' calculations. In almost all of the communities in the study area, land productivity has decreased for almost all types of crops. River erosion, inundation, flooding, and sand deposition have all been reported to have reduced paddy production; however, dampness and late cultivation have been reported to have reduced vegetable production. As a result of the delay in paddy cultivation, the cultivation of winter crops has been hampered and delayed. Flooding and inundation have made the land damp, making it difficult to plough in preparation for broadcasting winter crops.

2.3 Impacts on Livestock: Animal Welfare Implications of the Study Table 1 shows that there were 2754 documented livestock losses as a result of flooding in the study area between 2008 and 2017. Additionally, livestock such as goats and sheep, chickens, buffaloes, and cattle and oxen were lost as a result of the floodwaters. Affecting livelihoods because animal husbandry is the second-largest source of income after agriculture, the flooding that killed some livestock and the subsequent deaths of many others from unidentified diseases after the flood had a detrimental effect on their well-being. Chicken suffered the most from health problems, but buffalo was the most affected by the floods of the previous and recent years. One of the most serious problems during any flood in this study area is the livestock's inability to feed themselves.

In response to the rising level of the floodwaters day after day, the animals were relocated to a higher part of the house, and some respondents stated that they had also relocated their animals to a nearby embankment. A large proportion of the study area's wetlands were submerged during the flood period, and according to the respondents, food for livestock as well as shelter posed a significant challenge in this area. There are numerous different types of health-related problems that affect the livestock during flood season, and it is extremely difficult

to manage the medical service for sick animals. When this occurs, the cattle must be transported to an animal hospital that is located outside of the immediate area.

2.4 Implications for the Road and Transportation System: Due to the flooding, the existing water passage channel has been damaged. As a result of continuous flooding, erosion, and sedimentation, people have reported that the road situation is extremely poor during the rains. An estimated 95% of the road in the study area was destroyed or severely damaged by floodwaters in 2004. Information is provided in table (1) about the impact flooding has had on various aspects of Paktia province's socioeconomic pattern. Moreover, it specifies that a total of 11065 metres of road in the study area was damaged as a result of floods. Heavy rainfall during the monsoon season causes widespread damage to all local roads and drainage systems throughout the study area almost every year. The rainwater was unable to flow from the locality to the surrounding areas as a result. In the middle of the union, there are 26 few Char.

It is the Bazar and the weekly village market (known as Hat) in that char that provide the majority of the income and necessities for the people who live there. To buy and sell their goods, the people who live in the char go to the local market. Because of the overflow of water at the marketplace during the monsoon or flood season, the village market is closed for most of the day, seven days a week. During the flood period, it was discovered through individual household interviews that all of the roads were overflowing with floodwater. To maintain social contact and travel to and from any location away from the house, the boat was the only mode of transportation. Most of the people in the study area are poor, and as a result, the majority of them were unable to afford or acquire a personal boat for themselves. There were significant difficulties in transportation and social communication in these areas.

Table 2: Risk profile, Paktia province

Name of place	Population	Area (km ²)	Floods	Blockade of roads
Gardiz	188000	749	M	M
Ahmadaba	75000	502	M	M
Saidkaram	80000	392	M	H
Ahmadkhil	80000	474	H	H
Lajamangal	65000		H	H
Janikhil	70000	339	H	H
Zazi aryoub	95000	583	H	H
Chamkani	111000	278	H	L
Dandi patan	65000	189	H	L
Zurmat	15000	1478	H	M
Shwak	45000	111	H	H
Wazi jadrans	70000	474	H	H
Mirzaka	40000		H	H
Garda serai	63000		H	H

H-High risk, M- Medium risk, L- Lower risk

2.5. Impacts on Health: Overall, it was discovered that health facilities were the most frequently affected by floods, according to all of the respondents to this study. As a result of the flooding, all types of health centres have been closed indefinitely. Various water-borne diseases such as diarrhoea, cholera, jaundice, and skin-related health problems are the most frequently encountered during this time period. These types of health-related problems are most frequently experienced by children and the elderly, in particular. Because of the inaccessibility of basic health facilities, it is sometimes not possible to receive primary care.

According to the survey participants, providing medical services becomes more difficult during a flood. 121 people were injured and approximately 50 people were killed in Paktia province between 2008 and 2017, with the year 2013 recording the highest number of fatalities (11). When it comes to pregnant women's health, floods have a more subdued impact. During the floods, the expectant mother was unable to access any type of health care services. In the study area, it was reported that any type of health facility could be located a long distance away from the flood-prone area. Because of a scarcity of safe water, they have also complained that flood water has spread throughout the entire area and is contaminated by various bacteria and poisonous substances, making contact with the water potentially harmful to human health. However, they have no choice but to use the contaminated water in their various daily activities due to a scarcity of safe water in the region.

3. River Channel Migration and its Impacts on Study Area

It has been discovered that the River channel in the study area is frequently migrating, particularly in the southern region of the study area. In the vicinity of the river, such migration poses a threat to the settlements and farmland that have developed. It was discovered that the river has made 27 westward movements in the last few years. Over the last ten years, the channel has migrated more than one kilometre away from the locals' viewpoint. Recent flooding in the Lower North River Basin and the study area has demonstrated that the upstream/downstream and upland/lowland linkages are extremely important in the design of any comprehensive flood management plan, particularly in the Lower North River Basin.

Consideration of such connections will aid in the identification and elimination of the root causes of flooding, as suggested by the local community. Local administrators, researchers, and the general public in the study area are of the opinion that the extent of flooding has increased as a result of the development of various industries in the area since the construction of the study site. This is also observed in the current study, as it suggests that the backwater effect of increased flood discharge in the River has been reported by the locals, affecting the drainage of the inundated area, which is consistent with previous findings. Furthermore, on the

basis of the general hydraulic principle, it can be stated that the construction of an industrial zone is expected to result in aggradations upstream of these structures in the future.

As a result of these aggradations, the conveyance capacity of the river channel is reduced, resulting in flooding as a result of bank overtopping. The upstream catchments make a significant contribution to the River's flow during both the dry and wet seasons. The determination of the time of concentration of several subcatchments, as well as the flow routing in the main channel, is required for the proper design of any flood forecasting system, regardless of the type. A study of this nature would entail proposing specific watershed management activities in subcatchments that have a rapid response to rainfall and runoff.

In the study channel area, the hydrological linkage between upstream and downstream is the most significant factor contributing to the reduction in water flow capacity. In the study area, there is evidence of a link between upland and lowland ecosystems. As a result of the massive amount of sediment carried by several rivers that originate in the Indian range, the productivity of the farmland is greatly reduced. In order to ensure water security for irrigation purposes in the study area, it is necessary to manage these rivulets in an appropriate manner in order to reduce the risk of flooding and other risks associated with it (inundation, bank cutting, and sedimentation).

This upland-to-lowland linkage holds true throughout the entire River system. Many people believe that increased erosion in upland areas and debris flow has resulted in increased sediment in the river, which has resulted in a reduction in the conveyance capacity of the river channel and, as a result, flooding and bank cutting problems.

3.1. River Erosion: The local people of the study area have expressed concern about erosion as one of the most significant secondary effects following any flooding that has occurred. According to the results of the group discussion and key informant interview conducted with the sample group, river erosion following a flood is the most common phenomenon observed in the study area. Local residents in this area have expressed concern that two villages in this union have already been destroyed as a result of river erosion. Local data indicate that the erosion rate of the River is higher in the study area at the Horirampur Thana than it is in the rest of the study area. According to the participant, nearly a one-kilometre area near the River has already been submerged by the River.

Some of the participants in this study expressed dissatisfaction with the fact that they had already lost their cultivation land due to river erosion. Their income-generating activity, which was previously farming, has now been compelled them to shift their focus to business or day labour, they added. Participants stated that after every major flood, river erosion appeared to be a dangerous secondary negative impact that should be

addressed. The local people were forced to relocate their local marketplace due to river erosion, which was a source of contention.



Figure .1: river erosion and loss of cultivation land of the study area

Image taken during a transit visit to the research area. It has been discovered that river erosion is a continuous process in this area of the world. Due to the curved shape of the riverbank, the water force can easily break through the bank. It has also been discovered by the locals and the union Parishad office that, as a result of bank erosion and river channel migration, two villages have already been destroyed, and one char has been established to replace the two destroyed villages. Paktika is located on the Pakistani side of the Durand Line, which separates the countries of Pakistan and Afghanistan. To the north, it shares a border with the provinces of Khost and Paktia. The North Waziristan, Bannu, and South Waziristan Agencies are both located to the east of the city. The western border is shared with the provinces of Ghazni and Zabul, while the southern border is shared with the Pakistani province of Baluchistan. There have been numerous cases of river erosion in Paktia province. Between 2008 and 2017, a total of 9255 metres of retaining walls and approximately 4800 metres of intakes were destroyed as a result of river erosion and flooding in the study area.

In Paktika, as in many other parts of Afghanistan, there has been extensive deforestation. In recent years, devastating floods have resulted as a result of this. The province is predominantly hilly, with seasonal river valleys interspersed throughout. The terrain becomes more mountainous and rugged as one travels further north. In the west, the Road-e Lurah River rises in the mountainous Omna District and flows southwest to the Ghazni Province, where it forms a shallow river valley that dominates the topography in the Zarghun Shar, Jani Khel, and Dila Districts. The river originates in the mountainous Omna District and flows southwest to the Ghazni Province, where it forms a shallow river valley that dominates the topography in the Zarghun Shar, Jani Khel, and Dila Districts. The terrain in Omna becomes hillier as it gets closer to Pakistan to the east. The hilly southern districts are also

sparsely populated, with elevation descending towards the south and west as one travels south.

From its source in the mountains of the Sar Hawza District, the Gomal River flows south, before turning southeast to the Pakistani border, where it forms the broad river valley that defines the topography of Gomal District, before flowing east through Pakistan and eventually connecting with the powerful Indus River. According to the study's secondary data source, only a few non-governmental organisations (NGOs) are working to reintegrate people who have become landless as a result of river erosion. However, in this study area, there were no government projects or non-governmental organisation (NGO) activities to reduce or mitigate river erosion.

4. Impacts on Local Society

Along with causing physical damage, the flood has eroded social assets such as the neighbourhood, brotherhood, and strong ties of kinship, which have all been weakened by the flood. In recent years, the rate of erosion of social assets has continued at its current pace. As previously stated, many families are forced to evacuate in safe places for a period of time, ranging from a few days to several weeks when their community is hit by a flood. As a result, it is likely that all social institutions will be impacted during this time period as well. Indeed, the entire social fabric that distinguishes a population as a community has been severely harmed. People are compelled to relocate, some of them permanently, resulting in the destruction of neighbourhoods, the dissolution of friendships, the disintegration of support networks, and the intensification of domestic conflict. After the flood, it is likely that schools, social groups, and families will never be the same.

Following the devastating flood, family roles and responsibilities undergo significant transformations as a result of the worsening of economic hardship and living conditions. It was also discovered that people are unable to adapt to the new environmental system during the relocation process, which could help to alleviate the situation in the study area. Many of the flood-affected families were reported to be living with relatives, some of whom were welcomed and others who were not, thus creating some cracks in the social milieu of kinship. The careful examination of the timeline and the trend analysis of the study area revealed that the flood's effects are becoming more severe over time.

It is believed that the flood damage is contributing to the poor farmers' descent into a vicious cycle of poverty. The problem of flooding existed prior to 2000, but now there is a problem of drought, river erosion, and erratic rainfall that occurs even in inappropriate seasons as a result of climate change. In some cases, it has caused damage to crops that are ready to harvest, and in other cases, it has resulted in crop failure or low production. Rainfall occurring during an inconvenient time of year has caused cultivation to be delayed and winter crop production to be reduced in some instances.

In recent years, there has been an increase in the incidence of waterborne disease as a resource.

5. Impact of Flood on Farming

In the study area, agriculture is the primary source of income for nearly 85 percent of the population, and a local level interview revealed that agriculture is the most severely impacted sector during any flood. Several impacts of flooding on people's lives and livelihoods were discussed during the discussion, with local people sharing their experiences. Some of the most significant impacts on the agricultural sector, as well as the various challenges that farmers face as a result of the flood, are discussed in greater detail below.

5.1. Increased Expenses in Farming: Common practises in the study area include taking other people's land as sharecropping and on a rental basis (to cultivate on an annual basis), which are both forms of sharecropping. It is estimated that approximately one-fifth of the population of the flood-affected areas is landless, with the majority of their income coming from cultivating other people's land or working as daily wage labourers. They borrow money from local moneylenders at an exorbitantly high interest rate in order to invest in farming. Flooding that occurs on a regular basis, such as in 2010 and 2018, puts them in danger.

5.2. High Price of Seed: Floods also cause damage to cereal and vegetable seeds and grains that have been stored. The price of seeds is higher than for other commodities, and they are typically purchased from outside the locality. The poor farmers are compelled to use wet seed, which results in less germination than they would otherwise have. Animal husbandry yields a lower return than in the past. Large numbers of livestock have died as a result of sudden disease outbreaks in flood-affected areas, both before and after the flood. It is also difficult during this time to keep the livestock healthy and to manage their appropriate feed because of poor food management.

5.3. Poor Performance of Social Institutions: Social networks and institutions, which are regarded as assets by the community, are eroding as a result of the lack of time available for people to discuss and promote these networks and institutions. When it comes to running their own businesses, people become more individualistic. They are unable to secure resources from outside because of their inadequate social networks. The performance of social institutions is poor, and as a result, resource mobilisation is ineffective as well.

5.4. Changes in Cropping Pattern: Flooding had an impact on cropping patterns as well. Farmers were unable to transplant paddy on time in the majority of cases because of flooding and inundation caused by heavy rains. This resulted in a delay in the harvesting of paddy as well as the planting of winter crop seeds. It is also possible that the increased 31 dampness is responsible for the shift in cropping patterns. The total crop production is frequently reduced as a result of a change in cropping pattern.

5.5. Increase the Rate of Loan Amount: In general, after any type of flood, the poor and landless people of the affected area are the ones who suffer the most from a large amount of loans from various sources of income. After a flood, mental stress increases day by day, and people's way of life changes as a result of the situation. It takes two to three months to revert to the previous state of affairs.

6. Flood Management Activities in the Study Area

After speaking with residents of the study area, relevant stakeholders, and representatives from the Union Parishad, I was able to learn more about flood management efforts in the area. The government's Union Natural Disaster Relief Committee (UNDRC) is active, according to the discussion, and meets before the monsoon for general planning and preparation, as well as, obviously, after the floods for rescue and recovery efforts. The committee, which works under the supervision of the district administration office, has concentrated its efforts on three main areas: immediate rescue and relief operations, general relief efforts, and epidemic and other health-related risk control in the immediate aftermath of the disaster. Community police, local volunteers, the Armed Police Forces (APF), and various non-governmental organisations (NGOs) have all been actively involved in the immediate rescue operation team over the last few years. Food, clothing, water, and other utilities are provided through coordinated efforts under the supervision of the district Red Cross and Red Crescent office, which is in charge of coordination. A similar effort has been made by the District Public Health Office (DPHO) to coordinate post-disaster health risk assessment and epidemic control efforts in flood-prone areas. The Department of Public Health and Human Services (DPHO) has also carried out surveys and training activities during the pre-disaster preparedness phase.

Other governments and non-governmental organisations (NGOs) have taken an active role in the work of these subcommittees as well. Another government committee at the highest level is responsible for resolving the issues that have arisen as a result of the construction of afflux bunds and barrage. However, due to differences of opinion and a power imbalance, the committee has been unable to effectively resolve the issues.

7. Local Knowledge on Flood Issues

Predictive flooding, a flood-warning system, and neighborhood-based flood management can all help save lives and property during and after floods. During the fieldwork, members of the study communities shared their knowledge of flood forecasting, early warning, and flood management practises, which was useful for the researchers. This knowledge is primarily experimental, having been gained through years of battling flood disasters, and in some cases, it has been passed down orally through poems and songs. Any comprehensive flood management plan must take into consideration the existing local knowledge of flood-affected communities on the physical condition of the area, the history and

trends of the flood, local flood forecasting and warning approaches, as well as a variety of other aspects of flood management, among other things.

This is necessary because locals are more familiar with the local context, the physical setup, the flood problems, and possible solutions than outsiders are with them. While it is important to research existing local beliefs and practises for forecasting, early warning, and flood management during the planning phase, it is equally important to determine whether they are useful and appropriate for use in the operational phase and whether they can be integrated into the disaster management plan during the implementation phase. Within the study area, there are a number of different ethnic groups and subgroups, including groups with both local and outsider origins. As a result, local knowledge does not exist in the same form everywhere and in all communities. Although the study attempted to cover the entire area in order to document local knowledge on a variety of topics, it fell short.

8. Local Early Warning Practices

In the study area, there is no formal early warning system in place. People, on the other hand, attempt to infer and correlate their proven knowledge in order to mark for early warning. During the monsoon season, it is common practise for people who live along or near river banks to volunteer their time to assist in flood monitoring and warning, especially during the daytime. This is especially true in flood-prone areas. The following are some examples of local knowledge on early warnings that were documented during the field study:

8.1. Strange Sounds from River: The strange sound (rumbling sounds) coming from the other small rivers is being evaluated by the community. Based on their previous experiences, they are able to identify the sound of heavy floods upstream. If it is determined that there is a flood upstream, it is customary to shout in a loud voice to alert other people of the situation. Accordingly, people either decide to remain inside their homes while taking some precautions or to seek refuge in safer locations elsewhere.

8.2. Muddy Smell of the Water of the River: In addition to the smell of muddy water, another indicator of flooding is the presence of mud in the water. Generally speaking, a large flood transports fresh soil/mud along with the water, and the smell is distinct from the normal one. A second indicator of flood according to local people is the colour of river water, which is described by the people who live in the study area as "dark blue."

8.3. Presence of Dry Leaves, Mud, and Other Materials in River Water: Water levels rise, and floodwaters transport debris such as dead trees and other debris along the river's course. These are interpreted as indications of rising water levels in the reservoir. It has also been reported that if the population of some fish in rivers suddenly increases, this is interpreted as a sign that flooding may occur in the near future. During a major flood in the area, dead animals and snakes can be seen

floating on the surface of the water; these observations are based on information gathered from the local fishing community in the study area.

9. Interpretation of the results

According to the findings of the study, the floods had a negative impact on people's livelihoods and critical aspects of their lives, including agriculture, health, education, water and sanitation, housing and property, and assets in the province of Paktia. Crop production was the primary source of income for the households in the sample, followed by trading and fishing. According to the findings of the survey, over 85 percent of households had their crops damaged, with wheat and wheat fields accounting for the majority (92 percent), which is the staple crop, and as a result, food insecurity was experienced at the household level.

Crop production was the primary source of livelihood and income, as discussed further below in the section on livelihood. Because income sources are intertwined with livelihoods, this had the effect of decreasing people's income. Furthermore, for those households who had some food stocks and shops at the time of the floods, these were damaged, which resulted in a reduction in food security on a household-by-household basis. Though the floods did not affect health-care facilities, access to health-care facilities was hampered as a result of damaged and/or washed away roads, bridges, and culverts that made it difficult to reach facilities. Finally, increased disease burden (primarily diarrhoea, malaria, and coughing) at the household level resulted as a result of these factors.

Access to contaminated water sources and flooded sanitation facilities were also cited as contributing factors to disease outbreaks. In terms of water and sanitation, the river served as the primary source of water for the majority of the sampled households, followed by boreholes. Because the river is still their primary source of drinking water, households will continue to be at risk of increased disease outbreaks for the foreseeable future. As a result of the increased contamination that occurs during flooding, this is the case. Despite the fact that boreholes are the safest water source for drinking, previous vulnerability assessments conducted within the district have revealed that handling of water by households due to the distance between the source and the household has resulted in an increased disease burden, such as diarrhoea³, as well as infrastructure degradation.

The education sector was not exempt from the effects of the recession. Schools that were submerged caused significant disruption to learning. Housing units, the majority of which were made of poles and mud, were damaged in one way or another, causing families to relocate to other, more suitable areas for their needs. According to the study's findings, households lost a variety of productive and nonproductive assets (both directly and indirectly), putting them at greater risk of becoming vulnerable. In addition, the findings indicate that the most common flood-related coping strategies

used by households were moving to higher ground and digging furrows and canals during the floods. It is clear from the findings that these coping strategies are not very effective in dealing with stress. Households' coping strategies are influenced by a variety of factors, some of which include the type of livelihood strategy in place and the status of the household. The findings also reveal a wide range of underlying causes of people's vulnerability, which presents a significant challenge in terms of reducing overall levels of vulnerability. The most significant of these are poverty and living in flood-prone areas, as well as a lack of alternative means of subsistence. As previously stated in section one (1) of this report, the overall goal of the study has been achieved to a large extent. The recommendations made in this study should be implemented by the government and other important co-parenting partners.

9.1 Limitations of the results: There were some limitations to the study, which are listed below:

- The sample design did not account for age balance, as more male-headed households (72 percent) were sampled than youth-headed households (42 percent) (28 percent).
- Accessibility was a challenge because the data collection took place during the snowy season of 2011.

9.2. Implications of the results: The study's overarching goal was to determine the impact of floods on the socioeconomic status and livelihoods of people in Afghanistan's Paktia province, with a specific focus on women and children. The annual vulnerability assessments carried out in the country, which are referred to in the literature review, show that income sources are intertwined with livelihoods, despite the fact that no purely economic data was collected in the study. As a result, any negative impact on livelihood would result in lower household incomes and lower purchasing power for households.

The factors that determine the underlying cause of vulnerability have been identified, and coping strategies and development opportunities have been identified as a result of this. Results of the study have implications for the development of the people in the Paktia Community and the development of Afghanistan as a whole, according to the authors. Flooding and other natural disasters necessitate the development of long-term mitigation measures, which should be prioritised. In order to increase community resilience in the face of climate variability, it is necessary to implement the appropriate mitigation measures discussed in the recommendations section. As a result, it is impossible to overstate the importance of conducting a continuous assessment of flood risk.

In order to identify appropriate mitigation measures, it is important to include not only vulnerable communities but also all stakeholders, including the private sector and civil society. Suitable findings should be obtained in order to facilitate risk mapping, monitoring, and the implementation of preparedness and

mitigation strategies. It should be a top priority to make investments in flood management that take climate variability into consideration. It is necessary to raise public awareness of the flood risk in general in the community.

IV. CONCLUSION

People's socio-economic status and livelihoods in the Paktia Community were adversely affected by floods, as discussed in various sectors and across sectors in the study, it is clear. The findings of the study have established that livelihood patterns play an important role in the formation of settlement patterns to a large extent. Also evident is that there are many different underlying causes of people's vulnerability, which makes reducing or eliminating vulnerability a difficult task. The Paktia community identified proximity to a flood-prone area (57 percent), residence in a flood-prone area (28 percent), and poverty (18 percent) as the primary underlying causes of vulnerability. The study has also demonstrated that the effects of floods in one sector of society can have ramifications in other areas of society.

For example, as discussed in the health section, the impact of floods on water sources and sanitation facilities was blamed for the outbreak of disease incidences (such as malaria, diarrhoea, and coughing), which were attributed to the flooding. Because of the issue of water contamination in the river during floods and the handling of water from the borehole, there is a higher risk of health complications. Furthermore, although no health facilities were damaged as a result of the floods, access to health services was hampered as a result of infrastructure (roads and bridges) damage, as discussed further below in the section devoted to health. Additionally, school attendance was disrupted as a result of impassable roads, as discussed further below in the section on education.

According to the findings of the study, different types of households cope in different ways when they are affected by floods. The current coping strategies that are being used by the majority of households are not particularly effective. Discussions at the community and provincial levels established that the coping strategies were not sustainable because they had been used for a long period of time and the situation did not appear to be improving. The ability of local communities to cope should not be underestimated, but rather should be strengthened. The emphasis must be placed on improving the living conditions of the people in the area.

As a means of coping with the floods, communities should be encouraged to construct houses out of durable materials and away from flood-prone areas. Furthermore, the Ministries of Agriculture, Irrigation, and Livestock, as well as the Ministries of Rural Rehabilitation and Development, should encourage communities to expand the area cultivated on upland to improve food security at the household level through the

use of Extension Services. It should be considered to implement input assistance programmes for farmers who are vulnerable but still profitable.

RECOMMENDATIONS

This Section will therefore highlight some policy considerations that, if implemented, could have a significant impact on flood risk management.

It is recommended that the following policy considerations be taken into account:

- The government and key stakeholders should work with communities to encourage them to relocate permanently to higher ground, as they have expressed a desire to do so previously. The relocation should be accompanied by the provision of all necessary socio-economic amenities such as schools, hospitals, infrastructure, water, and agricultural support for a period of three (3) years to allow the households to settle. In addition, consideration should be given to the introduction of alternative livelihood strategies in the new settlement area.
- A deliberate policy should be implemented to compel communities, particularly in rural areas, to construct a house out of durable materials and away from flood-prone areas.
- Increased upland cultivation is encouraged by the Ministry of Agriculture Irrigation and Livestock as well as the Ministry of Rural Rehabilitation and Development in order to improve food security and household income.
- The relevant authorities should delineate both non-flood areas and flood areas. During floods, the non-flooding areas can be used as a temporary shelter for the settlements.
- Dams should be considered as a means of capturing excess water. There's a chance this will be used for irrigation.
- The construction of canals into the main Kurrama River as well as the construction of the Machalgho Dam should be considered. Given the variability of the climate, the government and key stakeholders should work with communities and local governments to raise awareness of the flood risk.
- Mitigation measures initiated by communities should be encouraged in order to increase community resilience.
- A community-based flood early warning system should be developed in the long run.
- A multi-sectoral approach to flood mitigation, rather than a single sector approach, should be encouraged because there are interconnections between flood impact on different aspects of society.

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