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Linkages between Indigenous Knowledge and the Flood Vulnerability in KP, Pakistan

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Abstract: *The present study investigated the use of indigenous knowledge to reduce disaster vulnerability in the district of Charsadda, KP, Pakistan. There are two spells of the rainy season in a year in the study area which caused floods, one in winter and the other in August, the peaked summer rainfall. These floods highly affect the agriculture sector and physical infrastructure in the area. Along with modern techniques, people have the capability to predict through their indigenous knowledge about these floods. The 84 respondents were selected from two village councils by using the multistage sampling technique. Both qualitative and quantitative data were collected for the study. A semi-structured questionnaire was designed for quantitative data and focused group discussion for qualitative data. In the study area, people rely on their own knowledge rather than any government announcement because of its cost-effectiveness and easy management for them.*

Key Words: Indigenous Knowledge, Flood Vulnerability, Charsadda, KP, Pakistan

Introduction

The typical tropical weather and uneven landforms, including high population density, poverty, illiteracy and lack of satisfactory infrastructure, rate the Islamic Republic of Pakistan as one of the foremost vulnerable developing countries to suffer often from varied natural disasters, particularly drought, flood, cyclone, earthquake, landslide, eruption, etc. that strike inflicting a devastating impact on human life, economy and atmosphere. Recent estimates showed that 29,210 thousand individuals were affected in the Islamic Republic of Pakistan from 1991 to 2014 owing to natural disasters, and 83,4000 have died throughout this era and damages to the USA \$ 3573.053 million (EM-DAT, 2014). In the Islamic Republic of Pakistan, 8,887 natural disasters were reportable from 1980 to 2014. Out of that, 47 % are associated with floods and rains. The tolls are 3,541 persons each year by the disasters from the year 1990-2014. The Islamic Republic of Pakistan is hierarchal tenth among high affected countries for

deaths because of weather-connected events like floods, rains, heat waves etc. ([Abbasi & Anwar, 2019](#)).

The province of Khyber Pakhtunkhwa (KPK) is the smallest province in terms of geographical region, with 9.4% of the full space of the Islamic Republic of Pakistan placed on the backside of the watercourse Indus. There are two major watercourse systems that exist in KP. One is the watercourse Indus and the second watercourse floats from Afghanistan. Throughout the monsoon downfall, the riverine floods occur in these rivers, and someday flash floods happen, leading to severe losses to the population residing in these areas. The reason behind these flash floods is targeted rainfalls within the watershed watercourse Indus swat and the capital of Afghanistan. 3.8 million of the population were affected by the floods of 2010, which killed 1070 folks in recent history ([GoKP, 2020](#)).

Floods have forever existed in the

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regions. However, over the last few years, their physical, social, and economic impact has had many hyperbolic folds. Several studies were taken to grasp flood vulnerability among the regions. These studies ranged from studies of technical causes of physical vulnerability to those of relationship to sustenance, gender etc. Needless to say, the agricultural communities in the region have a strong vernacular tradition. As a result, they have targeted an enormous wealth of endemic data and skills ([Abbasi & Anwar, 2019](#)).

Indigenous knowledge is outlined as "It refers to the full system, as well as ideas, beliefs, and perception, and also the method whereby it's not inheritable, augmented, stored, and transmitted" ([Abbasi & Anwar, 2019](#)). In ancient societies, folks learned from their atmosphere, from peers and communities wherever they were accustomed live, and such data varies from space to space, society-to-society, community to community and atmosphere to atmosphere. (Mwaura, 2018)

The aim of the study is to explore the linkages between endemic information and the reduction of flood vulnerability on the native level in district Charsadda of KP. The study conjointly plans to uncover the local knowledge in handling and predicting the occurrences of floods in the study area.

Relationship between Indigenous Knowledge and Disaster Management

The connection between indigenous knowledge and catastrophic events has fostered a ton of interest as of late. The new conversations around indigenous knowledge feature its capability to help fiasco risk reduction arrangements through reconciliation into calamity instruction and early admonition frameworks. All through catastrophe risk reduction writing, four essential contentions are made for the value of indigenous knowledge ([Tahir Ali, 2021](#)). In the first place, fluctuated explicit local practices and techniques implanted inside the data that demonstrate importance against cataclysmic events are frequently moved and adjusted to various networks in comparable circumstances. Second, partner consolidation

of indigenous data in existing practices and strategies energises the cooperation of the impacted local area and engages its individuals to require the main job out and out calamity risk reduction exercises. Third, the data contained in indigenous knowledge will work to further develop project execution by giving significant data concerning the local setting. At long last, the non-formal recommends that autochthonous data is dispersed, giving a lucky model to various instructions on calamity risk reduction. Though this distribution centres around an assortment of explicit autochthonous ways and instruments which might be moved and specially designed to various networks, the lessons learned to underline those four regions ([Tahir Ali, 2021](#)).

There is a partner plain hole between the advancement of scientific knowledge and, furthermore, the rising recurrence of disasters. This, notwithstanding, doesn't imply that apply of calamity risk reduction (DRR) is bombing. There are different examples of tries that include intersection rectifiers to significant upgrades inside the capacity of local networks to confront regular and various perils (J., 2012). A joint effort between partners is pivotal for property DRR. Local people groups, government specialists, non-government associations (NGOs), researchers, school networks and religious groups all have an undertaking to play. Networks (counting resident-based associations, instructors and students, and religious gatherings) as a vital asset and address the cutting edge of activity since they're generally seriously disappeared with, and furthermore, the first to answer to catastrophe (J., 2012)

Accomplishing such a blending of information and activity in DRR, be that as it may, demonstrates troublesome. A few researchers and government officials normally underrate the value of local data and local area exercises (Mercer, 2019). Likewise, local networks rarely have a nearby comprehension of scientific data, and association staff commonly guarantees that science is detached from the real world. Such a spot between partners, concerning moves and data, is made into account a huge obstruction for decreasing the risk of

disasters in a very property way and on an outsized scale (Wisner 1995).

To overcome this issue, Mercer (2019) gives a supportive four-step technique system. In the first place, it needs a partner starting commitment with the local area to make confidence and trust and to know individuals' objectives. Second, it includes partner appraisal of the weakness of the local area and its drivers, which can be inner or outside. Third, the structure centres around likely ways of scaling back individuals' weaknesses inside the substance of normal perils. These ways could likewise be exogenous or endogenous and assume a blend of scientific and local data. Fourth and finally, it gives house to every conversation and mix of aforesaid identified ways to incorporate base up and hierarchical activities for lessening the risk of disasters. Starting uses of this system to minimise networks in island New Guinea attempted triple-crown (Mercer et al. 2019)

Use of Indigenous Knowledge in Disaster Management

Indigenous people groups around the world have utilised their customary knowledge to coordinate for, manage and endure debacles. Their methodologies and practices have started at stretches their communities and are kept up with and ignored down ages ([John C. Scott, 2013](#)). As of late, strategy producers have generally ignored this tremendous collection of information for Western science and innovation-based methods of catastrophe risk decrease and reaction. Today, in any case, a few of those old practices square measure pondered essential and fundamental commitments to the protection of assortment and natural property. At the steady time, this information is underneath steady danger of being scoured, lost or unlawful, factors contributory to greater local area weakness as incontestable by the rising degrees of misfortune coming from catastrophic events in ongoing many years ([John C. Scott, 2013](#)).

Neighbourhood capacity, practice, data and custom have assisted communities that, with having fostered a definite significance, their regular air manage perils and flourish for

centuries in very in danger regions. Notwithstanding, in a few cases, these practices, in any case very property, are lost because of social, political or monetary change, bringing about misrepresented weakness. Thinking about the advantages and difficulties of this technique, which can be referenced later, there's a longing for enough investigation and report old gamble decrease and moderation practices to get a handle on any way they will be integrated into thought nearby individuals and public planning. Through participative evaluations (of every limit and weaknesses) and political cycles designed for joining local information with logical ways, communities ought to be sceptred to require the benefit of their own substance to foster incorporated ways that square measure systematised and perhaps moved to comparative settings somewhere else ([John C. Scott, 2013](#)).

Neighbourhood communities had advanced old autochthonic information frameworks for ecological administration and adapted ways, making them extra versatile for natural alteration. This information had, regardless, a serious level of worthiness among the heft of populaces inside which it's been safeguarded. These communities will basically decide with this information, and it works with how they might interpret sure chic logical thoughts for ecological administration along with catastrophe impedance, availability, reaction and alleviation ([Kamara, 2013](#)). Indigenous data could be a valuable public asset which will work with the technique for catastrophe impedance, preparation and reaction in cost-effective, popularity based and property manners by which. Hence a blend of approaches and ways from science and innovation and from content opens roads towards higher catastrophe impedance, status, reaction and relief worldwide. There's a rising affirmation of the connectedness of autochthonic information as a helpful and underused information repository that presents non-industrial nations, eminently Africa, with a solid quality in ecological preservation and catastrophic event on the board. In particular, from previous times, cataclysmic events, the board in Africa has been profoundly immobile in local

communities that apply and utilise autochthonic information to dominate and screen environment and different normal frameworks and layout early advance notice markers for their own advantage and people in the future ([Kamara, 2013](#)).

Research Methodology

The universe of the study was district Charsadda, 17 miles from Peshawar. Charsadda district is located in the west of Khyber Pakhtunkhwa province, spread over an area of 996 sq km. Two village Councils, namely Sardaryab and Mirzagan selected to conduct this study. A sample size of 84 households was selected through a multistage

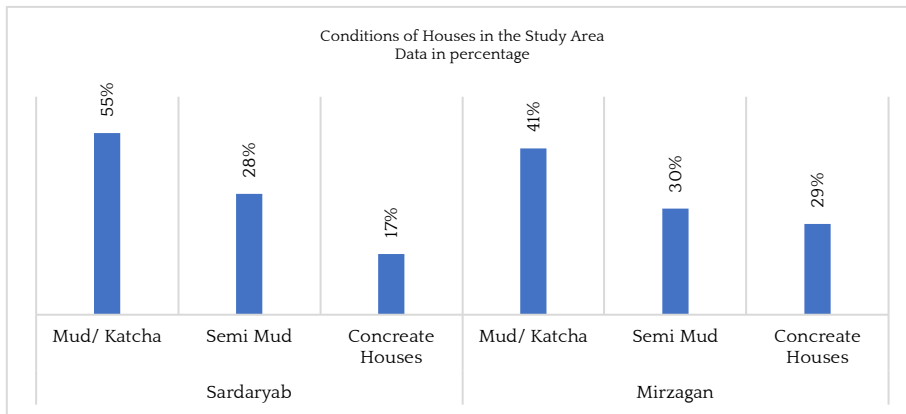
sampling technique from the study area (25% of respondents were female-headed houses). Primary data was collected by well semi-structured questionnaire as well as a focused group. The data were treated and analysed by using Excel, ANOVA and SPSS 21.

Results

Physical Vulnerability; House Situation

In the flooding zones, powerless or hazardous states of houses are generally uncovered through the level of the ground floor being below the normal flood level and the absence of an upper or uplift floor to safeguard individuals and resources from flooding.

N=84



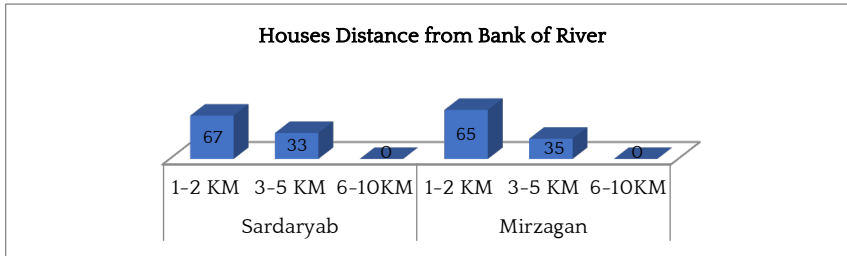
The above figure illustrates that in both village councils, almost half of the houses are made up of Mud/Katcha houses that leads to enhance their vulnerability to floods because mud houses are not enough to sustain or protect even in high rainfall areas. The mud blocks are extremely powerless in cut, strain and pressure. In the event of floods, walls separate at the corners, and the shear breaks foster across the wall, causing the breakdown of the construction. Broad obliteration was distinguished during floods, particularly in the event that it happens after precipitation. At the point when a flood hit the district, the most breakdown building was the mud houses, which is a preeminent explanation of the wounds and passing of people and their

domesticated animals too.

Houses Distance from River

The distance from the bank of the river is also a major source to minimise the effect of floods in the area. The larger the distance, low the damage will be and vice-versa. In the study area, 66% of the houses are located on the bank of the River Jindi and river Kabul. People reside near the edges of the river, and during floods, they suffer. People's attitude is quite important for reducing their vulnerabilities as the government does not allow making houses on the banks of the rivers. People violate the laws and build their houses on the bankside of the river.

N=84

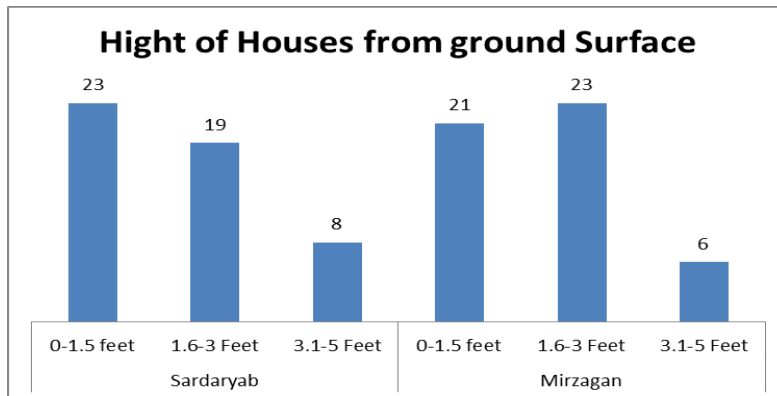


Height of the Houses

The level of the house starting from the earliest stage is a typical practice to bring down the impact of the flood and to stop the rising water goes into their homes. However, on account of the study region, 44% of the respondents' houses are beneath 1.5 feet level, which is actually an extreme to expand their weakness from a flood. 41% of the houses have a level reach between 1.5-3 feet. The set guidelines or the code of the houses are the stages should be raised something like 1ft above normal flood level with compacted earth and expand the edges least 3ft away

from building impression. The slant of the stage might be kept up with for sandy soil at 1V to 2H (For every upward ft level, flat width of 2 feet) and for clayey soil (1V:1.5H). The water should be emptied away out of the structure. For control of disintegration of the stage, well-established edge plants, hedges, or grass might be developed nervous. The profundity of the establishment might be taken as min 4 feet for delicate soil and 2 feet for hard soil. The width of the establishment might be taken as two times the width of the wall for delicate soil and 1.5 times the wall width for hard soil.

N=84

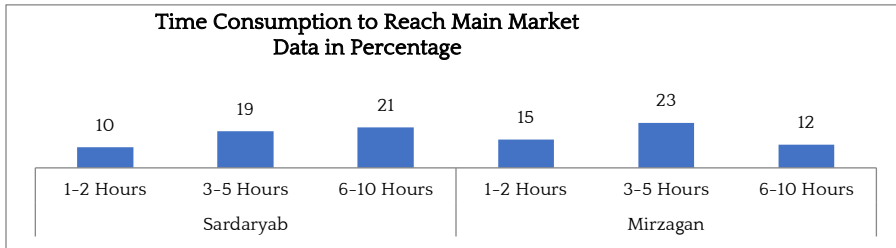


Distance from Main Market of Study Area

Remoteness from the community centres contributes to uplifting vulnerable communities to become more vulnerable in a way the more remote area lower infrastructural development takes place the area. Access to basic facilities is very low in remote areas like health and education. The

above figure describes in the study area, 42% of the respondents have a view that the time required to reach the main city is almost 3-5 hours approximately, which increases their vulnerability because if the person is hit by a flood, the time span is much higher and the chance of the survival of the patient is very low due to maximum time required to reach the modern equipment that is only available in the hospital of the city area.

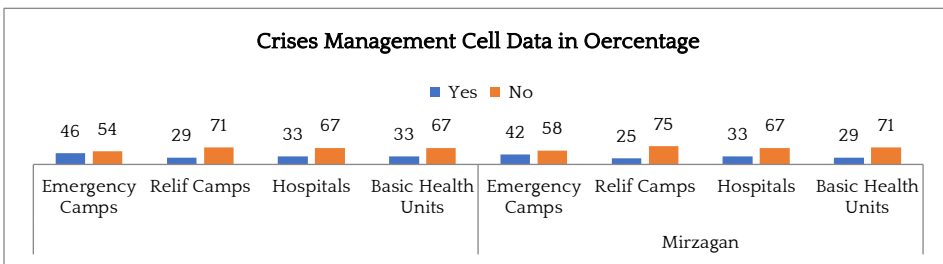
N=84



In disaster-prone areas or disastrous situations that occur in any locality, some of the segments of the health institution are very important to be existed in the area and provide very basic facilities to the flood victim, i.e. emergency camps, relief camps and basic health units for the survival of the people. The above figure tells that there is a lack of all above mentioned necessary

segments. In the village council, Sardaryab, the availability of the emergency camp, relief camp and basic health units is very low as a maximum of respondents go with 'NO' of the statement. The same is the case with village council Mirzagan. With these low-quality facilities, the people of these village councils are highly vulnerable to flood, and that's why the cause of damage is high in these areas.

N=84

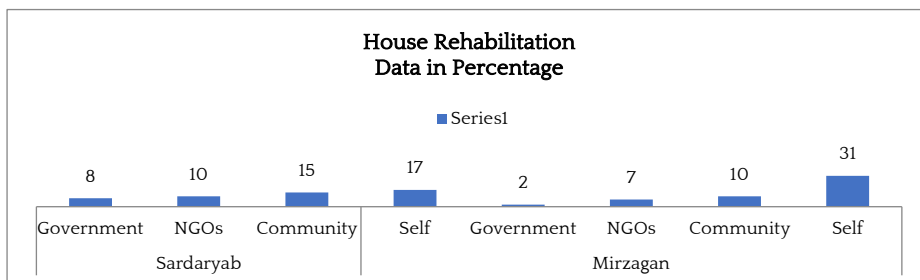


Rehabilitation and Reconstruction after Destruction due to Flood

After quick danger to the living souls, the following most powerless are the homes. The effect of tremors and floods on homes has been gigantic, and subsequently, the recreation of homes after these cataclysmic events is generally an extreme undertaking for the networks. The above figure shows that

48% of the respondents expressed that they reconstructed their homes with their own self-improvement. 25% have a view they can reconstruct their homes with the help of their networks. The job of NGO is 17% as per respondents for making houses for the flood-impacted networks. States are simply ready to help with 10% of the respondents of the review region.

N=84

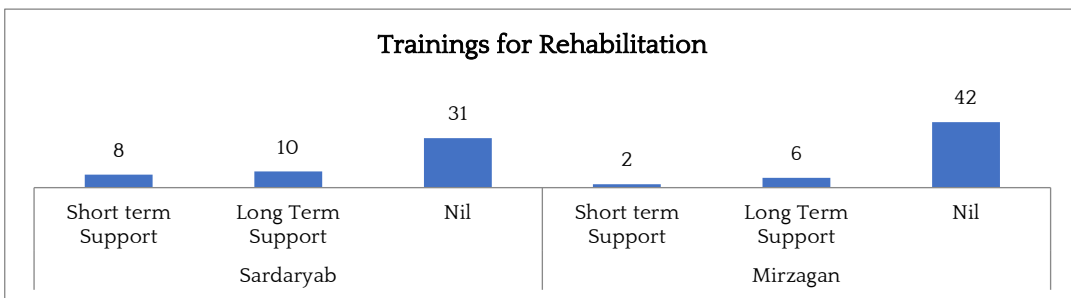


Training for Rehabilitation

Under extreme pressure, decisions are made in extraordinary circumstances. In flood-affected areas, the need for emergency responders is going high. In such a situation, a group of local people are the first who manage and have the most responsibilities. They play an important role in rebuilding their communities. Through training, these

respondents are quite able to respond to crises equitably because exercises make them skilful and develop techniques to tackle the situation. The above figure shows that the highest proportion, about 73% of the respondents from the study area, are never going through from training process, and they don't have skilled techniques for countering the flood impacts.

N=84

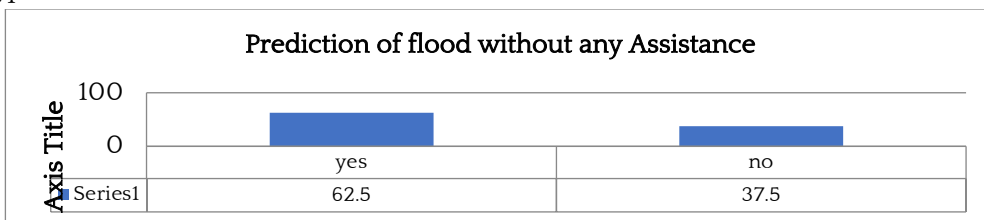


Prediction of Flood Indigenously

The figure shows that above 60% of the respondents are able to predict the flood without any external assistance provided to them. A lesser proportion of the respondents are not able to predict flood without external. Respondents of the view that an announcement on the television, radio or newspaper enables him to predict floods in coming days. After their ability to predict flood, the question arises of how they do so

through their number of practices or knowledge available indigenously available in the study area. The majority of the vote goes in the basket of rain patterns in a way. Fluctuations in the rain during flood season warn them to be aware that floods may arise in the area. Other knowledge related to their predictions is surface of the water is going to high, drainage problems start, edges of water changes, flow of river changes, change in the colour of water etc.

N=84



Estimation of Local Knowledge in Study Area

As examined before, Local information needs no tutoring and testaments; it is created by lengthy and restores encounters of networks living in specific land and meteorological and

environmental elements. With the progression of time and modernisation, a considerable lot of such information became terminated in light of past writing and ground real factors here for conceptualising neighbourhood information estimated.

Table 1. Age in Years Status of Living Cross-tabulation

Age in Years	Status of Living		Total
	Full Time		
16-30	10		10
31-45	24		24
46-60	38		38
above 60	24		24
Total	84		84

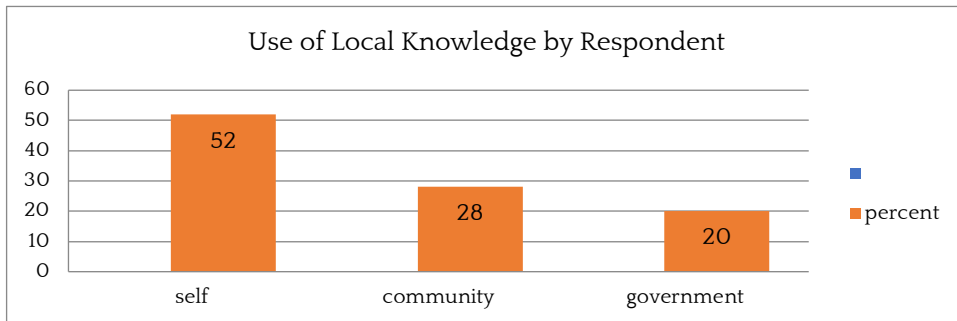
Given table shows that from absolute respondents, all are living in extremely significant time-frame nearby, and these respondents are very much aware of the climate and environmental factors of their own territory from any other individual. Besides, because of the extremely old connection with the climate of these individuals, they can not just foresee any future coming occasion effectively yet additionally can oversee and handle it.

Use of Local Knowledge in Forecasting Flood

Local communities group have been living

nearby for years, and they are considerably more natural than any other person in their environmental elements and ecological change. Nearby people group utilise their insight and native information in all phases of calamity the board to keep their selves from the most extreme obliteration. The figure shows that a large portion of individuals favour self-estimating 52% of the complete respondents from the review region depend on their own determining for flood by utilising their own insight about their environmental factors. The second driving hotspot for future occasions is the local area. Consequently, the vast majority of the local area relies upon their own self-estimating.

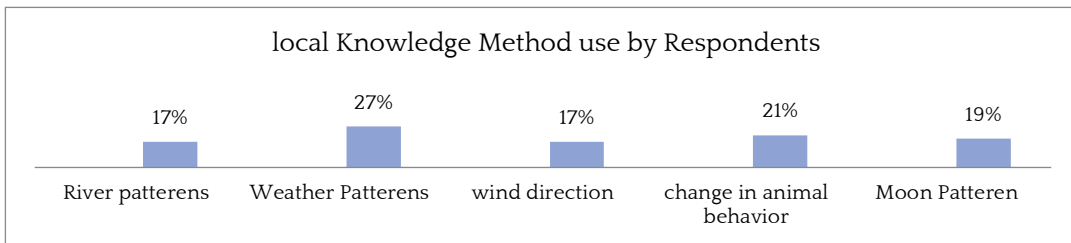
N=84



Local Knowledge Methods for predicting flood in Study Area

The figure shows that 27% of the respondents utilise atmospheric conditions for anticipating floods ahead of time, in light of the fact that the regions are clouded regularly, and the power of being overcast and discouraged dim climate enlightens them regarding the force of the flood. 21% accept

the creature's ways of behaving empowers them to foresee flood natively in light of the fact that data about creature ways of behaving for the most part given by the ladies they actually depend on them since they live inside their homes and notice their dairy cattle's development and conduct persistently. The existed arrangement of neighbourhood information won in the concentration on the region is:

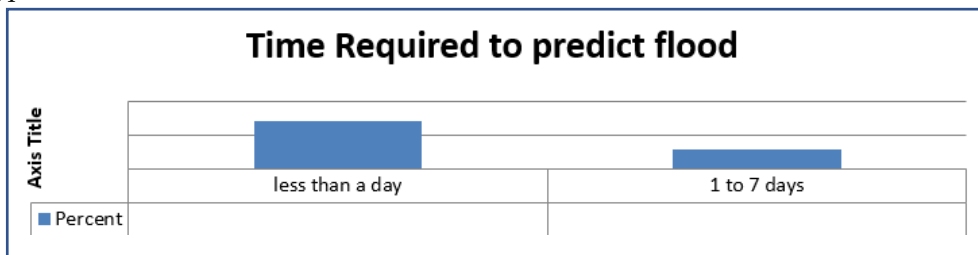


With respect to Weather Patterns concerned, i.e. sky turns desolate and Black rolls of cloud Weather surprisingly warm and sticky/sweltering spell after the downpour. For Wind areas of strength for direction blows from the south, solid breeze blow from north/, east wind blows at full moon, mud smell in the breeze, river designs dull rolls of water, Noise in the stream, waterway water becomes hot. Creatures Behavior dairy cattle become anxious and quit munching, Cattle howl consistently, Ants climb trees with eggs on their back, Bees move around in a group, Birds fly without objective, Increased number of flies and mosquitoes, Insects assault steers, Fish hop in the waterway and pounds, Crows fly around evening time Frogs call constantly. Moon patterns are a red half-moon, a full red moon, a red circle around the moon, and dark shades on the moon.

Time Required to Predict the Flood

The major portion of the respondents, 70%, have a view that they are able to predict a flood in less than a day, while there are respondents who also exist who can be able to predict a flood more than one day earlier. Early prediction helps in preparing themselves for countering the effects of the flood. These predictions are also serving as an early warning indigenously, which means that through self-prediction, they have less need to provide early warning, and they are able to take precautionary measures to save them from a flood. These practices are helping them to reduce their vulnerability to floods. The use of this historical knowledge and practices can save many lives, their livestock land and their productive assets.

N=84

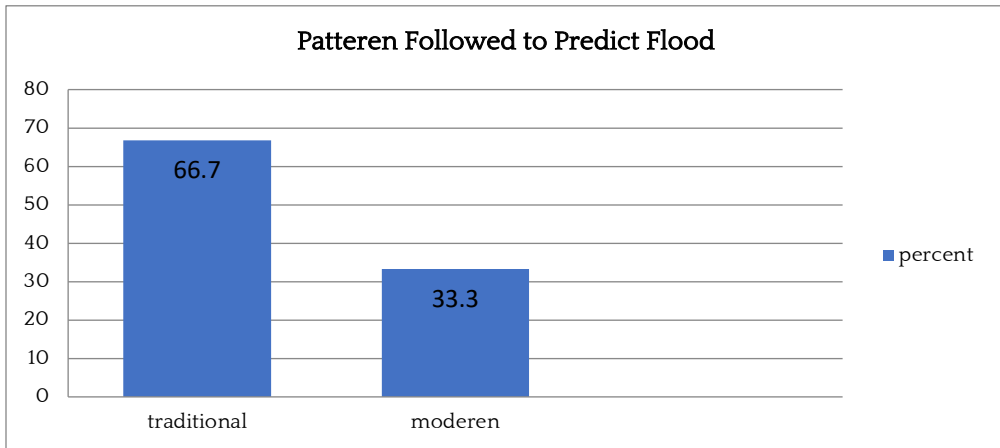


The Pattern Followed by Local People to Prevent Flood

67% of the respondents are in favour of traditional ways that they are using is good to mitigate the consequences of the flood. While 33% are in favour of modern ways to mitigate the effects of the flood. Two schools of thought are prevailing in the study area, as the majority of the respondents are in favour of traditional ways to mitigate floods. Traditional

schools of thought have a view that know-how of circumstances and the geographical understanding is best known by the local elites, and we best manage it, and they are against the government response because according to respondents government does not respond on time. The second view they have is that modern knowledge is not accessible to every individual in the area, so they easily manage and help him by using their own knowledge at the time of the flood.

N=84



Modernists have the view that the government respond in the best possible way. They have modern, scientific and updated knowledge in all aspects of the disaster, and they are better to respond during and after the flood period. Science-proven knowledge is best in regard to flood prevention during the flood and post-flood recovery period.

Conclusions and Recommendations

The survey of strategies and approaches according to a worldwide point of view of disaster the board reasons that the globe is giving unique worry to save loads of the human from disasters obliteration. Withal, their spotlight was and is on post-disaster exercises. These foundations and associations deal with a pre-disaster situation as a centre and focal reason. These associations are executing their ways in the weak groups while not including neighbourhood people and their insight and don't appear to be centring needs of those local networks. The circumstance isn't much of very surprising in that frame of mind for disaster the executives. There's a prerequisite to concentrating these issues as a central issue.

Adapting contains an expense monetary, social and possibility. Money-related capacity

is the key. Weak individuals have very little or no excess monetary profit to take a situation on the actions that might protect them from a flood. Thus, individuals' header is restricted to address prompt conditions rather than to embrace estimates that are future in nature. Notwithstanding, people are increasingly more dependent on the proper foundations, prominently inside the setting of fixing the nature of the flood. Reasoning formal institutional setting is decent for people to adapt, as this will build the likelihood of acquiring admittance to information and administrations. Hence, designated administration any place weak individuals approach ought to be advanced.

Native data gives fundamental components to downsize disaster risk and is especially significant for local area level disaster the board. Strategy producers should ponder defensive such compelling, customary adapt systems and enhance them to ensure that advancement doesn't build weakness to normal perils. Further, reassuring local area inclusion through the use of old practices gives a great deal of reasonable and neighbourhood explicit procedure since the local area comprehends the case in light of past disaster skills.

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