

Risk perception and the choice to live in flood risk zones?

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Abstract

Climate extremities like floods have gained some notoriety in the world which have heightened some interest in the phenomenon in recent years. How people who live in flood risk zones relate to and survive this environmental impact are important to understanding the flood disaster discourse. Interestingly, the risks associated with floods have not deterred people from inhabiting flood prone areas. This systematic review looks beyond the physical and economic dimensions and asks if people's appreciation of risks have a place in their decision to live in flood risk zones? Their decision may be guided by risk domains which highlight three scenarios; nothing will happen, there will be losses or gains. The latter, in the case of flooding, is corroborated by the views of rice farmers. The review found that what influences people's behavior in response to environmental impacts like floods is inherently embedded within their culture and society. It is therefore erroneous to think that people's decision to live in flood risk zones is irrational. Local knowledge systems which is specific to a people have often lowered the perceptions of risk among people by teaching them how to live with and survive floods. Modern science has on the contrary heightened risk perceptions and advocated rejection of flood risk zones.

Introduction

The term risk is a highly interdisciplinary concept and its definitions differ across and within disciplines (Bodemer & Gaissmaier, 2015). For instance, (Outreville, 1998) argues that risk is the foundation of insurance but his survey of insurance text books revealed the differences of opinion among writers concerning the definition of risk. (Hardy, 1923) defines risk as uncertainty in regard to cost, loss, or damage. He emphasizes on the word uncertainty in his definition of risk. He argues that where a destruction or loss is certain especially in a business environment, it can be charged in advance as cost and therefore, there is no risk. However, when the loss is uncertain, it is dealt in accordance with judgements of probability further exacerbating the problem of risk.

Hardy classified risk into five with the aim of reducing the ambiguity surrounding the term. One of the classifications; the risk of property destruction through physical hazards of nature elaborates how natural hazards like floods, which are outside the control of humans could cause the destruction of

property. In a similar classification by (Outreville, 1998), he considers this form of risk as a static risk given that the risk is from nature, however, the losses recorded are by irregular actions or mistakes by humans; building and living in flood risk zones, disregard for land use plans and, disposal of waste in flood channel among others. The arguments of these two writers put into perspective that risk may be natural and out of human control but the extent of losses from these risks depend on human beings.

(Young & Tippins, 2000) also highlight the uncertainty with risks. They posit that uncertainty often results from the absence of information, but it also may be due to attitudes toward risk, which will differ among individuals. Scholars from many disciplines study how humans behave under conditions of risk and uncertainty. For instance, economists tend to focus on the impacts of risks on an individual's quest to maximize his or her satisfaction. However, from a more sociological perspective, economic rationality may exist but factors such as personality, family upbringing, personal history, and other behavioral characteristics govern our attitudes toward risk. There may be some validity, arguing from literature that, the risk thoughts of people who decide to continue living in flood prone areas may be constructed along thoughts of Young and Tippins in their categorization of risks; pure and speculative risks.

Risk domains

Pure risks have two outcome domains. Either nothing will happen or losses will occur. In the case of choosing to live in a flood risk area, they are aware of the risks, however, some infrastructural facilities like flood protection and proper watershed management strategies may contribute to the floods not having destructive impacts on them. There is also the case that they are aware of the risks and they know that during floods there will be losses however, they continue to inhabit those locations for reasons that only 'makes sense' to them. The second categorization, speculative risks come with three outcome domains; nothing will happen, there will be losses and there will be gains. In addition to the above instances, people may choose to live in these at risk locations because floods provide favorable conditions (Becker, 2014) for their livelihood activities. So, they are aware of the risks but the possibility of gaining becomes paramount to them

Perceiving risk

This brings into perspective their risk perceptions and its place in the decisions they make. (Pidgeon et al., 1992) view risk perceptions from a social lens by defining it as people's beliefs, attitudes, judgments and feelings, as well as the wider social or cultural values and dispositions that people adopt, towards hazards and their benefits. Therefore, risk perceptions are constructed against societal and cultural backgrounds. (Sjöberg et al., 2004) also define risk perceptions as the subjective

assessment of probability of a specified type of accident happening and how concerned people are with its consequences. (Weinstein, 1989) as cited in (Sjöberg et al., 2004) explains that our perceptions of risks goes beyond the individual, and are a social and cultural construct reflecting our values, symbols, history, and ideology. Such perceptions direct our decisions about the acceptability of risks and are fundamental in influencing our behavior before, during and after a disaster. These perceptions are a complex result of the hazards we face and personal philosophies (Rohrmann, 2008).

These definitions emphasize the subjectivity and the place of the human being in risk perceptions. Given the subjectivity of risk perceptions, (Sjöberg, 1999) in his article; Risk perceptions by public and by experts: A dilemma in risk management, argues that risk perception has come to be one of the major obstacles to rational decision making because, a party (the experts) may see the other (public) as trying to see risks where there is none and the vice versa. He gives an example of the public taking risks that the experts discourage such as the risk of smoking or drinking. Many a times, the public are persuaded by their thinking that alcohol or smoking is a risk to others and not them. They perceive that it is a small risk they can control.

Also, the public/indigenous people can live in flood risk areas with the hope that their ancestors will not bring any harm to them or floods will come and go just like always. The experts on the other hand will simply avoid and advise against living there. Put it, the experts would say even if the ancestors are there, let's not give them the extra trouble of protecting us from flood impacts when we can simply avoid it. (Fragouli & Theodoulou, 2015) suggest that there is a strong relationship between risk perceptions and risk behavior. They therefore argue that we, as socio-cultural beings act not according to scientific risk assessments but according to our own perceptions of risk. These arguments may explain why contrary to experts advise against the habitation of flood risk areas, agglomerations in such areas keep expanding.

The pull and push in flood risks behaviour

Factors that affect our risk perceptions can be broadly categorized as macro, meso and micro levels. The macro level are structural or institutional in nature, the meso level factors are peer-to-peer or community, and the micro are at the individual psychological level (Campbell Institute, 2016). They together with other writers like (Weyman & Kelly, 1999) argue that, to understand what may influence a person's risk perception, there is the need to look beyond the psychological analysis of an individual's risk perceptions but to take into account the broad social, cultural and environmental explanations of the person's risk behaviors. For instance, a community with a high sense of culture of safety which its members are socialized into, will have a profound effect on how the individuals perceive of risk. This will result in less risk-taking behavior among community members. On the

flipside, when individuals are aware that institutions responsible for spatial and land use do not enforce laws to prevent settlement in flood prone areas, people are more likely to take the risk of inhabiting in such areas because there will be no sanction for that risk behavior (settling in the flood prone area).

At the meso level, peer or community pressure does influence how we perceive of risk. Even though an individual can perceive an act as very risky, peer or community influence can cause the individual to view it as less or not risky. For instance, an individual can perceive smoking to be very risky to health, however, his peers can influence his perception of smoking by alluding to themselves not having any health complications even though they have been smoking for a long period of time. Davey et al. (2008) as cited in (Campbell Institute, 2016) found that young drivers habitually drive around railway crossing barriers, despite individually believing that such are dangerous, they still do that because the perception of the community and peers was that such behavior was acceptable and an exhibition of driving skills.

It can therefore be argued that people that may decide to live in flood prone areas may harbor the view that the floods are temporal and will always come and go. A popular saying in African communities is that 'my great grandfather, grandfather and father lived here and did not die, so I will also survive'. This can give a (false) sense of resilience or influence people to continue living in the at-risk areas though individually they know the floods poses high risk to their lives and property.

At the micro/individual level, people's perceptions of risks are influenced by the person's level of knowledge of the risk. People that have knowledge of the ins and outs of a work environment are more likely to take higher risks because of their perceived knowledge. For instance, during the construction of a building, masons who are familiar with the job are most likely not to wear hand gloves even though they know that their fingers could be chopped off should there be an accident. However, the casual workers or laborers who do not possess an equal perceived knowledge about the work like the masons, will prefer to put on protective clothes because they do not know the magnitude of risk they are exposed to. (Weyman, A. & Kelly, C., 1999) argue that the feeling of personal control over a situation shapes the risk perception of the individual, thereby lessening the anxiety and make him more relaxed to engage in behaviors deemed highly risky by others.

The science of flood risk perception

Approaches to understanding risk perceptions among people is generally founded on either rationalist or constructivist paradigms. Arguments from the rationalist paradigm emphasizes on the individual's cognitive processes, and assumes that the existence of a hazard will prompt the individual to make an assessment which he then feeds into a decision he believes is rational that then influences his

adoption of protective or precautionary behaviors (Birkholz et al., 2014). The rationalist's point of view is more fit for modeling and predicting behavioral outcomes in the face of hazards with some scientific (expert) leaning. The constructivists acknowledge the importance of social structure in individual risk perceptions and they applied the political ecology theory to suggest how structural power relations within a community, economic pressure and differentials in vulnerabilities can influence a people's risk perceptions and interaction with hazards (Wescoat, 2015). In an attempt to explain the constructivist paradigm of risk perception, (Drake, 1992) postulates in his article; Myths of nature: Culture and the social construction of risk, that the individual's judgement and decision making is shaped and constrained by the social environment. This social environment; organization, institutions and culture within a society can dictate our worldviews and behavior as a result of resource access and control, knowledge systems and power dynamics.

A number of theories have been postulated over the years to explain how and what can shape risk perceptions of individuals. According to the Protection Motivation Theory by (Rogers, 1975), people are more likely to protect themselves when they anticipate negative consequences, when they have the desire to avoid them and feel they have the ability to take preventive measures. The main ideas for this theory are the perceived knowledge and positive attitude of bias. Another theory, the Risk Compensation theory by Gerals J. S. Wilde (1982), states that people tend to take more risks when they feel a greater sense of security. For instance, in a gated estate, people can decide to park their cars outside their garages without the fear of theft because they feel the security arrangements at the estates provides protection against burglary. Similarly, people can remain adamant at leaving flood risk areas because they believe flood walls and dykes provide adequate protection. In the case of Niger, the hope of being given some monetary and relief items after floods plays a role. Other theories include; the social action theory, social control theory, situated rationality theory, and habituated action theory among others. For the purposes of this study, I will adopt the Situated Rationality Theory by Tony Lawson (1997).

The Situated Rationality Theory argues that it is erroneous to presume that people are rational and high-risk behaviors are inherently irrational (Lawson, 1997). To him, there is always a justification for why an individual will perceive or take risks and so it is wrong to assume the individual is out of his mind. For instance, a student may decide to stay awake each night to work in order to finish up his research work earlier. He is well aware of the health risks; however, he believes an earlier completion and submission of his theses outweighs the health impacts of not getting enough sleep. This theory is not oblivion of the place of peer or community pressure on the individual's risk perception. In fact, it alludes to these in explaining some of its concepts. This theory emphasizes on the need to critically examine the risk perceptions of people to unearth the justification of their actions before labeling

them rational or irrational. In case of people living in flood prone communities, it may be wrong to think they are out of their minds or their decision to live there is irrational without having a holistic understanding of that decision.

The place of indigenous knowledge in flood risk

Furthermore, indigenous knowledge which is a knowledge system that develops from within a group of people in a particular place equally influences a decision to live or not to live in flood prone areas. To (Sillitoe, 2000), the term indigenous knowledge is synonymous to local knowledge or traditional knowledge because it is different from knowledge developed from formal science through research and institutions. It is therefore culturally relative, signifying that they are not a universal repertoire of knowledge that has to be accepted by everyone. Each cultural group has its set of indigenous knowledge informed by their socio-cultural traditions and history. Traditional knowledge develops through experience sharing and normally transmitted through oral tradition from generation to generation. These expressions operate in all aspects of the community's life (Haque, 2022). Walker et al., (1991) as cited in (Haque, 2019) simplifies the definition of indigenous knowledge as knowledge held collectively by a defined community. (Easton, 2004) has identified three different ways of understanding the concept of Indigenous knowledge. The first approach considers it as an inheritance from the past. The second approach describes it as a representation of an alternative way of thinking, typical of African cultures. The third definition considers Indigenous knowledge as a means to express what people know and create new knowledge from the intersection of their capacities and development challenges. He further argues that indigenous knowledge enables community members to find ways of recognizing, extending and reinventing their tradition. This buttresses the fact that, though it remains unwritten, it continuous to live from generation to generation.

(Haque, 2019) makes a case for the essence of indigenous knowledge in community development by arguing that even though this knowledge system is unwritten and verbal, it should be increasingly seen as a resource as it encapsulates the values, views, beliefs and perceptions of a people which should be mobilized to complement scientific knowledge in order to promote better planning and interventions for rural development. Traditional knowledge has been used over the years by rural people for agriculture, natural resource and biodiversity protection, and medicine among other important aspects of community. Therefore, community members are most likely to accept 'modern' interventions if they are in consonance with their local knowledge systems. It may suffice to say that these knowledge and strategies that been developed from within the people's peculiar experiences

have helped them to survive floods and to see floods as a normal or supernatural occurrence whose impacts are not because of their proximity to the flood risk zones.

For instance, let us look at some instances where indigenous knowledge has helped community to live with floods, playing down the risks associated with living in flood risk zones. Contrary to what the experts may advise, these indigenous knowledge rather informs the people's understanding of the world and natural processes, enabling them to predict and prepare to withstand the vagaries of nature (Haque, 2019). In a study by (Fabiya & Oloukoi, 2013), they found that communities along the coast often had ways of understanding weather patterns, the behavior of the ocean's current and local meteorological signals to predict the possibility of flood events. For instance, through lunar observation, they could predict ocean floods because they believed that the tidal levels rise with the approaching new moon. Therefore, they begin to prepare for floods once the new moon is sighted. They also studied the colour of the clouds, the behavior of aquatic animals, colour of the water from the creeks and water weeds or particles observations.

In another study by (Dube & Munsaka, 2018) on the contribution of indigenous knowledge to disaster risk reduction activities in Zimbabwe, they found that the continuous crying and unsettledness of *inkanku* (a rain-making bird) are symbolic of heavy rains to come. Such rains have a potential to result in flooding in the district. A community member from Tsholotsho district narrated that *'During rainy season, when we observe the continuous crying of an unsettled inkankhu, we know that heavy rains with a potential for flooding are imminent. We then ready ourselves to move up to higher grounds should the rains start falling'*(pg.5). In a similar finding on how communities use their indigenous knowledge systems to study and monitor climate and other natural systems alludes to the case of Swaziland where indigenous knowledge has been significantly applied to their disaster management. They predict floods by studying how high birds weave their nests on trees close to rivers.

Spirituality of flood risk perception

Indigenous knowledge and past experiences of people which are rooted in their spiritual beliefs and ancestral practices influence their perceptions of flood, flood risks and their risk behavior. The spirituality attached to these catastrophic events like floods informs the community on what may have caused it and how to address it. It is often a directive to appease the gods or reform their ways of living to conform with acceptable standards.

In a study (Bonye & Godfred, 2011), rural people saw floods as punishments from the gods or ancestors and can cope with them by sitting up against declining social morals. Agalik the *'Tindana'* (traditional land ruler in northern Ghana) of Sineisi community in the Upper East region of Ghana said *"The floods that occurred here last year and other forms of disasters did not just happen for nothing,*

it is a warning from the gods for us to sit up. We have broken a lot of taboos of the land. The bad things we do here; stealing and sleeping with people's wives among others are the manifestations of the floods and other forms of disasters we had last year in the district. So, I believe that these disasters are punishments from the ancestors. Until we sit up, these warning would continue to show with time" (pg210-211). During these periods they use their indigenous knowledge and experiences to survive the 'physical' manifestations of the floods while performing some sacrifices to appease the gods.

In the traditional African worldview, an environmental resource like water is not seen as only a factor of production with economic significance, but has its place within the sanctity of nature. Therefore, in the event of a flood, people do not just see it as a failure of water defense infrastructure, effects of heavy rains, climate change impacts or inundation of a piece of land, but an interaction or warning from the spiritual world (Millar, 2003). In a similar argument by (Fabiya & Olukoi, 2013), the Ijaws and Illajes of coastal Nigeria believe that the *Olokun* (Atlantic gods) will always fight through flooding if the tokens used in sacrifice are defective or if sacred rules are broken. The Illaje people believe the water spirits can be angered and if they are angry, they manifest that by inundating the place. They can only be appeased by sacrificing a chicken or goat and the blood poured into a designated spot of the river.

Indigenous knowledge equally influences the strategies adapted by a group of people to effectively deal with flood disasters. Communities have developed through a process of innovation and adaptation, a variety of coping strategies and techniques that are fine-tuned to their local environments. People living in flood-prone communities have indigenous knowledge and practices, developed through their cumulative experiences and form their survival strategies in the event of a natural disaster (Haque, 2019). (Shaw et al., 2008) contend that Indigenous knowledge is the basis of community coping practices that have helped vibrant communities survive natural calamities overtime. They make the case for how ancient civilizations, in the midst of disaster relied on their scarce resources and local knowledge which led to the evolution of low-cost and effective Disaster Risk Reduction strategies. These communities that have embraced and continue to rely on their indigenous knowledge have managed to save lives and property in the face of floods (Dube & Munsaka, 2018). Unfortunately, indigenous knowledge has taught them little about evacuating and permanently settling on highlands

Conclusion

Risk perception plays a key role in our everyday choices and decision making. Individuals perceive of risk differently depending on their sociological or scientific exposure. What may seem dangerous to one person may be most likely regarded as less dangerous or 'normal' by another. This has been an age long conflict between the experts and local people. The choice to live in flood risk zone and

conception of the risk thereof equally depends on the individual's belief of the kind of benefit that can be derived. Societal belief systems, family socialization and culture occupy a significant space in shaping the risk perceptions of locals. On the other hand, the educated and wealthy in society have a more scientific view which shapes their perceptions of risk and making 'avoid risky areas' a best option. Indigenous knowledge has been integral to communities surviving and living with floods. Unfortunately, indigenous knowledge has not heightened people's risk perceptions but rather lowered it, thereby reinforcing their choice to continue living in flood risk zones. This has implications on flood policy effectiveness and government expenditure. This discussion concludes on two notes: Government's conscious efforts to getting a deeper understanding of why people choose to live in flood prone areas will contribute to Flood Policy effectiveness; Governments and stakeholder engagements on indigenous knowledge system should be integrated into Disaster Risk Reduction strategies.

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