

Impact of Flood on Prayag Chikhali Village of Karveer Tehsil in Maharashtra (India): A Comparative Analysis (2005-2006)

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Abstract

During the last two years (2005-2006) floods caused by heavy monsoon rains have swamped large parts of western and central India, including the states of Andhra Pradesh, Gujarat, Maharashtra, Chhatisgarh and Orissa, of these first three have been the worst affected. As many as 31 districts in Maharashtra were affected by flood, which included 7, 375 villages and nearly one lakh families. Besides that 468 people were died. The districts viz; Sangli, Kolhapur, Satara, Pune and Nashik in the western part of Maharashtra have been severely affected by flood due to the heavy rainfall during the monsoon. In Kolhapur, particularly Karveer, Shiroal and Hathkangale tehsils were severely affected by flood that included 711 villages. The focus of present study is to look into the severely affected village Prayag Chikhali and to compare the severity of floods occurred in the consecutive years of 2005 and 2006. The present study also intends to plan for controlling the floods and to minimize the flood affect in the area under study.

Key words: Heavy rainfall, river flood, magnitude, frequency, flood impact

1. Introduction

According to the world health organization (WHO) “Any occurrence that causes damage, economic destruction, loss of human life and deterioration in health and services on a scale sufficient to warrant an extra-ordinary response from outside the affected community or area is called disaster.” Disasters are either natural, such as floods, drought, cyclones and earth quakes or human made such as riots, conflicts, refugee situations and other like fire epidemics, industrial accidents and environmental fallouts, but globally natural disasters account for nearly 80 per cent of all disaster affected people. Floods account for about half the destruction wrought by natural hazards every year the world over. The continent of Asia is particularly vulnerable to disaster strikes. Between the years 1991 to 2000 Asia has accounted for 83 per cent of the population affected by disaster globally. Floods and high winds account for 60 percent of all disasters in India. About 54 per cent of the Indian sub-continent landmass is vulnerable to earthquakes while about 4 crore ha is vulnerable to periodic floods (Parsuraman and Unnikrishnan, 2000).

“The soil of flood plains is often fertile and the level ground is easily tilled. The river furnishes water and provides an easily traveled highway on which the farm products can be carried to market. The two important characteristics, viz; fertile soil and accessibility, have made flood plains so desirable that they are nearly everywhere densely populated (Fletcher and Wolf, 1965).”

Now a days encroachment on flood plain increases, many structural features constructed on flood plain. But during the flood period due to the increased volume and velocity of river water these structural features were destroyed, which leads to great flood damage. The records of the past floods indicate that the peak discharge of the highest floods in India ranging from $1170 \text{ m}^3 \text{ s}^{-1}$ for a 133 km^2 area to $72\,900 \text{ m}^3 \text{ s}^{-1}$ for a $935\,000 \text{ km}^2$ area. From 1953 to 2007 near about 300 severe floods were recorded in the history of India; of these three were very disastrous; First disastrous flood occurred on 6th September 1970, on the Narmada river (Rakhecha, 2000). Second occurred on 11th August, 1979, on the Muccha river, which totally destroyed the Muccha-2 dam in the state of Gujarat, leads to more than 1500 deaths. The third and most noticeable flood was occurred in 2005 (July-August) due to continuous seven week rainfall; the western state of Maharashtra including the state capital Mumbai was flooded severely. The disaster claimed approximately 1200 lives and affected 20 million people (<http://international flood network.org>).

Therefore, the present study focuses over the severely affected village Prayag Chikhali and to compare the severity of floods occurred in the consecutive years of 2005 and 2006. In this context, the present study attempts to asses the flood affect on agricultural land, houses, household property, human beings, transportation, basic services (like telephone, mobile phones, electricity, etc.), In view of this, it also needs an appropriate planning to control floods or at least minimizes the flood

stages. The present study also intends to plan for controlling the floods and to minimize the flood affect in the area under study.

2. Study Area

The present study is restricted to Prayag Chikhali village. It is located in northern part of Karveer tehsil and Karveer tehsil is situated in the northern part of Kolhapur district of Maharashtra. It lies between $16^{\circ} 42' 50''$ north to $16^{\circ} 43' 55''$ north latitude and $74^{\circ} 10' 52''$ east to $74^{\circ} 11' 57''$ east longitude. It is located in the Panchaganga basin. The study area is a part of Krishna basin which is a second largest river of south India and it is drained by Panchaganga river. The north-east flowing Bhogavati, Tulsi, Kumbhi rivers and eastward flowing Kasari river originated at elevation of about **900 m** MSL and flow down to **550 m** MSL till all these tributaries with Saraswati an underground drainage meet at Prayag **12 km** to the north of the Kolhapur city, from that place it is known as Panchaganga river. The Prayag Chikhali village is exactly located on flood plain of the Panchaganga river and was severely affected by the flood. So, this village is undertaken for proper comprehension of flood damage in Karveer taluka. Therefore, the Prayag Chikhali village was selected for the present investigation.

3. Objectives

- To find out the causes, magnitude and frequency of floods in the study area.
- To evaluate the impact of floods on the life and property of the people.
- To compare the severity of floods occurred in 2005 and 2006.

4. Database

The present study is based on primary and secondary sources of data. Primary data was collected by conducting the intensive fieldwork with the help of preplanned and pretested household schedules and for that stratified sampling technique was employed to have better results of study. A comparative analysis is made to comprehend the impact of floods occurred in July-August 2005 and 2006. The secondary data is collected from District census handbook, Statistical abstract, Collector offices, Grampanchayat offices, Tehsil offices, Panchayat samiti, Zillha parishad, Daily news papers, Internet, etc.

5. Methodology

On the basis of data and information obtained from collector office and Grampanchayat highly affected houses and agricultural lands were selected for our investigation. Primary data was mainly collected by asking the questions from the head or other members of affected family. Pie Chart, Bar Graph and Multiple Bar Graphs are constructed for better analysis. Flood affect has been assessed by computing the loss of agriculture land, standing crops and any loss to human beings here in this village. Not only this, the loss of household assets is computed to understand the overall impact of flood on people of Prayag Chikhali village. It also involves the observation of river channel, its width, edges of river (whether rocky or muddy), existing flood plain (whether it is covered by agriculture or urban structures). The planning for the flood control in Prayag Chikhali was done with the help of Toposheet (survey of India), Satellite image and map of Karveer Tehsil from the census data.

6. Impact Analysis

Due to the drastic climatic change, the annual maximum peak discharges are expected to increase by 3-19 % in 2050 (<http://www.nat-hazards-earth-syst-sci-net>). On the other hand, unplanned urbanization on flood plain has been increasing very rapidly. Due to the high peak discharge during the heavy rainfall period such structures are mostly destroyed, that causes irreparable loss to economy.

The floods which occurred in various parts of the state of Maharashtra in 2005 and 2006 caused a major loss to the economy particularly to the agriculture sector. The standing crops, land and personal loss to the farming community has taken place. As many as one thousand villages were severely affected and the loss amounted to Rs. 5400 crores (www.tdma.nic.in). The government of Maharashtra reported that more than 20000 classrooms were damaged by flood in 2005, 97 school buildings were collapsed. Near about 437 primary health centers, rural hospitals, and residential premises for health personnel were damaged by flooding. For the repairing of roads and bridge damaged by flooding the government has spent Rs. 1200 crores. Electricity board was also suffered from huge losses, about 5667 of its transformers were affected, 12 high-tension towers fell and 14 small distribution stations were flooded (<http://mdmu.maharashtra.gov.in>). In 2006, near about 331796 families were affected by floods in Maharashtra, which involved 1138775 persons. The death toll due to that flood in Maharashtra was 480. In case of Kolhapur district 12 tehsils, 638 villages and 4 cities were affected by flood (www.karmayoga.com/floods).

The above mentioned statistics of flood damage reveals that Kolhapur district is one of the most vulnerable districts in Maharashtra. Therefore, in order to find out the severity of flood, the present investigation involves the analysis of flood damage in Prayag Chikhali village of Kolhapur district.

6.1. Impact of Flood on Houses

For the comprehension of impact of the flood on houses, they are categorized into following groups- Partly Collapsed Houses and Totally Collapsed Houses. The house collapse is a common phenomenon during heavy rainfall and floods. A large numbers of houses were collapsed during the flood in the study area, when only a wall of house or a portion of house equal to the 25 to 50 per cent is collapsed then this house is called as partly collapsed house. After some necessary repairing, these houses can be used for the residence purpose. When more than two walls and the roof of the house are completely collapsed then it is considered as totally collapsed house. Since the totally collapsed house cannot be repaired and it has to be reconstructed, in such situations, it becomes difficult for the poor house owner to reconstruct. Moreover, after the flood, hardly anything is left to continue their stay. Drinking water, food grains, necessary clothes, utensils, fuel for cooking, etc. are not available. This was what actually happened in Prayag Chikhali village. Such a situation entails them to shift to the safer places.

In 2005, near about 18458 (worth Rs 1155 lakh) houses in Kolhapur district were partly collapsed, and 412 (worth Rs 115 lakh) houses were totally collapsed (<http://mdmu.maharashtra.gov.in>). The comparative study of floods occurred in 2005 and 2006 revealed that the flood situation was very vigorous in 2005. The severity of floods depends upon two things –first is the duration of floods and another is height of floods. In 2005, duration of flood in Prayag Chikhali village was eight to ten days and the height of the floods reached 47 feet. In 2006, the duration of flood in village was four to five days and height of flood reached 43 feet, which was slightly lower than what it was in 2005. Therefore, proportion of collapsed houses, agricultural crop loss, household assets loss, etc. was much higher in 2005 than in 2006. The house loss was tremendous in 2005 than in 2006, near about 66.96 per cent houses were partly and 47.66 per cent were totally collapsed in 2005. The caste-wise study of house loss indicates very explicitly that, the chambhars (16.66 per cent) and the Mahars (28 per cent) are very much affected by floods as compared to other castes.

The nature, type and material used for the construction of house and morphology of village are main causes behind the house collapse. The above mentioned severely affected castes groups were having the katcha houses located on the peripheral areas of the village. The Peripheral area of the village was very adjacent to the river channel. In 2006, the house loss was reduced by 50 per cent. Near about 27.05 per cent houses were partly and 15.23 per cent were totally collapsed. The houses of scheduled castes were desperately affected by floods.

6.2. Impact of Flood on Agriculture

In 2005 the **11 lakh ha** agricultural land of Maharashtra was fiercely affected by the flood. On 21st August 2006, the agricultural loss was comparatively less (**8.5 lakh ha**) but in absolute term it was quite high. It may be noted that the loss of agricultural land in 2006 was comparatively less than what it was in 2005. The continuous loss in two years is in fact such a loss that does not allow a family to come back easily to the original condition unless helped by some agencies or government. The Kolhapur district was having 3, 61,826 ha cultivated land; out of that 37 lakh ha (10.22 %) agricultural land was rigorously affected. The estimated loss of agriculture was about Rs. 140 crores due to flood (Pudhari: Daily News Paper, 2006). It is necessary that the financial assistance from the government should be made available and should reach the needy people for restoration of land fertility. It is therefore inferred that unless the government extends some financial assistance to the poor farmers the fertility of agricultural land is difficult to get restored or regained for its utility. So, the affected families should be made strong enough to earn their livelihood from their own land.

The agriculture loss was almost 100 per cent in 2005 and it was 61.89 per cent in 2006. The flood level at Shivaji Bridge (Kolhapur District, Maharashtra) was 47 feet in 2005, which entered with force into the sugar cane crop fields consequently the large quantity of this crop was destroyed. It is found that, agricultural loss that has incurred was much higher to the Maratha caste (94.09 per cent) than other castes (2005), since the people of this caste having large agricultural land holdings that are located on the flood plain of the Panchaganga river. The agricultural loss of this sort was comparatively less in 2006, due to low flood level and its short duration. It was 40 per cent in 2006 as compared to 2005 flood. The sugar cane crop was badly damaged due to the flood, which was dried and used as fuel for cooking purpose by the farmers of this village. The degradation and salinization are also other outcomes of floods. The poor farmers are unable to reclaim their lands. Therefore, assistance in terms of compensation from government for agricultural loss should be at least equal to land recreation cost.

6.3. Impact of Flood on Household Assets

Generally the household assets include furniture, utensils, food, clothes, electronic goods, vehicles, etc. The household assets loss was higher in 2005 as compared to 2006 due to the above mentioned reasons. In 2005, due to high flood level, flood water was spread over the village. Flood water entered into each house of village under study. In this year loss of the household assets was higher in case of the Marathas (60 per cent), because they were having large number of electronic goods and such goods get easily damaged due to humidity during the flood. In 2006, due to the low flood level, flood water

entered into houses, which were close to river channel. Therefore, about 83 per cent Mahars and 17 per cent Chambhars were severely affected by floods, as their houses were situated on low rental area of flood plain.

7. Conclusion

From the ancient period many human beings choose the riverine locations for the settlements. Because, such a location has fertile soil, which is the fascinating factor for human beings to settle on such flood plains. Near about a half billion people on earth reside on river side and coastal flood plains which produce 1/3rd of world's food production. Such areas suffer from floods and put life and property of the people on stake. The processes of urbanization have increased due to the industrialization and modernization especially within flood plain areas where the risk of floods is generally high. The floods that occurred in Prayag Chikhali village in 2005 and 2006 were due to heavy rainfall and unplanned structural development on flood plain.

The poor farmers are unable to reclaim their land. Simultaneously, the agricultural productivity decreases and this creates onerous impact on agrarian economy. Therefore, it is more important that, the assistance from the government for the agricultural land is at least equal to the land recreation cost in order to reclaim the soil and maintain the productivity of the flood affected land. The study area is having both kutchha and pucca houses. The people who were economically and socially backward are having kutchha houses and their houses are located on peripheral areas of low rent on the riverside of the villages, which is risky during monsoon season. As a result they were worst affected by flood that occurred in 2005 and 2006. So in order to minimize the damage and loss of the people, government has allotted the land at the safer location to the affected families. But in reality people are not ready to shift to the allotted safer places, as they have very intrinsic affinity to their original settlement. Therefore, their mind is not ready to shift permanently to the allotted places. The flood has caused the loss of furniture, utensils, food, clothes, electronic goods, vehicles, etc. This loss is categorized into direct and indirect loss. The floods have caused huge loss, the household assets, clothes; all were washed away with flood. There was heavy casualty of big animals like cows, buffalos, bullocks, etc. and small animals like sheep, goat, calves, pigs, etc. Large number of milching animals (i.e. cows, buffalos) and the birds like hen were mercilessly affected by the flood. The veterinary doctors were deployed in the affected villages in order to carry out the primary treatment and vaccination of animals.

Sometime, the after-effects of the floods are very onerous than floods; when we consider the loss of human beings. The improper disposal of waste material like animals' carcass and garbage, contamination of drinking water, lack of sanitation, and spoiled food stuffs are the conditions in which infectious diseases get flourished. The non-governmental agencies like the Red Cross Society, Red Crescent Societies and many Social and Political organizations provided the heartfelt help to the affected people. It includes both food and non-food items. The massive rescue and evacuation operations were mounted by the state government. The government deployed army, navy and air force for the rescue and relief operations. Despite rescue operations the loss caused by floods was huge and irreparable. Proper solution for the flood control should be done and timely assistance be extended to minimize the loss of life and property.

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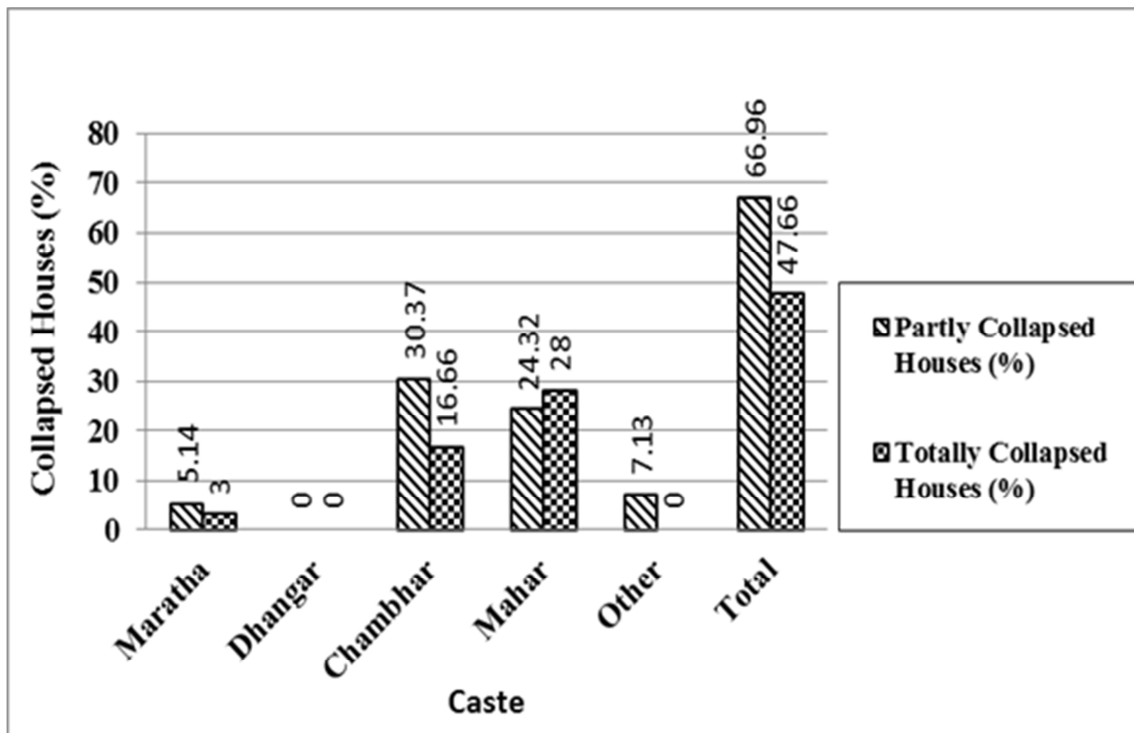


Figure 1. Prayag-Chikhali village: Impact of flood on houses of different caste groups, 2005 (Source: Based on fieldwork, 2005)

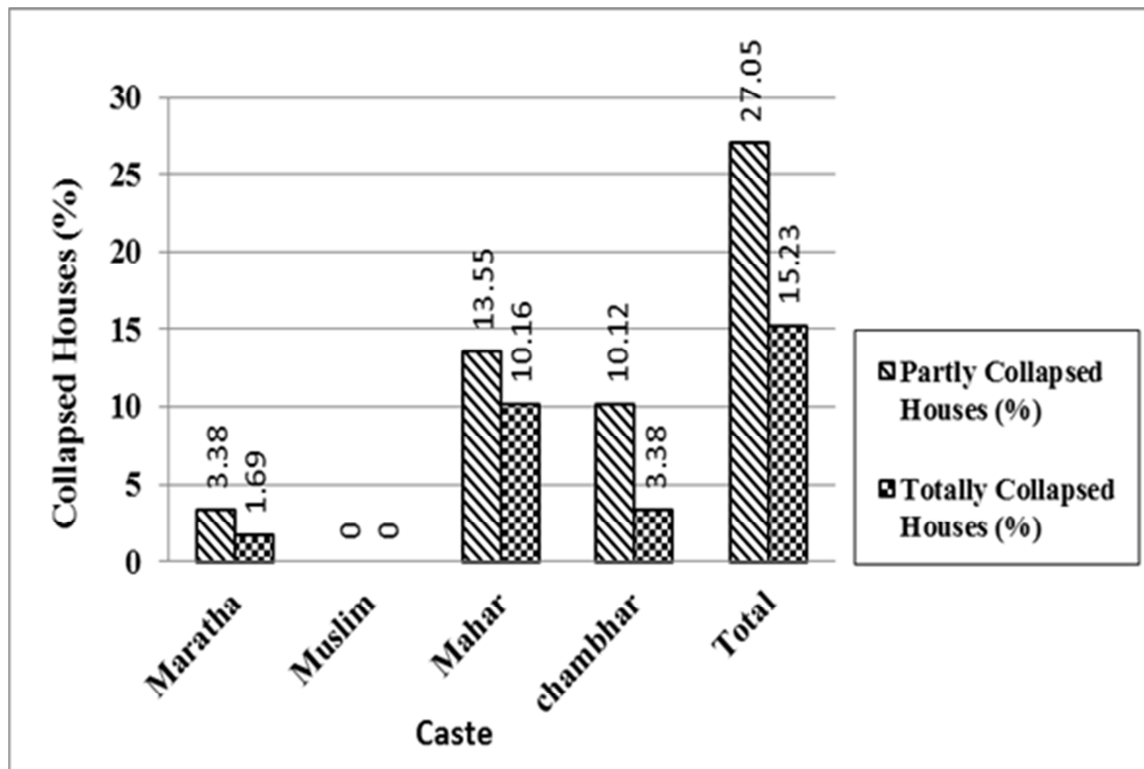


Figure 2. Prayag-Chikhali village: Impact of flood on houses of different caste groups, 2006 (Source: Based on fieldwork, 2006)

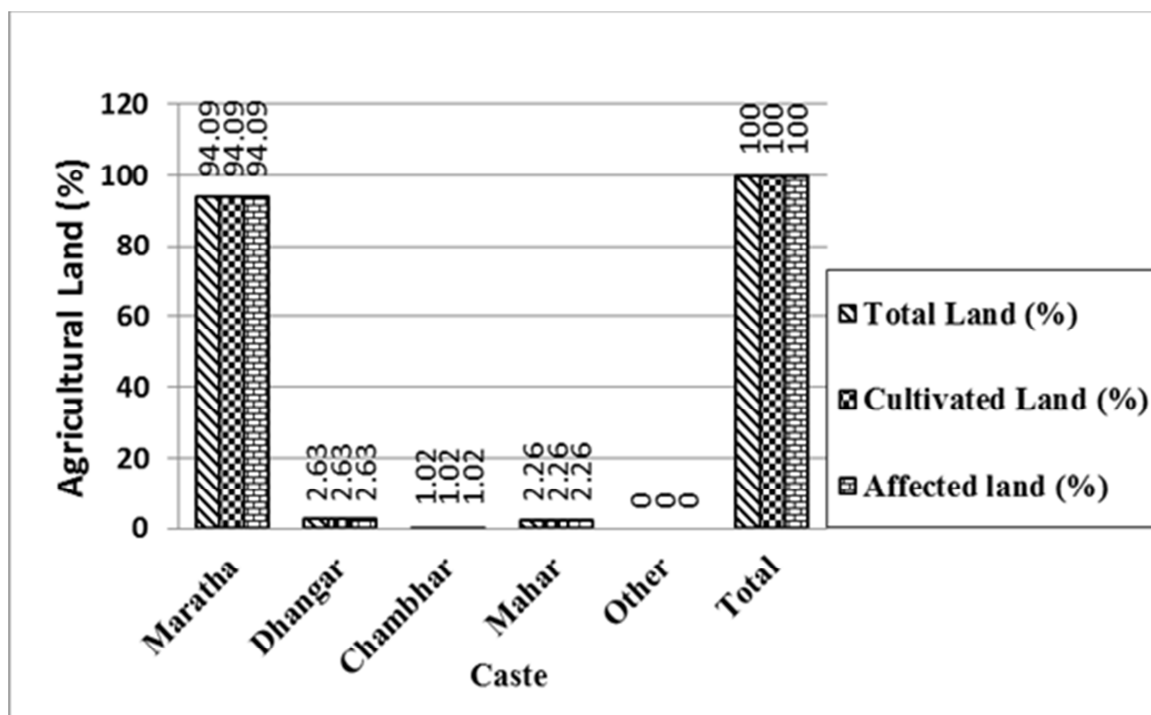


Figure 3. Prayag-Chikhali village: Impact of flood on agricultural land of different caste groups, 2005 (Source: Based on fieldwork, 2005)

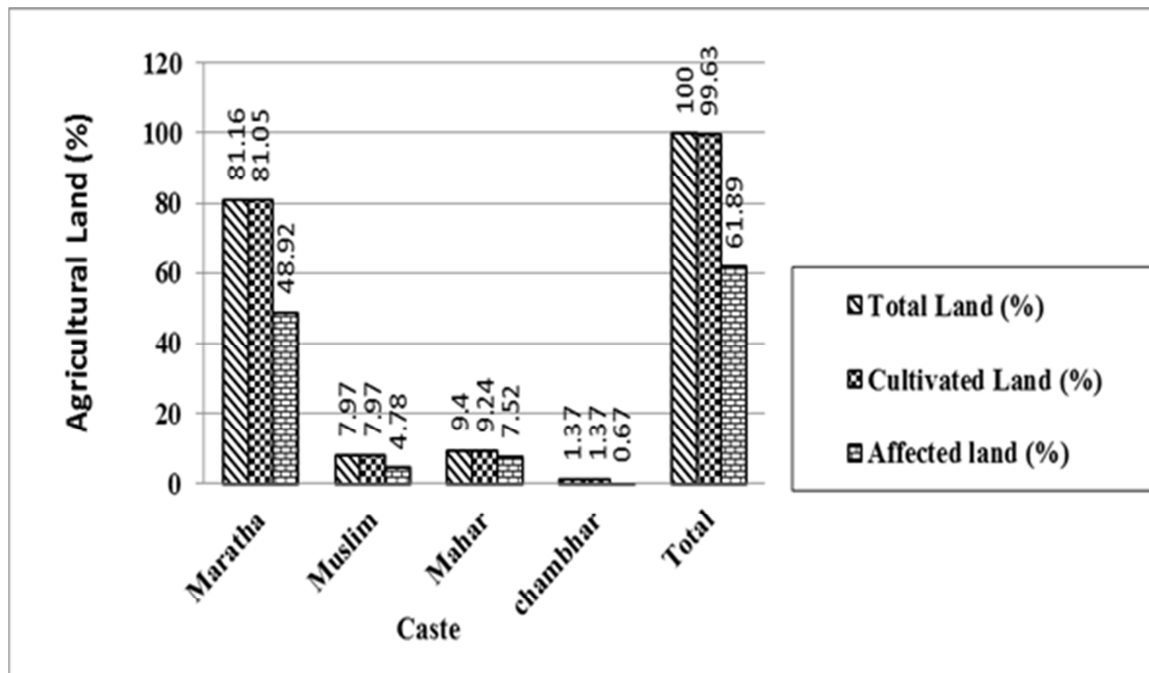


Figure 4. Prayag-Chikhali village: Impact of flood on agricultural land of different caste groups, 2006 (Source: Based on fieldwork, 2006).

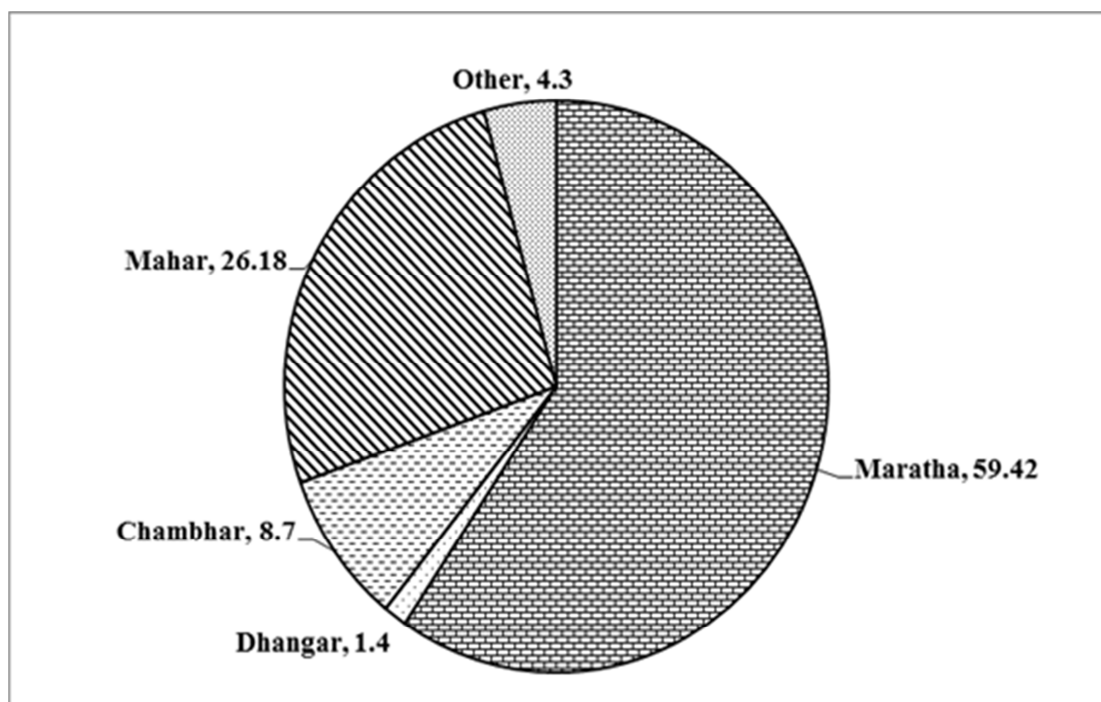


Figure 5. Prayag-Chikhali village: Impact of flood on household assets of different caste groups (%), 2005 (Source: Based on fieldwork, 2005).

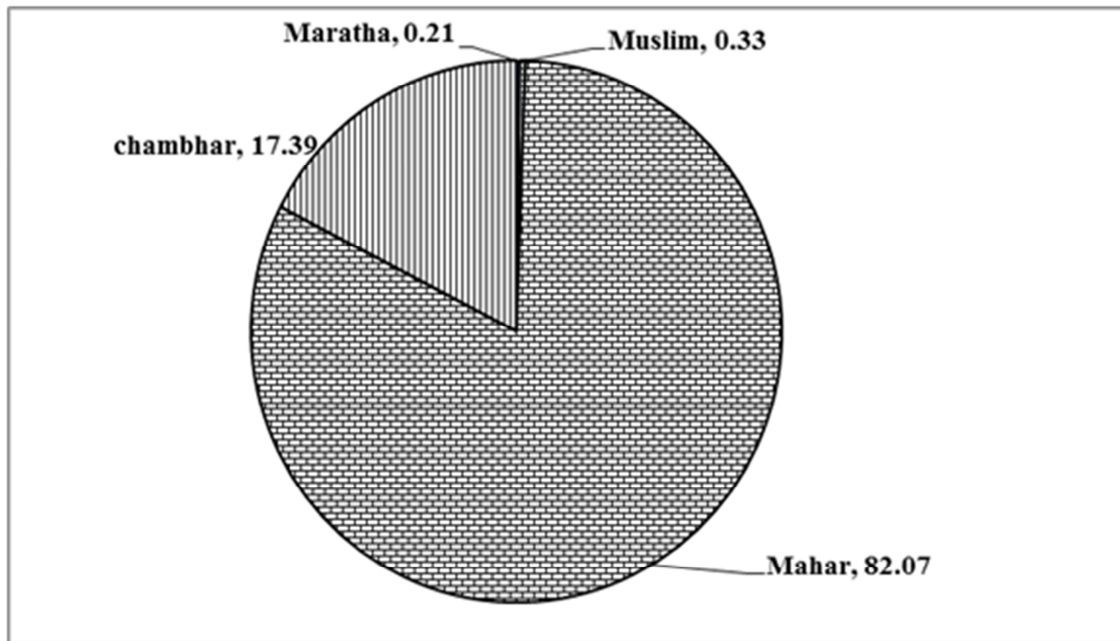


Figure 6. Prayag-Chikhali village: Impact of flood on household assets of different caste groups (%), 2006 (Source: Based on fieldwork, 2006).

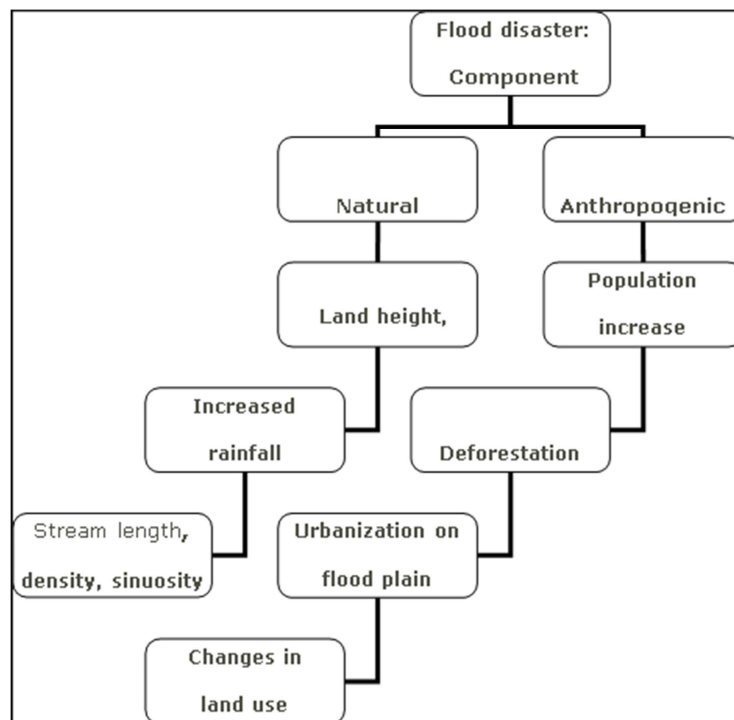


Figure 7. Important components of flood disaster based on the field observations.

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