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Flash Flood Utilization (FFU) For Indian Farmers

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Abstract: ***Flash floods happens when dams break, when levees fail or when an ice jam releases a large amount of water by melting or as huge ice block slides and change of sudden climatic condition due to Global warming Flash flood is a destructive type of natural hazard incident. The main danger due to velocity and speed with which flash flood develops and resulting powerful water flows. The risks arise from related phenomena such as tangible assets & debris flow, ice jam melts, surface water flooding, etc. The most comprehensive way to provide warnings is to install gauges both at and upstream of areas at risk and to use the outputs from forecasting models to help to extend warning lead times. This article tries to focus on the causes of flash flood and specially the remedial part which is optimum utilization of flash flood for agricultural irrigation purpose.***
Keywords: Flash Flood Utilization (FFU), Rainfall Quantity, Rainfall Intensity, Tangible Assets, Natural Hazards, Debris flow, Ice jam, Information and communication Technology (ICT), solar pump system(SPS).

I. INTRODUCTION

Flash floods is to be considered as the most common natural disaster worldwide over the last few decades. Their consequences are not only environmental but also economic, since they may cause damage to urban areas and may even result in the loss of life and eco-systems[1]. Rapid growth of population, expansion of industrialization and huge urbanization have led to encroachments within stream beds and land use changes to catchments in rivers, nalas, drainages etc including the upper urban centers. It is worth mentioning that many times flood phenomena could have been avoided if no anthropogenic interventions existed within stream beds. Moreover, due to climate change, flash floods will continually growing day by day. A flash flood is a rapid flooding of low-lying areas: washes, rivers, dry lakes and depressions. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm, or melt water from ice or snow flowing over ice sheets or snowfields. Flash floods may occur after the collapse of a natural ice or debris dam, or a human structure such as a man-made dam, as occurred. Flash floods are distinguished from regular floods by having a timescale of fewer than six to seven hours between rainfall and the onset of flooding[2]

A. Objective

The objective of this research paper is to **;**

1) To measure and identify the risk associated with flash flood impacts in order to protect the life, health, safety, infrastructures, property and welfare of the community's residents and visitors.
2) To analyze and ensure the development towards long-term and flexible funding strategy planning systems for river flash flood hazard management.
3) To ensure the support compatible human uses, economic activities, and improve habitat conditions in flash flood-prone and channel migration areas
4) To ensure that local and state government entities have the capabilities to develop, implement and maintain the effective flash flood plain management programs exclusively in the flash flood prone areas/region.
5) To increase the different public awareness methodologies towards the flash flood affected peoples for preventions from hazards and preparation for flash flooding.

II. SIGNIFICANCE

1) The paper objectives shall offer an opportunity for collective problem defining, measuring, analyzing, solving, improving the knowledge sharing, socioeconomic exchange and community-wide participation at local, national and international level with respect to the flash flood events.
2) The paper hypothesis will help and benefit to lead to an insight into the information through ICT(Information and communication Technology) and preparedness requirements of local communities and development of solutions adapted to the social realities with respect to the flash flood hazards.
3) The subject objective shall provide to lead the closer cooperation, support, guidance and coordination for flash flood forecasting and warning services of public institutions based on user requirements.

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4) Based on study of the paper w.r.t. flash flood hazards and including consultations with affected communities and other recipients of flood warnings, improved technical means of detecting the areas at imminent risk and warning more effectively, will be developed.
5) By controlling and conserving the flash flood excess water through suitable methodology &Technology and the same water can be benefitted to farmers for their crop irrigation through solar pump system(SPS) as per their future requirements and which shall also the save ground water depletion and global warming. And also, the flash floods will ensure that there is water drinking water in dry places.
6) Flash flood waters can carry nutrient-rich sediments which contribute to a fertile environment for vegetation.
7) Floodplains are beneficial for wildlife by creating a variety of habitats for fish and other animals.
8) The subject will be helpful for other researchers who will be interested in doing advance work on same topic through Define, Measure, Analyze, Improve and Control(DMAIC) putting proper PDCA(Plan, Do, Check & Act) rule with organized, safe and environmentally sound manner with the social ethics of Transparency, accountability, Integrity and Professionalism ways and means towards Flood management.

A. *Main Causes of Flash Floods*

Most flash floods happen after extremely intense rainfall from severe thunderstorms over a short period of time (normally 6 hours or less)[3] .The key elements to determine is flash flooding is as follows:

1) Rainfall rate and quantity, Rainfall duration and intensity , Flash floods also happen when damns break, when levees fail or when an ice jam releases a large amount of water by melting or as huge ice block and Global warming
2) Rapid Industrialization, Population Growth, Huge urbanization, Encroachment of river beds, Excessive rain from tropical storm systems making landfall, Persistent thunderstorms over the same area for extended periods, Combined rainfall and snowmelt, Ice jam
3) Excessive sand and stone and mineral exploration from the river beds[4].
4) Dumping and Throwing of garbage to the rivers and jamming the drainage systems
5) River Canals are blocked due to bad agricultural practices.
6) Tropical cyclones, Tsunami, Higher-than-average tides, Low pressure creation over the sea, Climatic Change and global warming and Periodical monsoon cycles.
7) Sudden creation of Low pressure depression over the sea beds, Abnormal Astronomical tide , Wind pressure, Velocity and volume, Waves, Low atmospheric pressure differences.
8) Negligence of maintenance of urban drainage systems by Municipality corporations, Low-capacity and having poor quantity of drainage equipment, Paved roads and streets and Dense buildings not as per town planning[5] .
9) Low amounts of green space available in the urban areas, Haphazard dumping of garbage and Excess using of Biological non-gradable items.

B. *Impacts of Flash Flood*

There are actually many dangerous flash flooding effects. Besides physical danger, flash floods also cause economic and social problems. The details is as follows:

1) *Loss Of Lives due to flash Flooding:* The gravest effect of flash flooding is death. In fact, flash flooding is the number one severe weather killer. Flash Floods kill by carrying people away in fast-moving water or drowning them[6].
2) *Property Damage due to Flash Flooding:* Since it only takes two feet of flood water to wash a car away, flooding can also cause great loss of property. Surely it has been seen images of cars floating away in flood waters. This is why it is so important to avoid flooded areas when driving[7]. Flooding also causes property damage to buildings by blowing out windows, sweeping away doors, corroding walls and foundations, and sending debris into infrastructure at a fast pace[8].
3) *Economic Impacts:* The economic impact of flash flooding can be devastating to a community. This brings business activities in an area to a standstill and major flooding results in dislocation of normal life long after flood waters recede[9]. In frequently flooded areas, there is less likely to be any investment in infrastructure and other developed activities.
4) *Psychosocial Effects:* Flooding can also create lasting trauma for victims. The loss of loved ones or homes can take a steep emotional toll, especially on children. Displacement from one's home and loss of livelihood can cause continuing stress and produce lasting psychological[10].

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5) *Pollution:* Floods will wash chemicals and sewage into the water. The contaminated water will spread quickly over an area – causing public health issues and destroying aquatic lives.
6) *Destruction of Wildlife Habitat:* Flash Floods will destroy places where river animals and fish might have breeding grounds. Even slight changes to river temperature and water patterns can upset natural ecosystems .
7) *Water Recharge:* Flash Floods can bring water back to dry areas. the excess flash flood water can be stored and conserved either in check dams, ponds/lakes and the same water can be used by the farmer for their crop irrigation purposes through solar pumping system(SPS) as per their requirements in the future. And also, the flash floods will ensure that there is water drinking water in dry places .
8) *Social Impacts:* refer to how a management method will affect people. It will look at how it impacts their houses and where they live, how it will affect their daily lives and their food and water supply.
9) *Environmental Impacts:* Flash Flood leaves an adverse impact the natural environment. It affects on the development of animals and plant life.

C. Measures To Be Taken During The Flash Flood

If a flash flood event is happening, there are steps you can take to stay safe. The first and most important thing to remember is to steer clear of flood waters.

1) Turn around, don't drown. Flash flood waters can rise or gain intensity in the blink of an eye. Stay away from flash flood water at all costs.
2) Another important tip that will help you survive a flash flood is to listen to evacuation orders from authorities. Also stress that you listen to evacuation orders the first time you hear them. Waiting even just a few minutes can be the difference between life and death. And staying behind can put you and others at risk if you need to be rescued from rising waters.
3) One last useful flood safety tip to pay attention to during a flood is to stay away from rooms where water covers electrical outlets. This is pretty self-explanatory, you don't want to be electrocuted walking through your flooded home or business.

D. Measures to be taken after the flash flood:

Once the flood waters recede, you might think you're safe. However, there are still plenty of flooding dangers that can threaten your health and property. There are also things you should in case a flood damages your property.

1) One of the most important safety precautions after a flood is making sure your water is safe to drink. Groundwater may have been contaminated during the flood so don't assume you can just turn on the faucet and the water is safe. Local authorities will let you know if water is safe to drink or if you should boil it before using.
2) After a flood, standing water is also a danger. While it might look tame compared to a raging flood, standing water left behind is a breeding ground for bacteria and can carry toxins or chemicals. If you have to touch standing water for cleanup or any other reason, protect yourself with rubber gloves, boots, and other protective gear.
3) Floodwaters can also hide sharp or dangerous objects, so it's best to avoid going into the water.
4) One last flood safety tip to keep in mind for after waters recede is to wait for the all clear from local officials to return to buildings or areas compromised by the flood. While your home or office might look safe to you, there could be major structural or electrical dangers. Always wait for the all clear.

III. METHODOLOGY

The methodology adopted for this research paper is both descriptive and analytical. The following segments has been considered for the study;

A. Hard-Engineering Systems

1) *Check Dam Systems:* Built along the course of a river to control the amount of discharge. Water is held back by the dam and released in a controlled way.
2) *Flash Flood wall Systems:* Can be used to raise the height of the river bank to a level where the river might not burst its banks.
3) *Levees and Embankment Systems:* Artificial levees can be built along river banks so that if the river floods, the water will not be able to breach the wall and cause damage. Levees can be expensive and can spoil the look of rivers.
4) *Straightening and Deepening Systems:* The river channel may be widened or deepened allowing it to carry more water. A river channel may be straightened so that water can travel faster along the course. The channel course of the river can also be altered, diverting floodwaters away from settlements.

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B. Soft-Engineering Systems

1) *Wash lands Systems:* These are areas of land where water can wash into during a flash flood. They are usually found in the lower course of a river. Sluice gates will be opened to allow excess water to flow into the area and flash flood marginal land.
2) *Afforestation Systems:* Afforestation cannot prevent flooding but it can help reduce its likelihood.
3) *Conservation & Utilization of Flash Flood Water:* By above methodologies, the excess flash flood water can be stored and conserved either in check dams, ponds/Lakes and the same water can be used by the farmer for their crop irrigation purposes through solar pumping system(SPS) as per their requirements in the future. And also, the flash floods will ensure that there is water drinking water in dry places[11].

IV. CONCLUSION

Climate change is expected to affect flash flooding through changes in rainfall, temperature, sea level and river processes. Climate change will exacerbate the existing effects of flooding on infrastructure and community services, including roads, storm water and wastewater systems and drainage, river flood mitigation works, and private and public assets including houses, businesses and schools. Climate change may change flash flood risk management priorities and may even increase the risk from flooding to unacceptable levels in some places. It is therefore important that flood risk assessments incorporate an understanding of the impacts of climate change on the flood hazard. Managing present-day and future risk from flooding involves a combination of risk-avoidance and risk-reduction activities. The treatment options could be a combination of avoiding risk where possible, controlling risk through structural or regulatory measures, transferring risk through insurance, accepting risk, emergency management planning, warning systems, and communicating risk (including residual risk) to affected parties. The best combination will consider the needs of future generations and not lock communities into a future of increasing risks from flooding.

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Study during my PhD research guided by Dr. KHALEDA REHMAN, Assistant Professor & Research Coordinator of JRU, RANCHI(JH)

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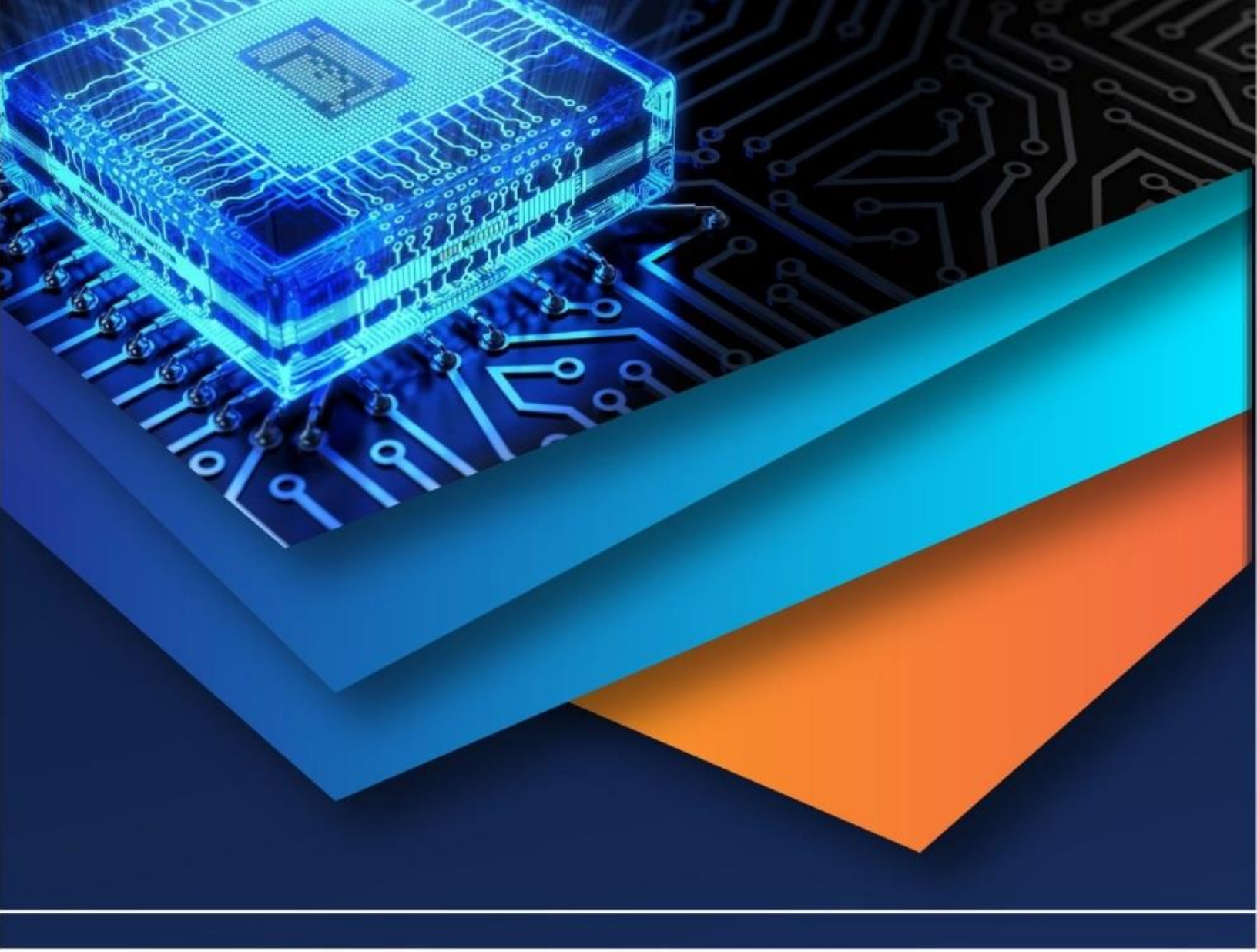
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