

Research Article

A Geographical Study of Agricultural Loss due to Natural Hazard in the Villages of Raver Tehsil in Jalgaon District, Maharashtra, India

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Abstract Tsunami, Cyclones, floods, landslides, earthquake, volcanos etc natural disaster are experiences unexpected human life loss & economic loss. During the study period it is observed that 2507 farmers are intensively affected by different types of Natural hazards. In the list of farmers affected by different calamities, large numbers of farmers are affected by hail storms and cyclones (1382). During the study period about 12 villages in Raver Tehsil are affected by the flood of Hatnur Dam back water out of them 10 villages are identified by the govt. those are affected by flood hazards during 2011-15. These affected villages are located near the bank of Tapi, Suki, Mor. During the study it is observed that accumulated soil deposits in the Hatnur dam is not excavated. To protect economy of villagers, deposits should be excavated periodically. Northern part of the region is covered by Satpuda mountainous region and more or less all rivers source are originated from the mountain. All tributaries are flowing from mountainous region across steep slope of the land surface is a one of the reason of flood because all tributaries are flowing speedily and spread on outer area of the course.

Keywords *Agriculture; Backwater; Cyclone; Flood; Natural hazards; Raver*

1. Introduction

Tsunami, Cyclones, floods, landslides, earthquake, volcanos etc natural disasters are experiences unexpected human life loss and economic loss. Northern part of the region is covered by Satpuda mountainous region and more or less all rivers source are originated from the mountain. Raver is a north eastern tehsil of Jalgaon district, famous for banana plantation not only in the state but also in the India (Gupta et al., 2015). This tehsil is characterized by piedmont plain. Satpura mountain ranges and ravines and bad lands along the banks of river Tapi.

In the present research work, researcher has classified the effect of natural hazard into floods, effect of Back water of Hatnur Dam, heavy rainfall and other types of natural hazard such as climatic depression, high velocity winds and heavy rain.

Flood not only causes huge economic loss in the form of damage to houses, industries, public utilities, and property but also many human lives and of cattle heads are lost (Sharma, 2012).

2. Research Methodology and Data Collection

For the present study base map of the study region is compiled with the help of tehsil map. Primary maps are obtained from survey of India Topographical Maps. Data regarding economic reviews of farmers collected through questionnaires and personal interview of farmers in affected villages. An attempt has been made to analyze such voluminous data with the help of computer and interpreted by applying suitable statistical and cartographic techniques. Required data for the research work is collected from Government office of the study region (Tehsil and Agricultural office Raver).

3. Discussion

Heavy rainfall is the main cause of inland flooding. Flood in rivers valley region is a disaster which can destroy the total environmental set up of the area. It causes river bank erosion, depression of land, shifting of river course, river channel widening etc. The economy also gets affected due to damage of crops direct or indirect affecting the agriculture sector (Ismail and Mustaqim, 2013). Loss of agricultural production due to the reason of heavy rain, back water and Cyclone.

3.1. Agricultural Loss due to Back Water, Heavy Rain and other Natural Hazard during 2011-2015

Following table (Table 1) is showing loss of agricultural production due to the reason of heavy rain, back water and Cyclone or wind during 2011 to 2015.

Table 1: *Agricultural loss due to back water, heavy Rain and other Natural Hazard during 2011-2015*

Sr. No.	Hazard Type	Total area (ha)	Affected area (ha)	No. of farmers
1.	Back water	753.29(23%)	497.79(66.08%)	778
2.	Heavy rain	571.16 (19%)	296.27(51.87%)	347
3.	Natural Hazard	1823.09(58%)	887.24(48.66%)	1382
Total		3147.54	1681.3	2507

Collected by the Researcher from Tehsil and agricultural office, Raver.

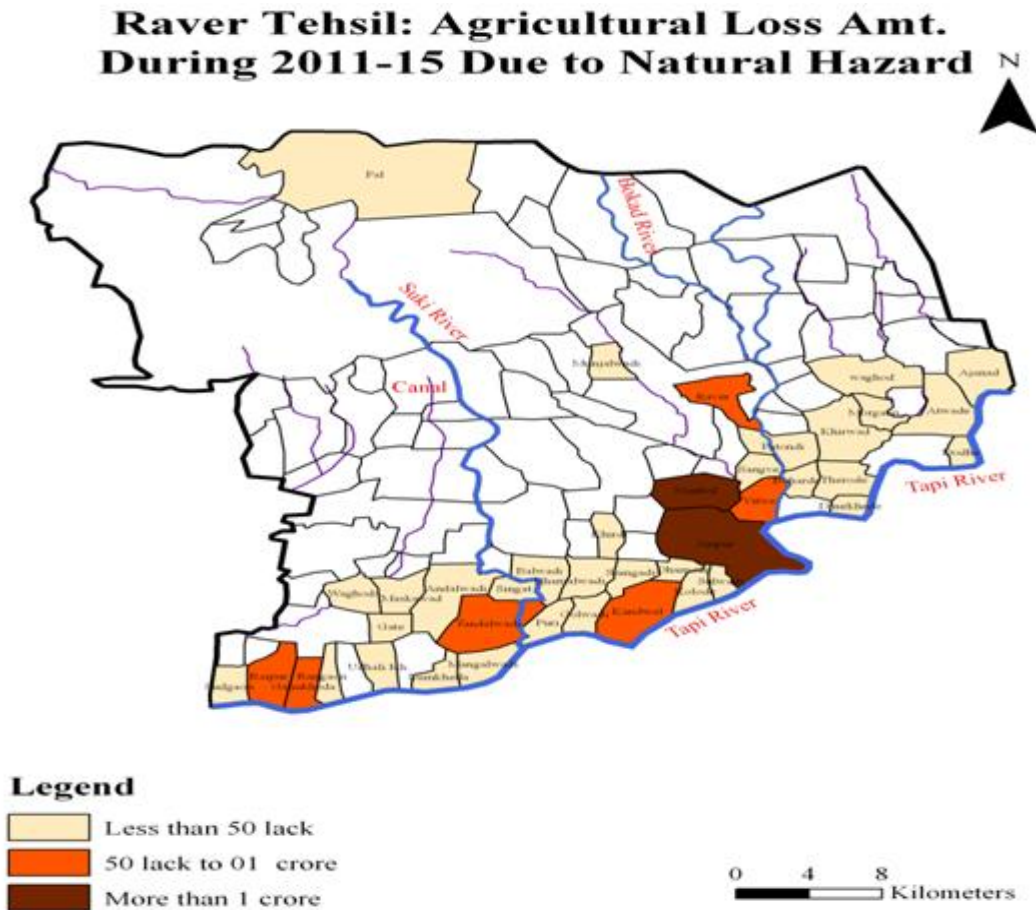
This table is clearly showing total affected area due to different natural hazards claimed by villagers, actual area sanctioned by state government and number of farmers affected by natural hazards. This table clears that out of total geographical area of the Raver tehsil about 1.84 % area is claimed as affected area.

Considering the above categories researcher has collected the data from the government offices. Analysis of such data reveals that during the period 2011 to 2015 area affected by hail storms, high wind velocity and cyclone are ranking hazards.

Raver is pioneer for the banana cultivation (Misrilal & Shri Kailas, 2012). Cotton is second ranking crop in the study region, affected by natural hazards. Farmers of the study region have cultivated 9 crops; out of them 7 crops have occupied significant proportion of culturable land. Yellow gram, wheat, Jawar, Corn vegetable, Soyabin and other minor crops are cultivated.

3.2. Village wise Agricultural Loss Due to Natural Hazard (Heavy rain, Cyclone, back water etc.)

During the study period in Raver tehsil about 36 villages (31.03%) are affected by the natural hazard like rain, cyclone, wind, various diseases on crops and other disaster types. Loss of agricultural crops are affected in area of 922.85 hector with loss of Rs.21.76 crores and 1426 families were affected. Due to the natural hazard highest affected village is Nimbol. The estimated loss of agricultural crops is about Rs.6.32 crore followed by Ainpur village Rs. 5.65 crore crops are loss.



Computed by the Researcher.

Figure 1: Raver Tehsil: Agricultural loss amount during 2011-15 due to natural hazard

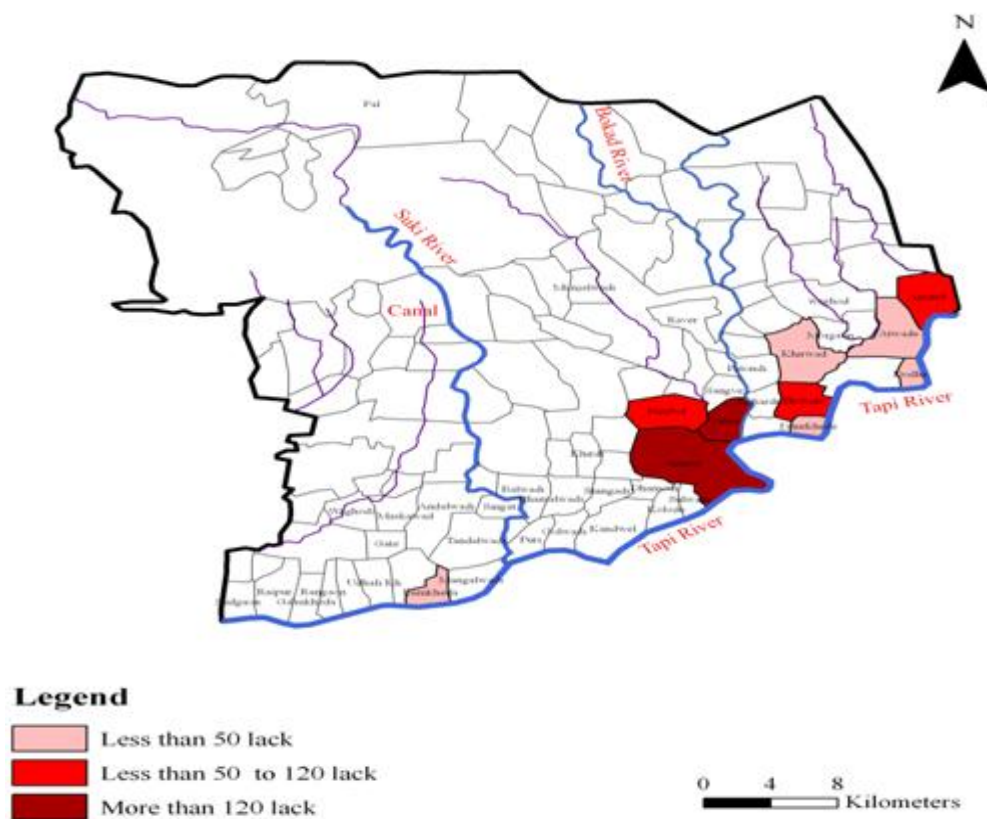
This map is showing location of affected villages and their loss in term of rupees (Figure 1). This map is clearly showing that more or less all villages those are located along Tapi River are affected by Hail storms, High velocity winds & Cyclones. This is the area of intensive Banana cultivation. Therefore huge loss of cash crop is discernible. This map clearly showing categories of cash crops in rupees ranging between 50 lakh and more than 1 crore rupees. Highest loss of banana crop with more than 1 crore rupees is found in two villages namely Ainpur and Nimbol. Ainpur and Nimbol are the big villages located near the bank of Tapi River. There are six villages having loss between 1 crore to fifty lacks namely Raipur, Gahukheda, Rangaon, Tandalwadi, Vitve Kandwel & Raver. Out of them four villages are located near the bank of Tapi. Villages having loss of 50 lack rupees are found in the southern belt of Rver tehsil. It is clear that southern part of Raver tehsil is victimized either by hail storms or strong wind destroying rich banana crop. Farmers should overcome these natural problems by changing crop rotation.

3.3. Village wise Agricultural Loss due to Back Water of Hatnur Dam

In the study region about 12 villages are affected by the floods of Hatnur Dam back water during 2011-15. It is observed that about 590 farmers are affected having estimated loss of Rs.9.27 crore of banana production.

Ainpur is mostly affected village by the back water of Hatnur Dam. During 2013-15 loss of crops of about Rs.4.25 crore rupees is found due to backwater (45% loss) Flood affected farmers have been identified by government of Maharashtra. According to state government about 149 farmers are affected in Ainpur village. Vitve village is also mostly affected village in Raver tehsil of Hatnur dam back water. In this village about 61.8 hector of land is affected, estimated loss of Rs.1.51 crore rupees during 2013.

**Raver Tehsil: Agricultural Loss Amt.
During 2011-15 Due to Back Water of Hatnur Dam**



Computed by the Researcher.

Figure 2: Raver Tehsil: Agricultural loss amount during 2011-15 due to back water of Hatnur Dam

Nimbol village is ranked 3rd ranking village, its loss of agriculture during the survey of 2011-2015 is about Rs. 1.18 crore. Back water is affected to Nimbol village during 2013. In this village number of affected farmers are 96.

Therole and Ajnad village is highly affected village and loss of estimated agricultural production is Rs.98 lakh and 55 lakh respectively. The role village 50 hector area is affected and 115 farmers are affected in 2015.

It is concluded that Ainpur is frequently affected village by the back water of Hatnur Dam. The geographical and physical location of the Ainpur is responsible to this loss.

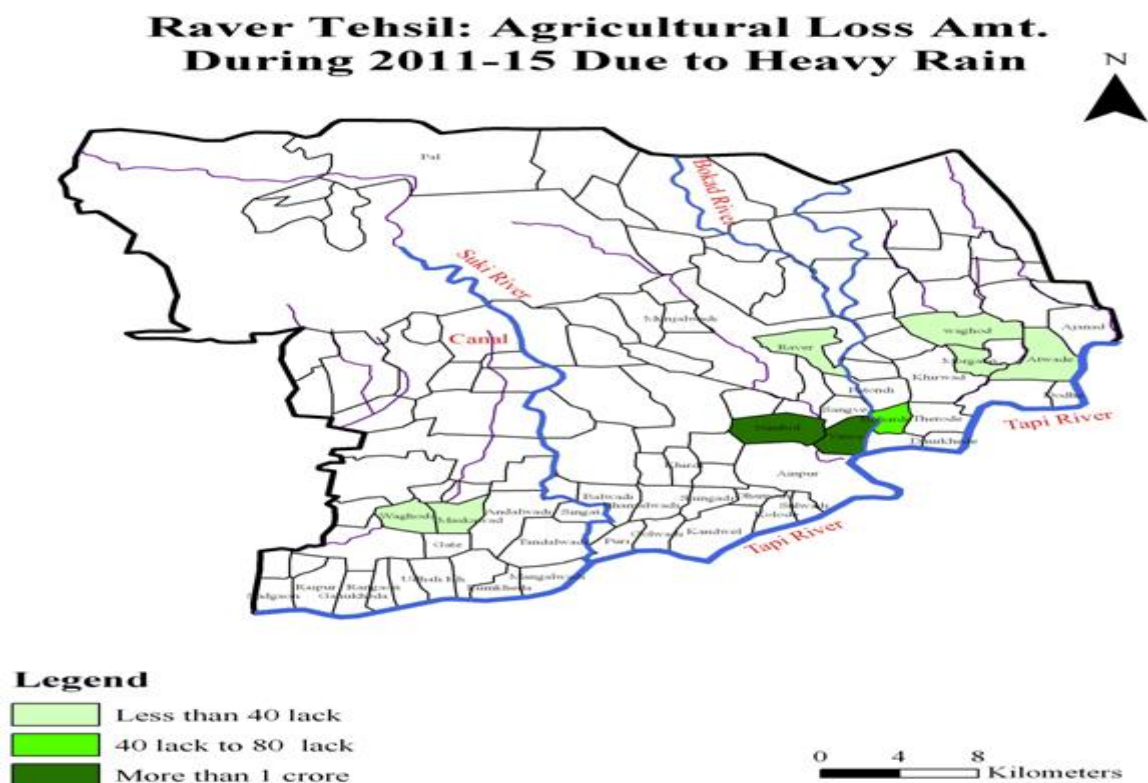
It is also concluded that Ainpur, Vitve and Nimbol village is affected due to the back water of Hatnur Dam having about 7 crores rupees agricultural crops loss. Figure 2 is displaying location of affected villages due to back water of Hatnur dam.

Hatnur dam is constructed on Tapi River (Chavan and Nile, 2012). It is in south west corner of the tehsil in village Mangalwadi. Near the bank of Tapi 15 villages are located towards the upper course of river tapi these villages affected by back water of Hatnur dam. Large area of these villages is occupied by influence of Hatnur Dam. When excess rainfall is burst near the source of river Tapi in Madhya Pradesh, areas of back water is increase and enter in the Banana fields.

Figure 2 is showing villages affected by increasing level of back water of Hatnur dam. There are 10 villages those are extensively affected by increasing back water of hatnur dam. Out of them Ainpur & Vitve displaying intensive loss of agricultural land and banana fields in these two villages there is a loss of more than 120 lack rupees.

Nimbol, Therole and Ajanad displaying loss of agricultural production about 50 to 120 lack rupees while five villages have loss less than 50 lack rupees. Map 2 is displaying location of affected villages due to back water of hatnur dam.

3.4. Village wise Agricultural Loss due to Flood/Heavy Rain



Computed by the Researcher.

Figure 3: Raver Tehsil: Agricultural loss amount during 2011-15 due to back water of heavy rain

Excess rainfall in short period is also harmful to the regional economy in the study region about northern 40% area is occupied by Satpuda upland rivers originated from this region are flowing across the study region and fed to river Tapi. Upper course of the rivers is elevated when these rivers reach on the piedmont plain, flowing velocity is more. Excess rainfall in a short duration accelerates the rate of flowing water and hence spread in outer area of the river creates flood hazards.

During the 2011-15 there are 10 villages identified by the govt. These are affected by flood hazards.

During study period agricultural loss is estimated as Rs.3,41,63,755 due to floods. State government has surveyed 10 villages those have 718.06 ha of land affected by floods of river Suki, Mor, Bokad & Tapi.

This table is showing area affected by floods, relief sanctioned by State government and number of farmers. This table clears that largest area affected by flood is found in Vitve, Nimbol, Beharde & Sangve villages. Considering agricultural loss of 491 farmers, govt. has sanctioned Rs.3,41,63,755. Location of villages affected by flood hazards clears the fact that influence zone of back water of Hatnur Dam is found up to 10 to 12 km. distance from river Tapi. To control the agricultural loss of the villages' govt. should take the action to control the back water (Figure 3). Considering the above scenario of flood affected villages highest flood affected village is Nimbol. Heavy rain in 2012 & 2014 about Rs. 1.5 crore agricultural expected crops are loss on 148 hector land. Total area of cultivated land is 252 hector of 239 farmers of Nimbol village. Vitve village is flood affected village during the study period this village is affected in 2011, 2012 & 2014. Last three year 87 farmers are affected in 240.35 hector cultivated land. Actually affected area is 164.2 hector i.e. 68% cultivated area is affected. In 2015 Beharde village is also identified as flood affected village. This year 65 farmers are beneficiar of crops due to flood by GOM. In Beharde 59.15 hector land is cultivated out of them 30.51 hector (about 50%) land is flood affected about 73.66% lacs expected agricultural production is loss in this village.

4. Conclusion

From this study, we have concluded that:

- It is observed that the loss of agricultural crops is due to the back water of Hatnur dam. Moreover the relief, slope & soil in the study area are responsible to the flood severity.
- The outcome of the work suggest that Govt. should frame work the sustainable plan for channelizing the random flow of backwater, so it will be useful for the irrigation practices in neighborhood villages or tehsils.
- Need to organize the awareness programme in the villages to dig out the soil from the Dam and also the importance of soil benefits to the farmers.
- Government should construct channel along the foot of Satpuda, east west direction for the control of water flowing from the mountainous region.
- Govt. should constitute the committee for this purpose with the members from geographers, geologist, civil engineers or architect, social worker, environment experts etc. to look after the environmental and climatic situation of the study region.
- Specifically government should prepare the plan for natural disaster affected villages because these villages are affected every year.
- It is urging to agricultural officers to suggest crops those can subsist in flood areas.

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