

A Case Study of Flood Susceptibility in Kuchaikote Block of Gopalganj District, Bihar

By

Udbhaw Sandylya

M.A (Geography) UGC-NET,

Delhi school of Economics, University of Delhi

Abstract

A flood is defined as water overflowing onto land that usually is dry Doswell (2003). The term flood is synonymous with the extreme situation where the extensive area is inundated with water for several days leading to the breakdown of all essential functions Tiwari (2006). Flood is not a newer concept as it has a long genealogy of its prevalence since the dawn of many human civilisations. Floods are frequently occurring hazard which cause mass damage to life and property, stagnation of the functions and disruption of the infrastructure. Further, it deadly affects the agriculture and manufacturing sectors (The building blocks of any economy) which in turn affect the service, quaternary and quinary sectors harshly. There are mainly five types of flood: Coastal Flooding, River Flooding, Flash Flooding, Groundwater Flood & Drain and Sewer Flooding. Floods produce damage through the immense power of moving water and through the deposition of dirt and debris when floodwaters finally recede. Although, flood is often negatively interpreted regarding human health and habitation but at same time it has some positive impacts as it shapes the earth's surface and gives rise to a unique topographic feature. Further, floodplains and natural levees along rivers and streams are considered as the most fecund land. These regions are known as the 'Cradle of Civilization' as many civilisations such as: (The Nile River Civilization, The Indus River Civilization, The Ganga River Civilization, The Tigris-Euphrates Civilization etc.) had sprouted.

Introduction

From the archaeological exhumations and evidences, it has been verified scientifically that in earlier period all human habitations and civilizations have sprouted along the brink of the perennial rivers. The incessant supply and availability of water has always been one of the prerequisite elements for the human settlements to sprawl. Far from the beginning humans have been guided and controlled by the river's stream. The path once if any river followed, the areas in its vicinity were occupied by human for their sustenance and livelihood. But in recent centuries particularly after the advent of Industrial Revolution (1764), the tradition of streams to be followed by humans has suffered the utmost level of transformation. Earlier, man used to mould himself in accordance with the flowing streams but nowadays he is moulding the channels according to his own requirements. In Kuchaikote, every year minimum three months of land inundation with water decreases the productivity of land, stagnates the essential day to day activities, causes a serious damage to the erected infrastructures and thus possesses a serious threat to the life and property. Many villages like Bisambharpur (Panchayat, Kalamitinia), Jamunia and Sipaya lie in the flood belt zone of the River Gandak and they suffer a lot during flood period the general water alert in the Kuchaikote block lies in between (104- 107 metres.) and every year Gandak surpasses this limit. As a result, there is mass destruction of life and property, mass evacuation of the residents living in the area along with their livestock and thus a situation of cataclysm is created in the region. The Gandak Floods have the highest potentiality to devastate and damage the ongoing daily activities. In 2016, Barai Patti Panchayat which housed 22 villages, all of them were hit severely by flood. All these 22 villages were located in low lying areas in the Gandak.

Publishing URL : <http://www.researchreviewonline.com/issues/volume-7-issue-88-august-2020/RRJ852360>

In every household, in these flood hit villages, water has entered affecting almost 1 lakh people. In six villages, due to excessive discharge of water from Nepal, flood water has entered the villages. Several people who even had the pucca houses were trapped in their houses. Due to morphological, climatic and other socio-economic reasons, the flood menace is perennial for the region. Heavy flood thoroughly upset the economy of area which have largely harmed the prospects of economic development of this Community Development Block. But in spite of it the large resources of water neither utilized properly for any proper steps were taken to control the annually devastating flood. Despite several attempts from the government side to combat and tackle the grim flood scenario in the region, the area has still been evident of the disastrous flood annually. To assess the causes and impact of flood in the study area a village named 'Kalamatinia' has been chosen as sample. The impact of flood on agriculture, migration, education, health and ecology and environment in this villages has been assessed with the help of primary data collected from the field.

Flood Impact

Floods are acquainted with the much-needed damage potential which is required for any calamity to be considered as the Disaster. The recent Global data on flood has proved that there has been an alarming rise in the extent of flood impact thus damaging all the exigent functions and activities annually for a definite period of time. There is need to transform the current paradigm status from flood control to flood management. Flood is a definite phenomenon and it can't be restricted from being taking place. There is dire need of holistic and integrated approach to mitigate the disastrous impact of flood. The common perception of flood is that it is mainly related to the under-developed or developing nations but extreme and utmost status of flood conditions can even also cause a serious damage to the developed, infrastructurally affluent and economically consolidated nations. In few recent decades many developing South Asian nations like Bangladesh, India, China, Pakistan etc. have witnessed grim flood scenario. Also, many developed nations like Poland, Germany, USA and Italy have suffered a lot with the havoc nature of the flood. Floods also lead to mass deaths of people and this death is mainly confined to the most vulnerable and marginalised class of people including old age population, women and children.



Fig: - 1.1, Inundation of Extensive Area with Flood Water, BBC, 2016

A recent data suggests that most of these deaths are related to the post-flood scenario because of seriously maimed economic framework of the family, grave subsistence hardship and demolition of the entire functioning infrastructure in the region. The pre-disaster preparedness with judicious planning and prudent skill can play a crucial role in mitigating the flood to a considerable extent. Many long-term activities like the flood plain policy implementations, effective watershed management, land use policy and programmes, mining activities in the catchment area, infrastructure development programmes and flood affected areas rejuvenation projects etc. can of great significance to tackle the plight situation of the region.

Causes of Flood

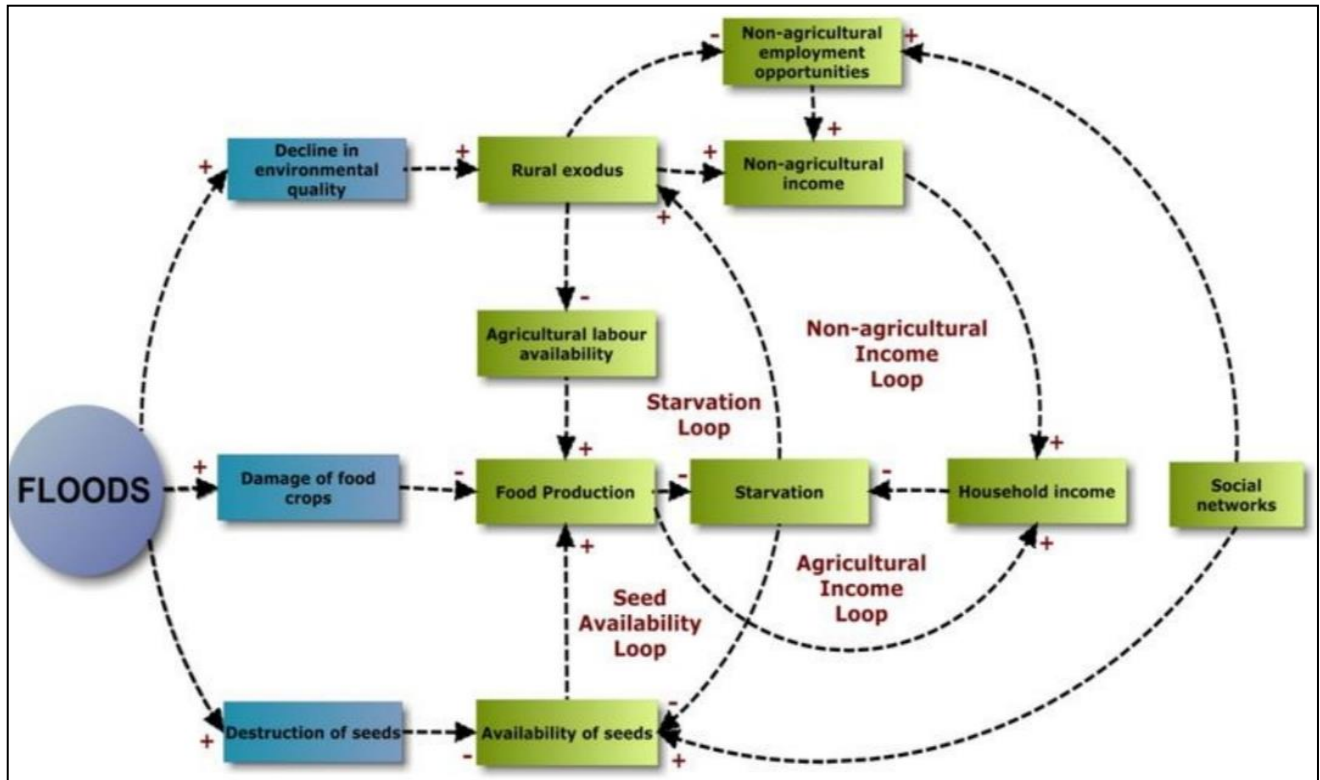


Fig No: 2 Causal Loop Diagram Showing Flood Impact, Researchgate.Net, 2010.

Flood in terms of its origin is a multi-dimensional phenomenon. There are several factors causing flood. The factors like Atmospheric hazards (Rainfall, Ice jam, Snow melt), Seismic disturbances (Landslides, Topographical transformation), Technological hazards (Natural levee break, Dam Failure) and Land use hazards (Sedimentation in the channel, choked drainage basin and Deforestation) are the leading causes of flood. The causes of flood may be classified into two categories.

1. The acatalepsy and untruthiness of Indian rainfall leading to flood impediment. The rainfall mainly be by the South-west monsoons results in extreme flood situations due to unabridged and toptfull natural channels. These overflowing channels are unable to carry the excess amount of water and thus river tend to distribute them horizontally in the vicinity area. As a result, the gruelling flood circumstances come in the forefront.

2. Flooding is caused by the inappropriate potential within the river’s bank to contain the high floods brought down from the upper catchment due to torrential rainfall. Areas having poor drainage

characteristics get inundated by accumulation of water due to heavy rainfall. Flooding is accentuated by erosion and silting of the river beds resulting in reduction of carrying capacity of river channel, courses, obstructions to flow, synchronization retardation due to tidal effects.

3. Another cause of flooding has been the incessant water logging in the irrigated area. This is because the enormous amount of water without any concern is always applied to the concerned command area

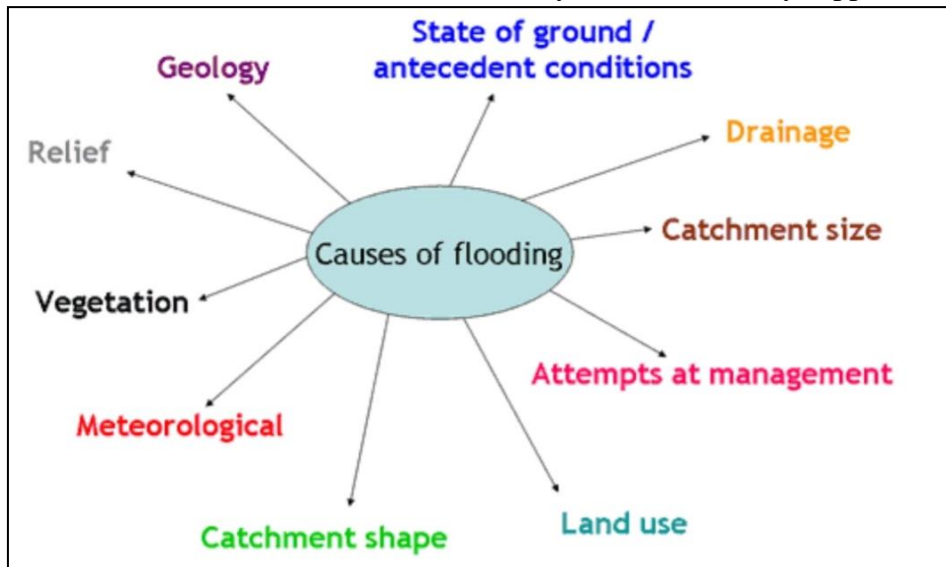


Fig: - 3, Major causes of flood, The British Geography, weebly.com 2010

and this enhances the ground water level thus reducing the capacity of the soil to soak them. There are various factors causing flood in villages and inner area of the Kuchaikote Block. Some of them are as follow: -

- The Gandak Barrage between India and Nepal at Bhainsaloton, Valmikinagar, West Champaran, Bihar releases lakhs of cusses water particularly during monsoon period. This water discharge further aggravates the water

starve to quench its thirst by engulfing the whole habitation situated in adjacent area of the main stream.

- Transgression of the rills. The primary survey revealed the fact that earlier there were seven huge traditional rills through which the excessive amount of water from the river was expelled out from various villages of the blocks. But in recent years all those rills have been transgressed and there is not any glimpse of a single one. This retraction has aggravated the flood impact in the region since water has not any option other than horizontal propelling.

- Another major cause of flooding in the region is the recklessly continued operation of the construction activities in the most vulnerable areas particularly along the Saran Embankment, poor watershed management and because of the institutional failure to some extent.

Major Impact of Flood

1. Impact on Agriculture

The three main impediments which a farmer suffers with particularly during flood are production, demand and supply. The inundation of extensive agricultural areas with water gives a sudden and robust jolt to the entire production framework as it leads to a noticeable decrease in the aggregate production ratio in the area. This decrease in production further breaks the chain of demand and supply. The diminishing agricultural production ratio due to flood leads to shortage of food intems particularly in those command areas which it has been serving since decades. This shortage of food is directly proportional to the increase in demand and supply.

The flow-on effects of reduced agricultural production can often impact well outside the production area as flood prices increase due to shortages in supply (Prosser, et al.,2001). On the other hand, flood events can result in long-term benefits to agricultural production by recharging water resource storages, especially in drier, inland areas, and by rejuvenating soil fertility by silt deposition (Apan, et al, 2010).



Fig No: - 4, Impact of Flood, Patrika.com, 2015.

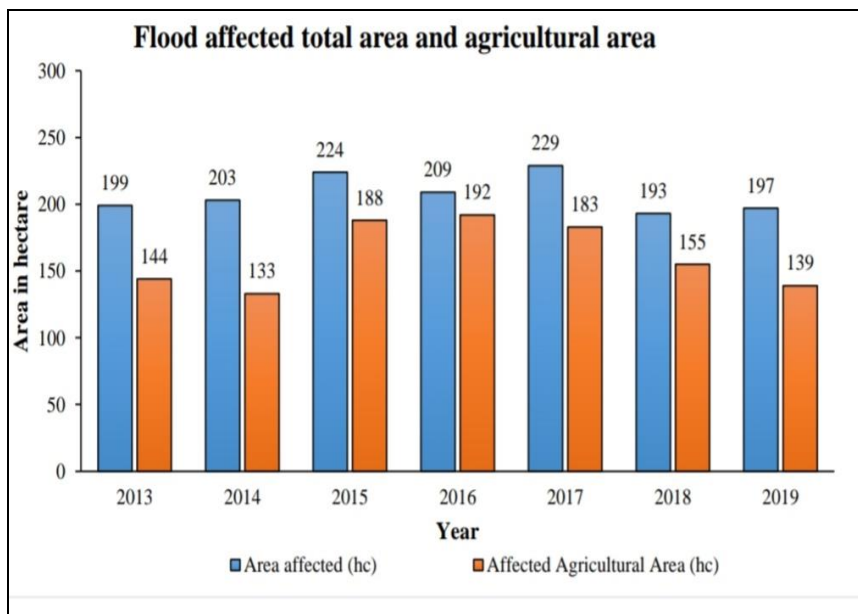


Fig No: -5, Impact of Flood on Agriculture, Primary survey, 2020.

The above diagram illustrates that each year about 210 hectares of land is inundated with flood water while averagely 150 hectares of agricultural land is extensively influxes with In 2013, 199 hectares of total land were under immersed under flood water while 144 hectares of agricultural land were freshened with flood water. In 2019, 197 hectares of total were dipped under flood water while at the same time 139 hectares of agricultural land were extensively inundated with flood water.

Table No:-1.1, Affected agricultural area and respondents,Primary Survey,2020.

Affected Agricultural Area (Hectares.)	No. of Respondents.
0-2	4
2-4	13
4-6	9
6-8	15

The above diagram shows that there has been a non-uniform trend in terms of total land and total agricultural land affected due to flood water. The data represents that the highest proportion of total land affected due to flood water was in the year 2017 while the highest proportion of net agricultural land affected due to flood was 2016. The succeeding year of 2013 i.e 2014 has shown less inundation of agricultural land as compared to that of previous one. At the same time, the same succeeding year has shown a sharp rise in terms of inunction with reference to total land. This zig-zag behaviour of land inundation is directly proportional to the erratic nature of Indian Monsoon. The year which is marked with a good monsoonal downpour, the same has witnessed more and more land inundations. These inundations have led to widespread crop damages. As well as fencing and livestock losses. Loss of Crops through rainfall, waterlogged soils are further accentuated by transport problem due to flooded roads and severely damaged infrastructures.

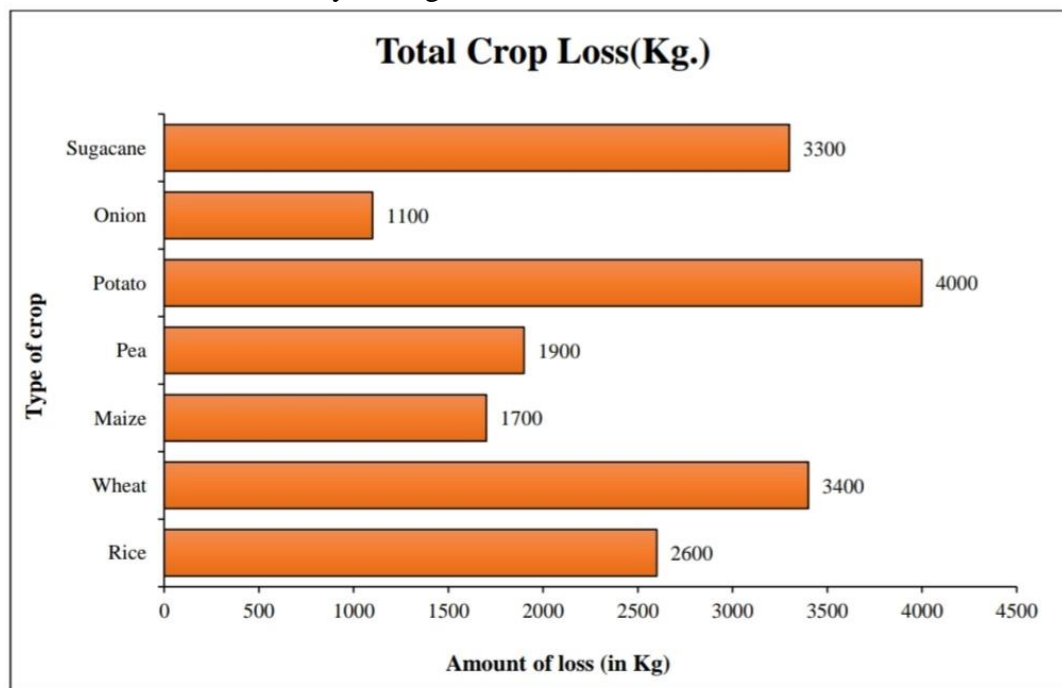
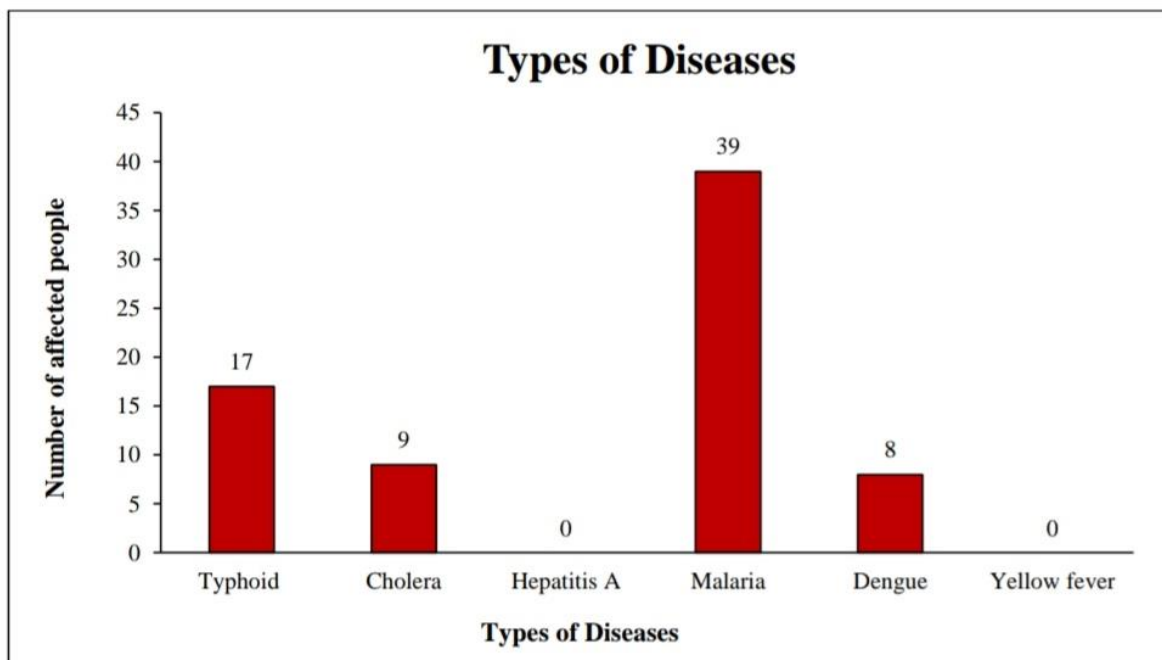


Fig No: - 6 Total crop loss due to flood, Primary Survey, 2020.

The incessant inundations of lands with flood waters have negative impacts on the social, economic and cultural composition of the region. The block area is known for best quality of sugarcane and many other crops like rice, potato, pea, maize, wheat and onion. The fields cultivated by such crops are totally damaged annually due to flood. The data illustrates that last year 3,300 kg of sugarcane crops alone were loosed dur to flood water from the Kalamatinia village. Similarly, 3,400 kg. of wheat, 2,600 kg. of rice, 1,700 of maize, 1,900 kg of pea, 1,100 kg. of onion and 4,000 kg. of potato were lost due to flood. These losses have created a plight situation of food insecurity and acute food shortage in the area during in and post-emergency situations.

2. Impact on Health and Sanitation Facilities

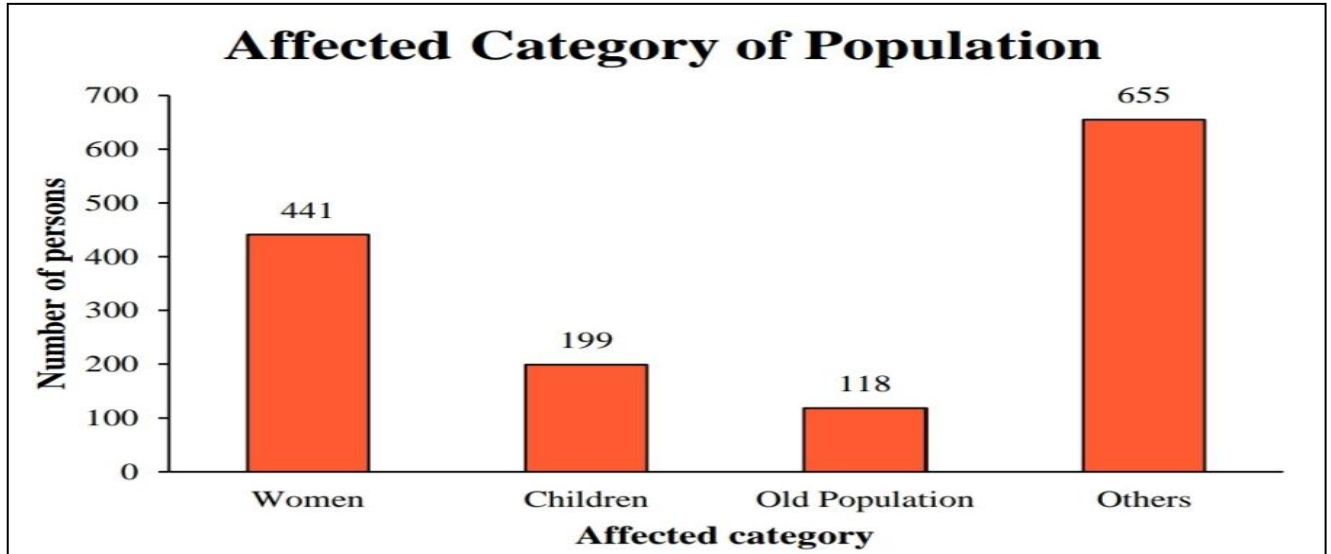
The arrival of flood is the harbinger of not only widespread devastation of economic, social, cultural and educational infrastructures but also is marked with arrival of several diseases like Yellow fever, Malaria, Typhoid, Malaria, hepatitis A, Cholera and Dengue.

**Fig No: - 7 Diseases due to flood, Primary Survey, 2020.**

The above diagram represents that last year 39 people were affected from Malaria, 17 people were affected from Typhoid fever followed by 9 from cholera and 8 from Dengue. In case of Hepatitis A and Yellow Fever due to data shortage and people's unsatisfactory response, it remained unfilled. There is not any hospital in Kalamatinia village and the nearest hospital is the Kuchaikote Community Health Centre.

Fig No: - 8 Affected population category due to flood, Primary Survey, 2020.

Since, Kalamatinia is a backward village thus, Sanitation is a big issue here. Less than 35% people



have access to the latrine and they urinate and litter their waste materials in the open fields. This is already a serious threat to the lives of people even during off-flood season. During flood season, this issue is further got worsened. Due to excessive water discharge, these waste materials start floating on the surface of water and they even reach to the resident areas of the people. From the health and sanitation point of view, the most vulnerable section of the society is the women, children and aged population.

3. Impact on Education

The Kalamatinia villlage has a primary school situated just next to the Ring Bundh of Saran Embankment. Since, this school is situated on the right side just opposite of main stream thus it rarely gets inundated with flood water. But in spite of this, school remains closed for more than three months as it used as a shelter home for the people harshly affected by flood water in the village water. It is the primary school of village indeed which has saved lives of hundreds of people who had taken shelter in its premises during grim flood situation.

Attendance (%)	Number of Students.
0-25	49
25-50	21
50-75	17
75-100	13

Table: -1.2 Impact of flood on school attendance, Primary Source, 2020.



Fig No: -9, Inundation of flood water in school, Dailyasianage.com.

The school is three-storeyed and sometimes, to stop hampering in regular classes of this school, first floor is used to teach these children for two hours per day flood period but the percentage of students attending the class is very less. The months of July, August and September are notorious for the local residents specially among children as it snatches their school from them for than three months.

4. Impact on Migration

The excessive inundation of settlement area due to flood water results in breakdown of essential day to day activities, leads to losses of houses, causes food insecurity & food shortage and thus increases the vulnerability of life and property. This in turn results in the mass movement of local residents and people from the area to safer places. Most of the people tend to go to their relative’s houses, some approach to the shelter homes and schools while others also migrate to the surrounding districts or states either lonely or along with their families. Thus, flood also plays an important role in Intra-State and Inter-State migrations. A data suggests that 38% of the working-class people migrated from the village area to other areas in search of some other jobs as well to overcome the issue of continued problems. Further, 25% of people migrated along with their families to other area, 4% of women and children also migrated to evade the flood impediment while 33% its residents remained unmigrated. Some of the families migrated due to recurring breakdown of the educational and health infrastructures. The migrated population mainly involves the most marginalised class of people who

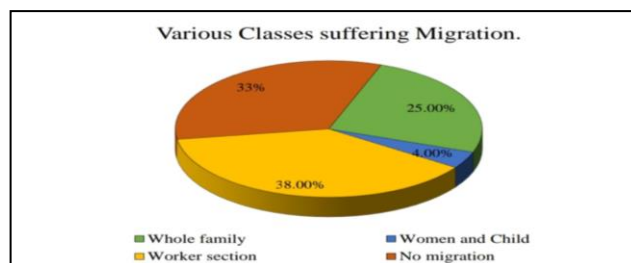


Fig No: - 1.10, Impact of flood on various classes, Primary survey, 2020.

dwell on the outskirts of the settlement areas. These people have either huts or mud houses which is easily washed away by the action of flood water. During flood, people having concrete and pucca houses take shelter on their 8-10ft. high roofs. Thus, they remain safe and hence their proportion in terms of migration is very less as compared to

that of the impoverished class of people.

The flood water leads to severe losses of lives and properties and to a great extent migration the village area is affected by this loss. The above data illustrates that Macrolevel loss in the sample village was 17% while Moderate-Level was 24.50%. The 25.00% 4.00% 38.00% 33% Various Classes suffering Migration. Whole family Women and Child Worker section No migration Minor-Level loss was 11% while the percentage of no loss was 26.50. This loss is the key indicator affecting the movement and migration of people from the village to other areas.

Conclusion

The impact of flood can't be underestimated. Flood is definite incident that will inevitably take place particularly in those areas which are served by perennial streams. When this perennial stream is accompanied by the heavy downpours of monsoons then situation gets more worsened and accentuated. All above mentioned conditions very easily get applied in the study area thus flood is always a grim situation here. The chapter very explicitly illustrates about the efficacy of flood on agriculture, day to day economic activities, health and sanitation facilities, education, migration and environment. Despite several attempts from the government and disaster management authorities the impact of flood has yet not been reduced to needed goal. The flood 17% 21% 24.50% 11% 26.50% 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% Level of loss % of households Level of Losses No loss Minor level loss Moderate level loss Macro level loss Total loss recurrence in the region has banded the local residents as well as the authorised officials to take some serious decisions regarding the flood management in the region. The disaster management authorities should must seek



Fig No: - 1.11, Level of loss due to flood, Primary Survey, 2020.

for a robust causal, contingent and emergent strategies of flood management rather than flood control as flood is a chronic mechanism in the study area.

REFERENCES: -

- Amitabh Tewari and Suruchi tewari ‘Water Resource Management in India: Issues and Options’ 2003.
- Anil Agrawal and Sunita Narain ‘Floods, Flood Plains and Environmental Myths’, Centre for Science and Environment.
- Application of remote sensing in flood management with special reference to monsoon asia: a review , November 2003, Pp-4.

Publishing URL: : <http://www.researchreviewonline.com/issues/volume-7-issue-88-august-2020/RRJ852360>

- A Study done by RBI in 1984 “Agricultural Productivity in Flood Prone Eastern India”.
- B. Merz , assessment of economic flood damage , June 2010, Pp-2,3.
- CH. Bala Ramulu, ‘Water Resource Management: Reforms in Andhra Pradesh’, 2003.
- Joy Sanyal S N Huses, flood, cropping pattern choice and returns in agriculture: A study of Assam Plains, India , August 2014, Pp-2.
- Karunesh Kumar Shukla, Purnima Sharma integrated action plan for improvement of, Pp-34.
- https://shodhganga.inflibnet.ac.in/bitstream/10603/27843/10/10_chapter%201.pdf
- <https://www.cambridge.org/core/journals/meteorologicalapplications/article/flood-study-of-the-himalayan-tributaries-of-the-gangariver/818C042DBDE8C5BCB239F96EB5F19895#>
- [https://en.wikipedia.org/wiki/Kuchaikote_\(community_development_block\)](https://en.wikipedia.org/wiki/Kuchaikote_(community_development_block))
- https://en.wikipedia.org/wiki/Floods_in_Bihar
- <https://www.indiatoday.in/india/story/flood-situation-grim-in-gopalganj-after-nepalreleases-3-5lakh-cusec-water-into-gandak-river-331744-2016-07-27>
- <https://timesofindia.indiatimes.com/topic/Flood-in-Gopalganj>
- <https://www.livehindustan.com/tags/flood-in-gopalganj>
- <https://gopalganj.nic.in/disaster-management/>
- <https://www.livehindustan.com/bihar/gopalganj/story-flood-in-gopalganj-1317342.html>
- <https://www.jagran.com/topics/flood-in-gopalganj>
- http://www.ssvk.org/pdf_doc_files/Rapid%20Assesment%20of%20Gopalganj%20Flood%202010%20undertaken%20by%20Dalit%20Watch%20Bihar.pdf
- <https://www.bhaskar.com/bihar/gopalganj/news/seven-villages-engulfed-by-floods-ingandak-river-people-preparing-for-high-position-074100-5534311.html>