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Surviving Floods using Psychological Preparedness and Socio-economic Assets in Ghana's White Volta Basin

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Abstract
This study focused on the annual Bagre dam spillage-induced floods in Ghana's White Volta Basin and households' resilience. We take up this issue because there are limited studies that delved into the drivers of household's resilience to the perennial floods. We draw on the protection motivation theory and relevant literature across the world to provide guidance on the analysis of the data. This study explored the drivers of household's resilience to floods using in-depth interviews involving 40 participants residing in communities affected by flooding. The data gathered were analyzed using thematic analysis. The findings indicated that the drivers that influenced households' resilience to floods are hopefulness, inspiration, self-determination, social relationship support and emotional support. The findings of this study underscore the need for policymakers to prioritize proactive flood protection and ensure timely response, recovery, and restoration efforts.
Keywords: *Floods; Drivers; Household; Resilience; Ghana*

1. Introduction

Globally, rural livelihoods are affected by environmental threats even if the impacts are not the same. One of the recurrent and damaging environmental threats in global history is flooding (United Nations International Strategy for Disaster Reduction [UNISDR] (2024). However, there are no signs that the incidence of flooding will decrease. This is because flooding has natural and human-induced origins. The naturally induced floods occur as a result of heavy rainfall, rapid snowmelt or a storm surge from a tropical cyclone or tsunami in coastal areas and climate change. On the other hand, human pressure, and infrastructure expansion constitute the human-induced flooding (Hirabayashi, Mahendran, Koirala, Konoshima, Yamazaki, Watanabe, and Kanae 2013; Jongman, Hochrainer-Stigler, Feyen, Aerts, Mechler, Botzen, and Ward. 2014). It bears mentioning that flooding often results in the loss of lives and personal properties worth millions of dollars. For example, climate-induced floods killed 410,000 people and affected about 1.7 billion people (International Federation of Red Cross and Red Crescent Societies [IFRC], 2021). Apart from the human and property losses, floods also lead to infrastructure damages that make it difficult for affected communities and individuals to recover and maintain their livelihoods. For example, flooding often damages road networks, energy facilities, buildings, and social facilities (Jamshed et al., 2020; Njogu, 2021). The destruction of infrastructure in rural areas, for example, cut them off from market, health, and access to education. Flood disasters can break down transportation networks and access to farms, markets, and consumption points. Floods can cause financial loss to producers, suppliers, and consumers of food production which could reduce individual's capacity to afford food in communities (Pacetti et al., 2017). Suffice it to say that rural areas are more vulnerable to floods due to limited social, economic, and physical resources.

Approximately 85 percent of vulnerable households to floods live in Africa, and consequently, countries in that category experience the dominance of flood-related demises (ProAct Network, 2008; Inter-Parliamentary Union [IPU]

and International Strategy for Disaster Reduction [ISDR], 2010). As far as vulnerability to flood is concerned, Ghana is ranked high among countries in the world (ISDR and World Bank, 2009). As one of the most disaster-prone countries in Africa, Ghana has endured widespread damages from flooding, including damage to infrastructure, economic fatalities, and several mortalities. Ghana, just like other countries in Africa, has had its fair share of flood disasters, with urban and rural areas having a disproportionate share of floods (Global Facility for Disaster Reduction and Recovery [GFDRR] 2014; Okyere, Yacouba & Gilgenbach 2012). For example, in 2024, communities in the Upper East Region of Ghana were affected by heavy and continuous seasonal rainfalls, which were later exacerbated by the annual opening of the Bagre dam canals. Indeed, the Bagre Dam, located in Burkina Faso, caused unprecedented flooding in many local communities, destroying lives and properties.

In a bid to manage the effects of disasters such as floods, several scholars have posited that the complimentary and viable solution to mitigate, adapt and manage disasters lies in the understanding and embracing resilience (Adeyeye and Emmitt, 2017). The concept "resilience" in this context refers to the ability of individuals and groups to resist, absorb, accommodate and recover from the effects of a disaster in a timely and efficient manner, through the preservation and restoration of its essential basic structures and functions (Roberts, 2013). In other words, disaster resilience is a shared responsibility among stakeholders such as government parastatals, non-governmental organizations, community groups and households in the affected communities to understand, and along these lines fortify their capacity to manage, survive and recover from disasters (Arbon et al., 2016). The current understanding of the resilience entails three interrelated capacities which include adaptive, absorptive, and transformative (Roy et al., 2021). Resilience therefore, adds a strategic meaning to the sense of safety, security and protection from various types of disaster, including flood. Resilience to flood disaster as considered in this study concerns the human system which involved the households. Household resilience to flood disaster was therefore viewed as the capacity of individual or group sharing a living arrangement to sustain their household during flood; including adapt to changes in the physical, social and economic environment; be self-reliant, if external resources are limited or cut off and learn from the experience to be more prepared for next time.

In the Upper East Region, floods are among the most regular and destructive natural disasters that cause distress to households. Agriculture is mostly rain-fed and largely on a subsistence basis with nearly 90 percent of farm holdings being less than 2 hectares in size (MoFA, 2024). Thus, the occurrence of a flood event directly affects their agricultural output. The area is also noted for its high poverty levels and as of 2024 it had the third highest multidimensional poverty index of 43% in the country (Ghana Statistical Service, 2024). The continued rise in water levels results in flooding which affects farmlands, posing a threat to lives and properties as the spilled water found its way into the Black and White Volta Rivers, which overflowed into several communities in the Upper East Region. According to an assessment report by the National Disaster Management Organisation (NADMO), about 11,959.6 Hectares of farmland has been affected by the floods with a total of 3,556 households (21,336) people being affected posing a food insecurity risk to the affected communities (IFRC, 2018). From 2018 to 2024, the Talensi district was inundated by six heavy flood events. These floods occurred mostly within July to September (NADMO, 2024). These led to several damages as well as the devastation of farm produce and strategic infrastructure. A classic instance is the September 2023 and 2024 floods that affected about 3,000 hectares of farm land, and destroyed crops including maize, groundnuts, onions, yams, cassava, and rice (MoFA, 2024; NADMO, 2024). Even though flood events occur in the districts, past assessments of flood susceptibility have mostly remained at the national level with limited consideration of the local-level. Most households at the local level tend to be more susceptible as a result of their location and limited resilience capacity to cope with floods. Hence, there is a need for resilience assessment to bring to light local specific conditions and aspects of households' and communities' resilience that require improvement. As such, this study explores the drivers of household's resilience to floods. Through the lenses of the protection motivation theory, this research addresses the gaps in household's unexplored surviving drivers to floods. The paper is structured as follows: following the introduction, the next section outlines the theoretical and conceptual perspectives. This is succeeded by the methodology, presentation and discussion of results, and finally, the conclusions and policy implications.

We draw on the Protection Motivation theory (PMT) to understand the psychological and socio-economic factors that shape resilience to dam spillage-induced floods in Ghana's White Volta Basin. The Protection Motivation theory (PMT) focuses on understanding how individuals evaluate threats and the associated response to deployed. The PMT was developed by Rogers (1983) following the works of Lazarus (1966) and Leventhal (1970). PMT propose that people's decision to protect themselves against any risk of a disaster, is influence by critical factors such as adaptive response process and threat appraisal process (Westcott, et al 2017). The threat appraisal is centred on discovering the

cause of the threat and its related matters that can upsurge or lessening the probability of maladaptive behaviours; assessing the adaptive responses to the likely or actual threat and one's capacity to absorb the activities that protect them or avoid the peril constitutes the adaptive response process (Rogers, 1975; Kothe, et al 2019). Assessing information about potential threats and protective responses is needed to help the individual to determine whether or not to engage in a given protective measure in response to a given threat. It is also argued that while the threat appraisal process allows the individual to evaluate the risks of the potential threat, the adaptive response process, allows the individual to evaluate potential responses that could protect the individual from a given threat. In other words, people's view of the severity of the impact of an event and their capacity to cope usually motivate them. Concern about and response to threats of flood disasters is extremely complex, as such, the PMT has limitation in its application. Sutton (2001), for instance, argues that the theory needs to integrate the abilities and resources people required to take action to protect them from the consequences of disasters. However, the theory provides a valuable context for us to elucidate household's interpretations of disaster regarding their exposer to floods and associated behaviours that could reduce their vulnerability to floods. Here, we use the PMT to understand and analyse households' flood risk perception and how it shapes resilience efforts.

From a conceptual standpoint, floods are natural disasters that occur as a result of a group of factors beyond human control and cause material and human losses. Flooding is a natural process that occurs when the level of a body of water rises until it overflows its natural banks or artificial levees and submerges areas that were usually dry. Along a watercourse, a flood can manifest itself annually. Usually high water flow is contained between the natural banks or artificial levees, but when the volume of the floodwaters can no longer be contained within those natural or artificial confines, waters expand into the surrounding areas (World Resources Institute 2016). Lane (2017) defines flood as an overabundance of water that inundates dry land. Land use land cover changes (LULC) including clearing away of wetlands, deforestation, modifications of flood controls such as with levees enhance the frequency and intensity of flooding (Zekouda, Meddi, LaVanchy, and Remaoun, 2020). In particular, increases in precipitation, sea level rise and adverse weather occurrences closely linked to climate change enhance the severity of flooding (Arnell and Gosling 2016).

Constructing household's resilience to floods has also been acknowledged as a decisive policy objective amongst several development frameworks including, the Sendai Framework for Disaster Risk Reduction (United Nations [UN], 2015a), the Paris Agreement on Framework Convention on Climate Change (UN, 2015b), and the Sustainable Development Goals (UN, 2015c). Resilience was studied as a dynamic process of successful adaptation to adversity, revealed through the prism of developmental psychopathology. There has been considerable debate in research and practice regarding the definition and operationalization of resilience (Luthar, Cicchetti, & Becker, 2000). Researchers who have narrowly focused on developmental risk often view resilience in response to adversity as an exception rather than a rule (Luthar, 2006). A transactional social-ecological approach considers this phenomenon as a state, an adaptive system of a family or society (Hays-Grudo & Morris, 2020). Pirozhkov, Bozhok, & Khamitov (2021) point out that resilience is a medical term that means a set of traits inherent to the subject that make it capable of overcoming stress and challenging periods in a constructive way. In their opinion, the characteristics that determine such ability are not always natural; in many cases they must be acquired. It should be noted that the definition of resilience approved by the American Psychological Association (APA) is the most common and widely used today, in which resilience is understood as "the process of positive adaptation in the face of adversity, trauma, tragedy or significant stress" (APA Dictionary of Psychology, 2023). Residents or communities commonly adopt strategies to sustain their lives and restore their losses. Whereas most of the studies mentioned preventive strategies as the common coping strategy, other studies identify some relevant reactive coping strategies. To better adapt to flooding and build resilience, it is important to allow local actions to prevail as local people are able to address a problem in their own community. It is worth mentioning that some of the resilience strategies are costly and sometimes ineffective (Danso and Addo, 2017).

psychological preparedness involves several intertwined within-individual processes and capacities, such as awareness, knowledge, anticipation, concern, thinking, feeling, experienced stress, motivation, intentions and decision making, and management of, or coping with one's thoughts, feelings, and actions (Reser & Morrissey, 2019). Psychological preparedness refers to the mental and emotional readiness to cope with challenging or stressful situations, such as emergencies or disasters. It involves anticipating potential reactions to stress and developing skills to maintain control and make rational decisions during those situations. Psychological preparedness is crucial for

individuals and communities facing natural disasters or other emergencies. It helps them navigate the immediate crisis and manage the potential long-term impacts of the event (Reser & Morrissey, 2019). Psychological preparedness is a key component of overall disaster readiness, alongside physical and material preparation.

2. Research Methods

We used the qualitative case study design to carry out the study. Qualitative research inclines to generate text from in-depth interviews and focus group discussions (Siti, 2017). An in-depth interview guide was used as the research instrument based on Kleinman's eight empirical questions because it permitted the researcher to gain more rich information on the phenomenon (Le Gautier et al., 2021)**.** The in--depth interviews guide generated the data from Fourth (40) flood victims who have suffered from loss of property due to the 2024 flood disaster in Talensi District. A total of 19 male respondents and 21 female respondents were involved in the study. The selection of participants was based on purposive sampling. All interviews were recorded by means of a tape recorder. Interviews that were conducted in languages other than English were transcribed verbatim to English. Each interview continued until saturation was reached. Where calls to participants for interviews were unresponsive, the researcher recruited new participants from the affected communities. Prior to all interviews, the study participants were told about the rationale of the study and the procedures as well as the length of the interview. Additionally, they were informed about the benefits and risks of the study and how they were selected to take part in the study. The analysis was done using the procedure of inductive thematic analysis (Braun & Clarke, 2006). The researchers familiarize themselves with the data then the initial codes generated and collated with the supporting data, codes were then grouped into themes and subthemes, reviewed and finally the write up of the narratives of the individuals (Braun & Clarke, 2006). Member checks were done with five participants as a key strategy for enhancing the credibility and trustworthiness of qualitative research. Its primary purpose was to ensure that the researchers' interpretation of participants' experiences accurately reflects their intended meanings.

3. Results

The researches present key findings about how households survive floods using psychological and socio-economic assets in Ghana's White Volta Basin. The study identifies three main themes, which are (a) drivers of household's resilience to floods**,** (b) elements of community essence and (c) social capital or support.

3.1 Drivers of household's resilience to floods

From the interviews, it emerged that participants demonstrated diverse flood resilience such as hopefulness, self-determination and inspiration to resolve issues they encountered, notwithstanding living in difficult times during floods. The participants were of the view that their pains empowered them to continue with their lives after the flood disaster. Moreover, they indicated that if they had to stay in the temporary situation without any work done, the situation would worsen their misery. These thoughts of the participants were expressed in direct quotations as follows:

> I must confess that I was depressed and disappointed nevertheless I managed to find a way out.... it will be worthless for an individual to continue to be depressed for long time... I had no choice but to accept what has happened and allow my sadness and sorrow to be part of life (Interview with a participant in Talensi District March, 2024).
>
> During the flood my shop was inundated and everything I had in the shop got loss but that did not dishearten me. Life must go on ... so now I have started another small business to survive my life after the flood (Male respondent)

The optimistic nature of the participants gave them courage to search for ways and means to continue their life after the flood disasters. Optimism is related to positive self-determination. This case shows that the survival level and high determine factor had enabled them to continue living despite their difficulties.

3.2 Elements of community essence

The study found significant elements of community essence in the study area. The study established that participants were more confortable staying with fellow community members than staying at temporary settlements provided. The participants living with their community members displayed elements of community essence, such as feeling satisfied living in their original house sites and having a high sense of belonging to their homes. This is because they have been living in the area with their families for a long time. For example:

> You see, these houses around this neighbourhood are all my family members... I am confortable and have no fear living with them here. If I was staying at government provided temporary shelter, I will not be confortable since I will not know the people around... the major difference here is that, as members of the same family, we face the adversity together and together, we feel strong.

The study also revealed that those living in the provided temporary settlements showed elements of insulating and have difficulty sharing their emotions with other flood victims. Some of the participants confessed that many flood victims exhibited a sense of egoism and always feeling unsatisfied. This situation is likely owing to the inadequate basic needs provided in the temporary shelters. These negative attitudes stalled the participants from rising together and building new lives after the incident.

These results suggest that, irrespective of living in poverty after the flood, they participants were able to recover faster because they stayed in their original houses. Thus, they continue with their routines daily activities without the support of other people. This can be attributed to the fact that respondents had a high sense of belonging to their settlements and had strong relationships with other people who stay in the same area. These helped to reinforce their relationships and allow them to have enhanced resilience than the participants living in temporary settlements along with other people from different backgrounds.

3.3 Social Supports

Social support extended to the participants was seen to influence their resilience to recover after the flood disaster. The study results revealed that, the delivery of social support such as tangible support (foods, goods and living necessities), social relationship support, information support, and emotional support has helped them to be more resilient in getting back their new lives after the flood incident. Nevertheless, the results of this study revealed that only tangible support and social relationship support were received by the respondents.

> So far, in terms of food and essentials assistance was okay and I received it from government, and some NGOs. Besides, I also got support from my sister, she helped me while I'm getting this transit house … the other siblings are helpful and very encouraging.

The results of the study further indicates that participants received abundant social relationship support in the form of affection and a sense of togetherness among family members to help them recover from the flood disaster. Emotional support was one of the most desired supports among the participants that help them rise and continue with their lives. Emotional support is defined as empathy and support towards the psychological problems that the participants face, especially motivating the participants' spirit in building new lives after the incident. One participant had this to say:

> I think most of the flood victims including me are really hoping for emotional support. If anyone could give us emotional support it would be great, because at this situation we really need it.

This study also discovered that the participants hoped for informational support such as advice and useful information to assist them to solve their problems, especially related to permanent housing and economic recovery assistance, as stated by one participant:

> As a flood victim, I really need valid information especially anything related to permanent house assistance and economic recovery advice. I think the government needs to consider how to distribute the right information and make sure that the information reaches us.

Therefore, some participants have recommended that the government should consider the best method to provide and share information related to flood victims, as well as to ensure that this information reaches the targeted people successfully. If the specified information regarding housing provision or economic recovery advice is properly provided, the flood victims will be able to live better lives after flooding events.

4. Discussion

This section explores the study's key findings and situates them in the context of other related literature. The study results were anchored on three themes based on data sourced from rural households affected by the 2023/2024 floods. This research supported the idea that rural households suffer disproportionally from floods, and therefore, flood resilience can be particularly beneficial for them. The results suggest that, irrespective of living in poverty after the flood, they participants were able to recover faster because they stayed in their original houses closer to their relatives.

Thus, they continue with their routine's daily activities with limited support from other people. This was attributed to the fact that respondents had a high sense of belonging to their settlements and had strong relationships with other people who stay in the same area. These helped to reinforce their relationships and allow them to have enhanced resilience than the participants living in temporary settlements along with other people from different backgrounds. This finding corroborates with Brown, Perkins, and Brown (2013), who argued that community spirit plays an indispensible role in community recovery efforts, mostly after an incident or disaster. However, nurturing sense of togetherness and dependency among victims of flood is a difficult thing due to the fact that they do not know each other and will stay for only a short period in the temporary shelters. Thus, victims of flood are unable to improve their settlement areas and would not be able to work with members of the community and local agencies to improve their condition.

Additionally, this study results revealed that, the delivery of social support such as tangible support (foods, goods and living necessities), social relationship support, information support, and emotional support has helped them to be more resilient in getting back their new lives after the flood incident and that participants received abundant social relationship support in the form of affection and a sense of togetherness among family members to help them recover from the flood disaster. This finding is supported by Malecki and Demaray (2003), who indicate that social support is seen as a form of behavioural support from social networks to improve the functionality of affected members due to a catastrophe. Prior researches also support this finding as indicated by Gelbrich, (2010), that information support such as advice and guidance can assist individuals to overcome their problems. Bailey, Sabbagh, Loiselle, Boileau, and McVey, (2010) also mentioned that information support received by individuals could significantly decrease anxiety and psychological distress when handling problems.

Dziwornu and Kugbey (2021) discovered health problems among flood victims and therefore suggested that care must be taken to address the psychological needs of victims in the after math of flood disaster. For example, the loss of loved ones and properties can cause depression and stress among adults and children. The psychological impact can last for a long period of time when their psychological needs are not met quickly. However, findings from this study indicate that participants demonstrated diverse flood resilience such as hopefulness and inspiration to resolve issues they encountered, notwithstanding living in difficult times and that their pains empowered them to continue with their lives after the flood disaster. This finding resonates with previous literature which states that persons with high hopes, inspiration and determination during disaster could lead to improved life well-being, enhanced adaptability, and could go through a rapid recovery phase (Bisschop et al., 2004; Kuijer & De Ridder, 2003). From the discussions, this study underscores the critical role of hopefulness, inspiration to resolve issues they encountered; self-determination, social relationship support, information support, and emotional support drive household resilience to floods in Ghana.

5. Conclusions

In conclusion, the resilience level of the participants that took part in this study was motivated by several major issues, namely the flood victims' hopefulness, self-determination and inspiration to resolve issues they encountered in times of difficulties and the social support extended to the flood victims. The also conclude that to improve the resilience of flood victims, their integral social relationship support must be improved. Besides this, the positive spirit among the community members needs to be protected. Finally, aside the physical support and information support among family members and the community, emotional support also need to be elevated or enriched to suit the necessities of the flood victims to help them recover quickly after a disaster.

6. Recommendations

This study recommended that all factors influencing flood resilience must be taken into consideration by related agencies such as the National Disaster Management Organization (NADMO), the Department of Social Welfare, and the District Assemblies. These related units are required to formulate interventions to promote community involvement in improving self-defence, as well as family and community resilience when faced with disaster risks. Besides, the Sendai Framework (2015-2030) should be implemented to emphasize the role of society in managing and reducing disaster risks. This approach promotes community participation in disaster management, especially in lessening disaster risks. This is in line with the statement that the importance of developing an individual's potential to the optimum level, as well as enhancing community resilience in facing current challenges is by building and nurturing an attitude of helping each other for the benefit and well-being of the community.

References

Adeyeye, K. and Emmitt, S. (2017) Multi-scale, integrated strategies for urban flood resilience. *International Journal of Disaster Resilience in the Built Environment* *8*(6):00-00 DOI: 10.1108/IJDRBE-11-2016-0044

APA Dictionary of Psychology (2023). Resilience. https://dictionary.apa.org/resilience.

Arbon, P., Steenkamp, M., Cornell, V., Cusack, L., & Gebbie, K. (2016). Measuring disaster resilience in communities and households: pragmatic tools developed in Australia. *International Journal of Disaster Resilience in the Built Environment*, *7*(2), 201-215.

Arnell NW, Gosling SN (2016) *The impacts of climate change on river flood risk at the global scale*. Climate Change 134(3):387–401. https://doi.org/10.1007/s10584-014-1084-5.

Bailey, J., Sabbagh, M., Loiselle, C. G., Boileau, J., & McVey, L. (2010). Supporting families in the ICU: A descriptive correlational study of informational support, anxiety, and satisfaction with care. *Intensive and Critical Care Nursing, 26*, 114-122.doi:10.1016/j.iccn.2009.12.006.

Bisschop, M. I., Knegsman, D. M. W., Beekman, A. T. F., & Deeg, D. J. H. (2003). Chronic diseases and depression: The modifying role of psychosocial resources. *Social Sciences and Medicine, 59*, 721-733. doi:10.1016/j.socscimed.2003.11.038.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology; In qualittaive research in psychology. *Uwe Bristol*, *3*(2), 77–101. https://psychology.ukzn.ac.za/?mdocs-file=1176

Danso S.Y, and Addo IY (2017) Coping strategies of households affected by flooding: a case study of Sekondi-Takoradi Metropolis in Ghana. Urban Water J 14:539–545. https://doi.org/10.1080/1573062X.2016.1176223

Dziwornu, E., & Kugbey, N. (2021). Mental health problems and coping among flood victims in Ghana: A comparative study of victims and non-victims. *Curr Res Psychol,* 6:15-21.

Gelbrich, K. (2010). Anger, frustration, and helplessness after service failure: Coping strategies and effective informational support. *Journal of the Academy of Marketing Science, 38*, 567–585. doi 10.1007/s11747-009-0169-6.

Ghana Statistical Service (2024). *Economic Statistics Reports*. Statistical Year Overview. *https://statsghana.gov.gh › storage › img › infobank*

Hays-Grudo, J., & Morris, A. S. (2020). *Adverse and protective childhood experiences*: A developmental perspective. American Psychological Association. https://doi.org/10.1037/0000177-000.

Hirabayashi, Y., Mahendran, R. Koirala, S. Konoshima,L. Yamazaki, D. Watanabe,S. and Kanae, S. (2013). Global flood risk under climate change. *Nature Climate Change* 3(9): 816–821.

International Federation of Red Cross and Red Crescent Societies (IFRC), 2021, Disaster response and contingency planning guide, IFRC, Geneva.

IFRC. (2018). *Emergency Plan of Action final report*—Ghana: floods. Geneva: IFRC.

Inter-Parliamentary Union [IPU] and International Strategy for Disaster Reduction [ISDR], (2010). Disaster risk reduction: An instrument for achieving the Millennium Development Goals: Advocacy kit for parliamentarians [online]. Geneva: IPU. Available from: www.ipu.org/PDF/publications/ drr-e.pdf [Accessed 16 October 2024].

Jamshed, A., Birkmann, J., Feldmeyer, D., & Rana, I. A. (2020). A conceptual framework to understand the dynamics of rural–urban linkages for rural flood vulnerability. *Sustainability*, *12*(7), 2894

Jongman, B., Hochrainer-Stigler, S., Feyen, L., Aerts, J.C., Mechler, R. Botzen,W.W. and Ward. P.J. (2014). Increasing stress on disaster-risk finance due to large floods. *Nature Climate Change* 4(4): 264–268.

Kothe, E. J., Ling, M., North, M., Klas, A., Mullan, B. A., & Novoradovskaya, L. (2019). Protection motivation theory and pro-environmental behaviour: A systematic mapping review. *Australian Journal of Psychology*, *71*(4), 411-432.

Kuijer, R. G., & de Ridder, D. (2003). Discrepancy in illness-related goals and quality of life in chronically ill patients: The role of self-efficacy. *Psychology and Health, 18*, 313-330. https://doi.org/10.1080/0887044031000146815.

Lane S. N. (2017) *Natural flood management*. Wiley Interdisciplinary Reviews: Water 4(3):e1211. https://doi.org/10.1002/wat2.1211.

Lazarus, R. S. (1966). Some principles of psychological stress and their relation to dentistry. *Journal of dental research*, *45*(6), 1620-1626.

Le Gautier, R., Wallace, J., A. Richmond, J., & Pitts, M. (2021). The role of explanatory models of chronic hepatitis B on illness experience: a qualitative study of Vietnamese participants in Australia. *Ethnicity and Health*, *26*(8), 1225–1241. https://doi.org/10.1080/13557858.2019.1612519.

Leventhal, H. (1970) Findings and Theory in the Study of Fear Communications. *Advances in Experimental Social Psychology 5*:119-186 DOI:10.1016/S0065-2601(08)60091-X

Luthar, S. S. (2006). Resilience in Development: A synthesis of Research Across Five Decades. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (pp. 739–795). John Wiley & Sons, Inc.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The Construct of Resilience: A Critical Evaluation and Guidelines for Future Work. Child Development, 71 (3), 543-562.

Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School psychology quarterly*, *18*(3), 231.

MOFA, (2024). Ministry of food and Agriculture. Agriculture in Ghana. Facts and figures.

Njogu, H. W., (2021) Effects of floods on infrastructure users in Kenya. *Journal of Flood Risk Management* https://doi.org/10.1111/jfr3.12746

Okyere C.Y., Yacouba Y., Gilgenbach D. (2012) The problem of annual occurrences of floods in Accra: an integration of hydro logical, economic and political perspectives. *Theor Empir Res Urban Manag* 8:45–79

Pacetti, E., Balbi, A., Lingam, M., Tombesi, F., & Perlman, E. (2020). The impact of tidal disruption events on galactic habitability. *Monthly Notices of the Royal Astronomical Society*, *498*(3), 3153-3157.

ProAct Network, (2008). Climate change adaptation and disaster risk reduction. Available from: http://proactnetwork.org/proactwebsite/media/download/PApolicies/drr_caa_policy_paper.pdf [Accessed 16 April 2021].

Pyrozhkov, S.I., Bozhok, Ye.V., Khamitov, N.P. (2021). Natsionalna stiikist (rezylientnist) krainy: stratehiia i taktyka vyperedzhennia hibrydnykh zahroz [National endurance (resilience) of the country: strategy and tactics of anticipating hybrid threats]. Visnyk Natsionalnoi akademii nauk Ukrainy [Bulletin of the National Academy of Sciences of Ukraine], (8), 74–82. https://doi.org/10.15407/visn2021.08.074.

Reser, J. P., & Morrissey, S. (2019). *The crucial role of the psychological preparedness for disasters*. Retrieved 11 June 2025,fromhttp://www.psychological.org.au/in psych/psychological_preparedness/

Roberts, T. (2013) *Understanding the Research Methodology of Interpretative Phenomenological Analysis*. *British Journal of Midwifery, 21*, 215-218.

Roy, A., Sharma, A., Yadav, S., Jule, L. T., & Krishnaraj, R. (2021). Nanomaterials for remediation of environmental pollutants. *Bioinorganic Chemistry and Applications*, *2021*(1), 1764647.

Rogers, E. M., & Williams, D. (1983). Diffusion of. *Innovations (Glencoe, IL: The Free Press, 1962)*.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology: Interdisciplinary and Applied, 91*(1), 93–114. https://doi.org/10.1080/00223980.1975.9915803

Siti Uzairiah, M. T. (2017). *Qualitative Research, Interview Analysis & Nvivo11 Exploration.* Kuala Lumpur: Aras Publisher.

Sutton, S. (2001) Health Behaviour: Psychosocial Theories. In: Smelser, N.J. and Baltes, B., Eds., *International Encyclopedia of Social and Behavioural Sciences*, Elsevier, Oxford, 6499-6506. https://doi.org/10.1016/B0-08-043076-7/03872-9.

United Nations (UN). (2015a). Sendai Framework for Disaster Risk Reduction 2015–2030 (http://www.unisdr.org/we/coordinate/sendai-framework). Accessed 13 August 2020.

United Nations (UN). (2015b). *Adoption of the Paris Agreement*. UNFCCC. Report No. FCCC/CP/2015/L.9/Rev.1, (http://unfccc.int/resource/docs/2015/cop21/eng/ l09r01.pdf). Accessed 13 Mar 20234

United Nations (UN). (2015c). Sustainable Development Goals (http://www.un. org/sustainable development/sustainable-development-goals/). Accessed 13 Mar 2024.

UNISDR, (2024) Annual Report 2024. *UN Office for Disaster Risk Reduction*: https://www.undrr.org/annual-report/2024

United Nations International strategy for Disaster Reduction (UNISDR). (2015). Global *Assessment Report on Disaster Risk Reduction*

Westcott, S. L., & Schloss, P. D. (2017). OptiClust, an improved method for assigning amplicon-based sequence data to operational taxonomic units. *MSphere*, *2*(2), 10-1128.

World Resources Institute (2016) www.wri.org/blog/2015/03/world%E2%80%99s-15-countries-most-people-

exposed-river-floods. from webpage www.wri.org. Last access 26 May 2025.

Zekouda, N., Meddi, M., LaVanchy G.T, and Remaoun, M. (2020) *The Impact of Human Activities on Flood Trends in the Semi-Arid Climate of Cheliff Basin, Algeria.* Water Resour 47:409–420. https://doi.org/10.1134/S0097807820030136.