

# Spatial Distribution of Flood Affected Areas & Its' Impact on Agriculture: A Case Study of Murshidabad District, West Bengal, India

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**Abstract:** *The present Study is an attempt to study the Spatial Distribution of Flood Affected Areas and Its' Impact on Agriculture in the District of Murshidabad (India). Flood is an overflow of an expanse of water that submerges land. Flooding may result from the volume of water within a body of water, such as a river or lake, which overflows or breaks levees, with the result that some of the water escapes its usual boundaries. Murshidabad district is affected by frequent flooding, drainage congestion and bank erosion, resulting in extensive submergence of land, loss of life and property, loss of agriculture and dislocation of the communication system. From this study it was found that frequent occurrence of flooding as a resultant of damage agriculture system in the district.*

**Keywords:** Spatial Distribution of Flood Prone Areas, Net Sown Area (NSA), Cropping Intensity.

## 1. Introduction

We live in the earth surface where the people are exposed to the different types of natural hazards and disasters. People have tried to manage them but, could never control it because the nature is created by the God. Flood is the one of the most important natural disaster that has never been controlled by the human beings, however, could try to control or minimize the risk. Generally we consider flood as an overflow or accumulation of an expanse of water that submerges the land. Flood is not a new phenomenon to human kind. Since the ancient time people are facing vagaries of the flood. But the rate of occurrences of flood varies with climatic and geographic conditions. Asia continents are the most flood affected continents in the world due to its high population growth. Flood is the one of the devastating natural hazard in India. India is the second flood vulnerable country in the world after the Bangladesh.

Flood are the common occurrence in the district of Murshidabad, specially in the low lying Bagri or eastern half, which is situated between the Bhagirathi and Ganges. Some low lying pockets, specially the vast *beel* areas of Kandi, Bharatpur, Khargram, Suti, Hariharpara, Nowda, Jalangi, Lalbagh, Nabogram police station of this district are very much vulnerable from flood views points heavy down pours coupled with the sudden discharge of canal water often aggravate the flood situation to a considerable extent. Flood is an important disastrous element which disturbed the socio-economy of the district to a significant extent. Considerable numbers of river and rivulets flow through this region whose beds are already fill up with sediments and thus become derelict. Therefore, they are losing water holding capacity within the river beds. Due to this situation the supply of water which is supposed to flow down through the river beds cannot do so and overflow their banks, causing flood. Apart from the natural factors, there are several socio-economic and administrative factors which are indirectly responsible for flood problems.

In case of spatial distribution the study reveals that 1.41% of that total land of this district is seriously affected by flood. The total flood prone area is 11695 hectores of the district. The spatial variation of flood affected area depicts the fact that 46.90% of the total land of area under Beldanga P.S is seriously affected by this calamity. It is located at the southern part of the district as well as on the left back side of the river Bhagirathi which is included the Jalangi Bhagirathi interfluves sub-region of the district Murshidabad. Therefore, this region is seriously affected by flood due to over flows of the rivers Jalangi and Bhagirathi respectively. Set against this, there is only 3.39% of the total land are affected by flood in area under Raninagar P.S., it is located at the Northern part of the district and included within the Ganga- Bhagirathi basin sub-region.

Further details analysis regarding the spatial distribution of flood prone areas in this district invokes that the larger proportions of flood affected areas range in between 24.98% and 46.90%, located at the southern, south-central, extreme north and eastern most low lying areas of the district. The first sub-region is flooded by the river Bhagirathi, whereas the second sub-region is inundated by the river Ganga and the small area is affected by the flood of the Padma. These areas are included within the sub-regional divisions of the Jalangi- Bhagirathi interfluves, Nabagram plain, Ganga- Bhagirathi basin and Mayurakhi- Dwarka plain sub-region of the district.

Moderate proportions affected areas range in between 10.50% and 24.38% which are mainly confined to the western, central portion and the small patches of areas in northern part of the district. These patches are included within the regional subdivision of Nabagram plain, Ganga- Bhagirathi basin Mayurakshi- Dwarka plain and the Jalangi- Bhagirathi interfluves, sub regions of the district.

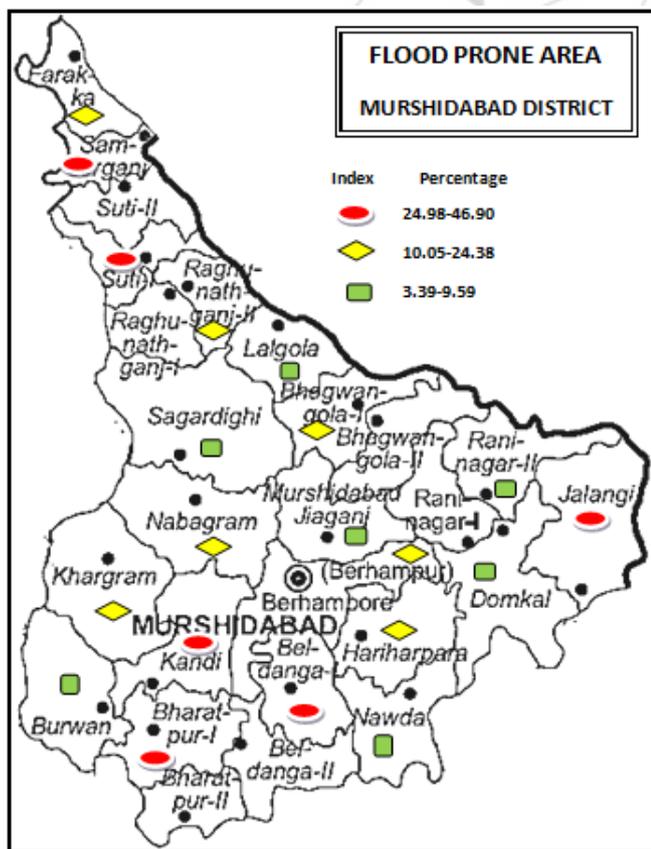
On the other hand, smaller proportions of flood affected area ranging in between 3.39% and 9.59% which are extensively found in the entire eastern, small patches of

area, in the western elevated area and northeastern part of the District. These areas are lying in the Mayurakshi-Dwarka plain, Raninagar plain, Jalangi- Bhagirathi interfluves. Ganga- Bhagirathi basin and Nabagram plain sub-regions of the district due to proper protection against flood as well as due to the favorable terrain condition, flood cannot affect the land property and resources to a significant extent. The above mentioned explanations can be indicated clearly from the flowing table number 1.

**Table 1:** Distribution of Flood Prone Areas of Murshidabad District

Range (in %)	Number of P.S.	Name of Area under P.S.
24.98-46.90	6	Beldanga, Suti, Samserganj, Kandi, Bharatpur, Jalangi
10.05-24.38	7	Nabagram, Farakka, Khargram, Berhampur, Raghunathganj, Hairharpara, Bhagwangola
3.39-9.59	7	Burwan, Domkal, Nawda, Mur-Jiaganj, Raninagar, Lalagola, Sagardighi

**Source:** Absolute data provided to Researchers, A.D.O. Kandi sub-Division agricultural officer (Traun Trivedi).



After studying the spatial extent of flood prone areas in this district, it is utmost necessary to identify the inner relationship between percentage of the flood affected areas and other variable related to agriculture. The study indicated that the same time these areas, where the larger proportion of flood affected areas predominant at the same time these areas possess relatively smaller proportion of net cultivated area. It is due to this fact that after flood, sterile sand covers the fertile cultivated land. Besides due to grooving and scooping of land the terrain becomes adequately undulating. Apart from sands deposition, the

erosion of soil also takes place over extensive parts of the land, which are affected by flood. These lands cannot be considered suitable for cultivation of crops. Therefore, ticked bushes are observed there and the productive cultivated land mass is converted into either cultivable waste land or fallow land. Flood occurs frequently and proper protective and prevention measures are not yet adopted, this land become completely unproductive for a longer period of time, increasing the area of pasture land also.

Due to all these reasons, within flood affected area relatively smaller proportions of the land are considered as Net Shown Area (NSA), as these lands are unsuitable for cultivations. Therefore, the farmers can not practice multiple cropping, at best whatever, land is available for cultivation the farmers prefer to cultivate single crop only. At the same time it is also observed that if the farmers prefer farmers cannot cultivate crops during rainy season due to flood and under drainage conditions.

To sustain their economy they are forced to cultivate that land. Therefore, very small parts of their farms are devoting under the practice of multiple cropping, due to these reasons; the flood affected areas cannot achieve higher order agricultural development. Rather in several occasions researcher have been observed that in this area obsolete and backward technology are in operation and farmers are very poor, who cannot adopt to scientific, modern and innovative ideas of cultivation as well as their economy thrives under the subsistence level. All these aspects can be studied from the following table.

**Table 2:** Co-relationship between percentages of Flood affected area and other agricultural variables

Variable I	Variable- II	R. Value	T. Value	Significant at the level of
Flood	% of NSA to total geographical area	-.12	-.51	Insignificant
Flood	Cropping intensity	-.06	-.25	Insignificant
Flood	Composite Index	-.01	-.42	Insignificant

**Source:** Absolute data provided to Researchers, A.D.O. Kandi sub-Division agricultural officer (Traun Trivedi)

There were sever flood occurred in the district in 1943, 1950,1956,1959,1971 and 1978.

## 2. Causes of Flood

The Mayurakshi system of river is rainfed. After construction of Massangore Dam, the main river Mayurakshi have no flow after monsoon months. This flood situation has been aggravated by wide spread deforestation resulting in soil erosion, particularly in the upper catchment areas of the river system. The soil of this area, in absence of productive cover is easily carried away. Enormous silt load is carried from steeper reaches of the system and deposited in the downstream flatter region. If is the river was allowed free run, then the silt could have formed levees by over spilling its banks. But this natural process has also been stalled by construction of embankments in low spill areas. This has resulted in

deposition of silts on the river bed itself. When the slope is flat and has resulted in further deterioration of these drainage arteries of the area.

The factors influencing the flood in this region can be summarized as under:

1. High precipitation
2. Embankment at High discharges of the river system
3. Limited outfall capacity of the river system resulting in drainage congestion
4. In-sufficient capacity of the Bhagirathi River
5. Rolling high flood level of the Bhagirathi near out fall of the Babla and Uttarsan River.

It may finally conclude that generally, floods are caused by the excessive rainfall in a short duration causing heavy discharge in river. Occurrence of frequent flooding in the district of Murshidabad is directly impact on agriculture system where the agriculture is the main livelihood for the peoples. Therefore, flood control is essential factor for the development of agriculture productivity in the district. So, the present study act as guidance for the government and different agencies for proper planning, management and arranging funding to be provided to affected area peoples.

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