CHAPTER IV

HISTORY OF FLOOD AFFECTED SETTLEMENTS
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4.1 INTRODUCTION:

Floods are high stream flow that overflows the natural banks of the rivers and most of the times become dangerous. India is the most affected nation of flood after Bangladesh. Out of total deaths by Floods in the world, (1/5) are from India.

Many regions in India have faced the natural calamities of various types. In the 35 states and 07 union territories in the country, 22 are disaster-prone. Floods are a regular feature of Eastern India where the Himalayan Rivers take large parts of its catchment areas, uprooting houses, disrupting livelihoods and damaging infrastructure. The flood hazard is compounded by the various problems like sediment deposition, drainage congestion and synchronization of river floods with storm surges in the coastal plains. Major flooding risers in India are Brahmaputra, Ganga, Narmada and Tapi, Mahanadi, Krishna and Kaveri.

The root causes of floods are excessive rains in river catchments, poor natural drainage, change of river course, landslide restricting river flow, cyclone and very intense rainfall. Another region the rise in population is forcing large settlements along the river banks, making the country highly vulnerable to Floods. The prime vulnerable states of India are Uttar Pradesh, Bihar, Assam, West Bengal, Gujarat, Orissa, Andhra Pradesh, Madhya Pradesh, Maharashtra, Punjab and Jammu and Kashmir. 62% damages are caused due to flood in the states like Bihar and Andhra Pradesh.

In the 1994, flood 147 people killed in Kerala, 138 people killed in Gujarat and marooned 10000 in Madhya Pradesh. The states of Uttar Pradesh, Haryana and Arunachal Pradesh were severely hit by flood causing huge casualties in 1995. In the year 1996, flood literally paralyzed India, in short, nearly every year one or the other part of the country is severely damaged by Floods and creating a very bad history for India. It is in time that the policies and measures for various preventions and disaster management activities are properly implemented.

In Maharashtra various disasters such as drought, floods, while low rainfall areas of the state are under the constant risk of droughts, high rainfall zones of eastern and western Maharashtra are prone to floods.
For the recovery from such losses of disasters, the Government of Maharashtra has established a mechanism for disaster preparedness and mitigation by integrating science and technology with communication network facilitates. Most of areas of the State have faced droughts for consecutive years, which responsible for agriculture damage and water shortage in more than 20,000 settlements. Floods, are not a regular phenomenon, took 180 lives in 1996 and, 900 lives in July 2005, in the Konkan region; caused heavy rainfall of about 37 inches. Table 4.1 gives a detail account of disaster vulnerability in Maharashtra.

Drought prone districts in the State get annual rainfall in the range between 600 - 750 mm through Southwest monsoon which is received in the months between June - October. Approximately 50% of the drought prone areas of Maharashtra are in the Deccan Plateau. Approximately 90% of the land in the state has basaltic rock, which is imporous and not allow rainwater percolation into the ground and thus makes the area drought prone.

Table 4.1
Maharashtra: Disaster Vulnerability

<table>
<thead>
<tr>
<th>River Floods</th>
<th>The most flood affected rivers in Maharashtra are Tapi and Vardha. Some time Pen Gunga gets flooded. The most flood prone area in Maharashtra is eastern part.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Droughts in Maharashtra</td>
<td>In maharashtra Drought prone area is Deccan plateau it contributes more than 50%. In the Drought prone area 12% Population is lives. After every 8 to 9 years acute Droughts occurred in the state. In 1996, 266.75% and 7 districts, in 1997, 17 districts in the state are drought affected.</td>
</tr>
</tbody>
</table>

4.2 DROUGHT:
Droughts are natural environmental hazards because these are directly related to one of the three fundamental requirements of any form of life such as water, air and food. Water indirectly related to food because crop, other plants and animals exclusively depend upon water. Drought resulting from accumulative effects of water scarcity cause extensive and enormous damage to agriculture and natural vegetation
and therefore cause famine and starvation of human and animal population of any region.

The term drought is used different way by different persons depending upon the context and purpose. As per the agronomist it is a shortage of moisture for the crop. As hydrologist defines it as “when surface and underground water level are depressed and there is diminution of stream flows”. According to economist drought means “situation where water shortage ultimately affects the established economy of the region. As meteorologist “Drought represents the absence of rainfall”. Thus, drought is not understood as any absolute condition but as relative terms. Its representation is depending upon the context in which the term is used.

There are three types of droughts: Meteorological drought is when the actual rainfall is much less than the climatologically mean of the area. Hydrological drought results from the scarcity of surface water and Agricultural drought resulting from declining of soil moisture.

4.2.1 Post Independence Drought in Maharashtra:

After 1947 there were droughts in Maharashtra during the three periods i.e. 1952-53, 1965-66 and 1970-73. In the drought that occurred during 1952-53, 5281 villages were suffered in Mumbai State. The districts affected were Ahmednagar, Jalgaon, Dhule, Nashik, Pune, Sangli, Satara, Solapur and Thane. But there were no deaths recorded because government of Maharashtra provided help to the drought struck people. In the drought that occurred during the period 1965-66, 16151 villages from 23 districts out of a 26 were badly affected due to of drought. During the period 1970-73 there was continuous drought for three years. In the year 1972-73, 2548 villages out of 35800 in Maharashtra state were badly affected by drought. During the period 1984-85 there was continuous drought for the year.

In the districts Thane, Solapur, Sangli, Parbhani, Hingoli, Washim and Yavatmal received 80 to 90 % rainfall in 2011, other districts like Nashik, Dhule, Nandurbar, Aurangabad, Jalna, Osmanabad, Nanded, Amravati, Wardha and Nagpur recorded 60 to 70 % rainfall. As per the data from Government department, almost 10,000 villages in the state are facing acute water shortage. Water supply to district headquarters like Jalna, Osmanabad, Beed, Dhule, Aurangabad, Solapur and Nanded has been restricted to once in two days. Villagers in Akola and Buldhana districts have no option to drink polluted water.
Droughts occur frequently in the state. Rainfall in drought-prone districts is erratic and consequently, agricultural production is unstable. Twelve drought-prone districts i.e. Ahmadnagar, Solapur, Pune, Nashik, Sangli, Satara, Aurangabad, Beed, Osmanabad, Dhule, Jalgaon, and Buldhana together accounted about 60% of the state's net sown area, which highlights the fact that the bulk of the state's cultivated area is located in drought-prone area.

**Fig. No. 4.1**

Dhule district has experienced both flood and drought conditions. Due to drought conditions of the district and absence of major industrial growth most of the agricultural labors are migrating in the nearby districts and states like Gujarat and Madhyapradesh in the month of October to March in the year.

Droughts affected about 20,000 villages in 23 districts; 28.4 million people and 4.5 million hectares of crops in 2001. According to a report of Government of Maharashtra, number of districts affected by droughts in the year 2002-03 and 2003-04 were 33 and 11, respectively. Deficient rainfall in Western Maharashtra and Marathwada regions for successive years has largely affected on agriculture in the region, which is the main source of livelihood and employment. The situation of droughts in Maharashtra continued in 2004, following the failure of monsoon in 2003, the Government of Maharashtra declared droughts in 11 districts namely, Pune, Satara, Sangli, Solapur, Nashik, Ahmednagar, Beed, Latur, Dharashiv and
Aurangabad. Altogether 71 talukas in these 11 districts are badly affected by the droughts.

Study region comes under the “Drought prone region in Maharashtra”. Study region witnessed both drought and flood. At the time of flood it makes serious problem for human life. Flood affects on human life as well as economic sources.

4.2.2 Droughts in India:

Droughts are the natural disasters caused by scarcity of water in the region. This can be result of less rainfall, which happens mainly due to large-scale deforestation, overuse of water resources, like wells, etc. cause to water shortage. Drought recorded since ancient period. Prayers for having rains at every time, for removing drought is happen in Rigveda as well as in Sanskrit literature. There is reference to drought in yakshas nirukta, Valmiki’s Ramayana and Jataka Tales. In his book “Arthasharsha” Koutilya had made a rule that in the period of drought the king should provide food grains and seeds from his food storages to the poor people. The drought that occurred during the period 1396 to 1408 in the southern region of Narmada River is known a “Durgadevi Cha Duskal”. In this period many people from Maharashtra migrated to Gujrat and Malva. After that in 1460 Damaji Pant distributed food grains from the government storage to poor suffering people. When Shivaji Maharaja was born, in the period 1624 to 1631 there was a drought in whole Deccan and Gujrat. Aludden Khilji provided food grains in the period of drought. Abdul Fazal says about Akbars help to the drought affected people. Akbar started construction of forts as well as tanks for storing water so that the people could get work during drought. Akbar provided food to people. During the drought that occurred in the period 1629-31 Shahjehan gave relief in revenue. In the time of east India Company during the period 1765 to 1858 there were 12 droughts and for 04 times the condition has become dangerous. Romesh Chandra a historian had written that during the period 1877 to 1900 near about 1.5 crore people died due to drought.

India comes under monsoon climate and associated rainfall is very much deceptive, irregular and uncertain, and nearly most parts of the country are affected by drought and floods in one way or the other. e.g. Rajasthan is a chronic drought-prone area but heavy rainfall during the first two week of July 1990 exceeding 500 mm a day caused severe flood in most part of Rajasthan. The acute drought affected areas of the country include 67 districts where drought affects 25% of the total cropland and 12% people of India. This zone largely affected by severe droughts, includes larger
tracts in the state of Rajasthan, Haryana, Maharashtra, Karnataka, Andhra Pradesh and Southern part of Uttar Pradesh.

India has a history of droughts leading to famines. In 2000-2001 a total of eight states had noted for shortage of food. Government scheme and preventions play the important role in coping up with these environmental calamities. The agriculture in India is fully depending on rains, which when is not adequate results in poor yielding of crops. This is true for major drought-prone regions like southern and eastern Maharashtra, northern Karnataka, Andhra Pradesh, Orissa, Gujarat and Rajasthan.

In India, 28% of total agriculture area is drought prone. In 2001, more than eight states suffered the effect of acute droughts. Analysis of rainfall behavior for the past 100 years reveals that the frequency of occurrence of below-normal rainfall in arid, semi-arid and sub-humid areas is 54 to 57%, while severe and rare droughts occur once in every eight to nine years in arid and semi-arid zones.

4.3 FLOOD: NATURAL HAZARD:

Flood means inundation of large area with water for several days in continuation. Generally, floods are considered to be associated with rivers and people conceive floods as the outcome of accumulation of large volume of water coming out from the rivers through overtopping of river banks at peak discharge period. Flood is a natural phenomenon and it causes to rainfall but it becomes hazard and disaster when it causes huge loss of human lives and property.

The causes of flood are heavy rainfall, Spell of extremely heavy rainfall, highly meandering courses of river, large scale deforestation; increased urbanization, faulty agricultural practices and blocking of natural flow of water. For minimizing the floods hazard following steps should be taken i.e. Preparedness, Mitigation, Prevention, Rescue operation, Relief work, Recovery, and Rehabilitation. To mitigate the adverse impact of heavy flood control measures should be as delay the return of runoff resulting from heavy rainfall to the rivers, hasten the discharge of river water, divert the flow of river.
4.4 FLOODS IN MAHARASHTRA - 2005:

In August 2005, heavy monsoon flash floods hit the northern region of state causing heavy loss to life and properties. In the district Akola 15 villages were badly affected. Even though the death total was not that high, the damage to properties was very high.

Heavy rainfall occurred from 21-7-2005, in Kokan and western Ghat, it causes heavy flood in Raigad and Ratnagiri district of the state. In these districts many villages and towns are under flood water. On the date 26-07-2005 heavy rainfall of Mumbai and Thane breaks the record of 100 years, it affects on lifestyles and towns and villages. In the catchment of river Godavari many villages and towns gets flooded. Heavy rainfall also occurred in Nanded and Parbhani district. The release of water from the Koyana and Ujani dam’s flooded Sangli, Kolhapur and Solapur districts. Flood alerts were issued in four different regions after reservoir levels touched “danger levels”. Water was released from various dams in the state and people were being transfer from low-lying regions to safe places.

The rainfall in a day 26-07-2005 to 27-07-2005 declared by the Indian Meteorological Department. As per the data of I.M.D. it is noticed that in the period of 18 hours Mumbai gets 94.4 cm rainfall and Thane received 70 cm rainfall, it is not happened in the past. In that period the flood condition is worst

4.4.1 Impact of Flood:

Heavy rainfall occurred in the state affects on various regions.

Mumbai: Mumbai is the case of urban flash flooding. In the period of 3-4 hours water level increase rapidly and it submerged the roads and railway route. Underlying areas in the city get flooded, in the slum area flood problem is worst. The upper class and middle class people also affect in the flood. The basement floor flats were under flood water and the people lost their goods i.e. Electronic goods, Furniture, Clothes and Utensils. Flooding breaks the basic services and lifelines in the town. There is absence of electricity in Mumbai and Thane districts. In the flood 8 telephone exchanges came under flood water. The phones stopped, mobile phones were also not reachable .The life of flood affected area is badly disturbed. All the mode of public transport are stooped.
Western and Central Railways could not run their local services due to heavy rainfall. The long-distance trains run by the Central Railways were cancelled. The tracks on the Konkan Railways were highly damaged. For the first time ever in the history of Mumbai, the international and domestic airports were closed for a day, as the runways were badly flooded. The national and international flights at the Sahara and Santacruz were disrupted for a long time. The Pune-Mumbai Express Highway was also closed for a day due to heavy landslides. In Mumbai 52 local trains, 37,000 autorikshaws, 4000 taxis, 900 buses and 10000 trucks and tempos were badly damaged. The cost of the floods was unprecedented and these floods caused the break of entire commercial trading and industrial activity for days. Mumbai’s drainage system collapsed and as the floodwaters subsided, there was a risk from water-borne diseases. The most serious of these has been leptospirosis, which is a disease people get when they wade through water infected by animal urine. Water-borne diseases caused an estimated 150 deaths in the week.

Thane: In the Thane district the flood affected all the urban centers i.e. Ambarnath, Ulhasnagar, Kalyan, Dombivali, and Bhiwandi. All urban centers were under flood water. All dams in Thane district filled with water due to heavy rainfall in the catchment area. Water is released from all dams it causes increase of water level. Released water make serious problem in the region.

Konkan, Raigad and Ratnagiri: Heavy rainfall in Konkan, Raigad and Ratnagiri district makes serious problem at Mahad, Roha, Mangaon and Chiplun. The floods cut off a large number of villages in Raigad and Ratnagiri. The heavy rainfall causes landslides in that area. Due to rainfall 100 People are died, Due to landslides many houses collapsed. In the flood area rescue operation conducted in many villages to extract dead bodies from the garbage. Mumbai-Agra national highways comes under flood water, traffic is disturbed by flood. On Konkan railway track disturbed at many places due to landslide. Many deaths recorded due to landslides. Landslides and flood jointly disturbed human as well as transportation systems.

Marathwada: In the Marathwada, Nanded and Parbhani districts experienced high flood. In the Nanded district all the tehsils including the district headquarter were seriously affected by a rise in flood water levels in the Godavari river. In Parbhani, river Dudhna breaks record of last 100 years of high flood. It damaged more than 20 villages largely. The Indian navy deployed boats to migrate the people from
those villages. Both rivers Godavari and Dudhna makes serious problem in Marathwada for Nanded and Parbani district.

**Western Maharashtra:** In Western Maharashtra Kolhapur and Sangli districts were largely flooded by the discharge of excess water from Koyna, Warna and other dams in that region. The backwater of the Almaty dam in Karnataka did not permit floodwaters to join from the Sangli and Kolhapur district. The District Kolhapur got extensively flooded, for more than 10 days. 107 villages had been badly affected and 27 were completely lost their contact from the rest of the state. 29 villages were without electricity as over 700 transformers were submerged under water. 52,000 hector of plantation crops got damaged. 40,000 people were shifted in the relief camps. The transportation through Mumbai Bangalore National Highway-4 had been restricted as its portion near river Panchganga was below 2.5 feet of water.

In the Solapur district, the well-known Pandharpur, was flooded by the discharge of water from the Ujani and Vir dam. The Koyna reservoir, about 200 kilometres south of Mumbai, overflowed and loose contact 50 villages in the Satara district. Patan and Karad in Satara district suffered losses from floods in the Koyna river. The authorities transfer 10,000 people from the banks of Krishna. The dams Koyna, Warna, Radhanagari, Dudhganga, Panchganga and tulsi released water, and the level of water at the Rajaram bandhara was 3.5 feet above the H.F.L. In Pune, as the rivers Mula and Muttha began to flow in full force, the transfer of a record 16,000 people were carried out from the low lying areas to safe place. The people from the low-lying areas in the industrial belt of Pimpri – Chinchward were transfer to safer places. All the rivers in these area experienced very high flood and the people in particular area are shifted at safe place.

**4.4.2 Human Casualties:**

In the flood more than 1100 lives claimed in the Maharashtra state. Highest deaths are recorded in urban areas like Mumbai and Thane. 166 deaths recorded in rural areas of Raigad district due to landslides. 54 persons recorded for missing and 167 recorded due to various injuries. Flood is a worst disaster in terms of human lives lost.

More than two lakh hectares of land in Maharashtra is prone to floods and Patur taluka in Akola district has the largest flood prone area in the State. Nanded and Nashik are frequently affected by floods in the monsoons. A severe flood hit Wardha, Yavatmal, Kolhapur in 1994. Chandori, Saikheda and Niphad are the three major
flood-prone areas in Nashik district. A series of landslides recorded by heavy monsoon rains it killed 418 people in Maharashtra in the month of July, 2005, and more than half of these deaths are reported from Mumbai. A number of landslides had occurred in Mumbai and Raigad districts due to heavy rains in July and August 2005 died several people and causing loss to economic wealth.

**4.5 Flood in Dhule District -2006**

The most parts of the Dhule district had heavy rainfall on 5th August 2006 and 7th August 2006. Immediate Reports from tehsil on 6/8/2006 morning indicated that almost all the rivers in the district were crossed H.F.L. Also reports from irrigation department indicated the water discharges from the dams were above normal levels. The alert will give to the villages on river banks.

**Serious condition of the flood during 06/08/2006 to 09/08/2006:**

On 6 August 2006 district administration geared up for response. They immediately ascertained water stocks in all the small and medium projects and water discharges from them. They also contacted CWC offices of Hatnur and Ukai and ascertained the inflow to and outflow from Hatnur and position at Ukai. On assessing the reports they visualized imminent disastrous flood situation in Tapi basin and adjoining areas. They immediately contacted following authorities for providing boats for flood rescue operations since this district did not have one.

i) District Collector, Jalgaon.

ii) District Collector, Nashik.

iii) Commissionerate, Nashik Division.

iv) Dy.Secretary, Relief and Rehabilitation.


On 6th August 2006 Sahur village on Tapi left bank in Shindkheda tehsil was cut off from rest of the land due to flood water. At this time discharge from Hatnur dam was about 4 Lac cusses. They received only one OBM boat from Nashik they rashes with it to Sahur. Due to very heavy rains throughout they reached on bank of Amravati River near Dondaicha on 7th August 2006. Since this river was spate with the too strong currents the flood rescue team could not proceed further. On 7th August 2006 twelve more villages in the Shindkheda tehsil too were water locked due to
floods and water discharges from various projects which had doubled to 9,55,000 cusses.

Table No.4.2 Gives detailed information of high rainfall days between 1/06/2006 to 08/06/2006

Table No.4.2
High Rainfall Days of study region
(During the period: 01/06/2006 to 08/08/2006)

<table>
<thead>
<tr>
<th>Date</th>
<th>Dhule</th>
<th>Sakri</th>
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<th>Shindkheda</th>
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<td>34</td>
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</tr>
</tbody>
</table>

Source- Irrigation Department, Dhule

On 7th August 2006 flood rescue team, led by DPO, reached close to Sahur and launched the Rescue operations. By noon on that day the discharge was at record peak at 15 Lac cusses as measured at Prakash Bridge about 40 Km Downstream of Rescue Operation site. Flood rescue team experienced the dangerous and rapidly rising water levels. On 07th August 2006 flood rescue team rescued about 1350 people from five most severely affected five villages i.e. Sahur, June Shendhwade, Tekwade, Vadade-Chawadade and June Kolde on the extreme downstream of Tapi River in the Shindkheda tehsil of the district. Other two boats were pressed into rescue operation
in upstream sector of Tapi river in Shindkheda and Shirpur taluka. They could rescue about 40 people and had to return to Surat on 7th August 2006 night amidst of rescue operation as the flood situation on the bank of Tapi was worsening by then.

4.6 HISTORY OF FLOOD AFFECTED SETTLEMENTS IN STUDY REGION:

Flood in the district reported from places near the banks of Tapi, Panzara, Arunavati, Aner, Kan and Burai river in Dhule, Sakri, Shindkheda and Shirpur tehsils. 92 villages have been identified which are prone to flood every year. There are 12 monitoring stations, to combat flood, the governmental machinery is pressed in to action before the monsoon. A monitoring cell functioning round the clock to take the stock of the situation and guide-lines are issued by the Headquarter wherever and whenever warranted.

Tapi is the major river in the study region and other rivers are its tributaries. Girana and Purna are other major tributaries contributing to Tapi waters from Jalgaon district. Hatnur is medium project and Ukai dam is a major project on Tapi in Jalgaon district. 92 villages identified as flood prone in the district in advance as a risk assessment measure. Following settlements are badly affected by the flood in the district.

DHULE:

Up to the 19th century, Dhule was an insignificant village, subordinate to Laling, the capital of the Laling. Under the rule of the Nizam, Laling was incorporated with the District of Daulatabad. The town passed successively through the hands of the Arab kings, the Mughals and the Nizam and into the power of the Peshwas about 1795. In 1803, it was completely deserted by its inhabitants on account of the ravages of Holkar and the terrible famine of that year. In the following year, Balaji Balwant a dependant of the Vinchurkar, to whom the parganas of Laling and Songir had been granted by the Peshwa, repeopled the town and received from the Vinchurkar in return for his services, a grant of inam land and other privileges. He was subsequently entrusted with the entire management of the boundary of Songir and Laling and fixed his headquarters at Dhule, where he continued to exercise authority till the occupation of the country by the British in 1818. In January 1819 Captain John Briggs was chosen as the headquarters of the newly formed district of Khandesh. It sanction for building public offices for the transaction of revenue and judicial
Encouragement was offered to traders and others to settle in the new town. At this time, Captain John Briggs described Dhule as a small town, surrounded by garden cultivation and shut in between an irrigation channel on the river. The town was located on the Southern bank of the Panzara river with an area of about one square mile. In 1819, the population was only 2509 persons, living in 401 houses. In 1863, there were 10,000 inhabitants; while in 1872 the number had further increased to 12,489, with 2620 houses. From the date of its occupation by the British, the progress of Dhule had been steady. In the end of 19th century the town had already become important trading centre due to trade of cotton and linseed. Coarse cotton, woolen cloths and turbans were manufactured for only local use. In 1872 Dhule experienced severe flood, which did much damage to houses and property. Dhule has long history of flood. Now a day Dhule was located on both bank of river Panzara.

**KUSUMBA:**

The old Kusumba village was located on right bank of river Panzara. National Highway No. 06 which starts from West End Hajira in Gujrat and ends to East End Kolkata in West Bengal passes through Kusumba Village. The distance of Kusumba village from Dhule city is only 20 km. Village Kusumba was lost due to the flood, that was occurred to Panzara river in between years 1945-1960. After that the village was relocated to 0.5 Km away from the river bank. The newly located village is the current Kusumba. The architectural structure of Kusumba village as like cross line road. Each road meets every another road in 90 degree like Haddppa Sanskruti Designed by Sir Mokshagundam Visvesvaraya. There is a very nice Hemadpanthi temple of Kalambeshwar Near Panzara River which is very old. Kusumba once faced water scarcity in 1972. Now a day Kusumba village is on a safer location. Residuals of old village are found near the river bank.

**NER:**

Ner is a village located on right bank of river Panzara in dhule district. Ner is 23 km. away towards west of Dhule. National Highway 06 passes through Ner. Ner had been a part of Khandesh region since the time of the Faruqi Kings. The Mughal emperor Akbar had made Ner the headquarters of a mahal in the Sarkar of Nandurbar. Residuals of its former consequence are seen in the Muhammedan tombs that still line the main road leading into the village. It, along with the neighboring villages, suffered much during the 1872 floods of Panjhara.To day 09 Mahals are in Ner. i.e. Mahals Kali, Mahals Pandari, Mahals Raiwat etc.
THALNER:

Thalner is the first capital of the farugi kings. It is located on the right bank of river Tapi in Shirpur tehsil. Which is 47 Km away toward north-east of Dhule. It was fortified by a strong fort which played a very important role in the history of Khandesh. Located on the bank of the Tapi and the foot of the fort is an old stone built temple dedicated to Thaleshwar. The name Thalner probably derived from this old temple of Thaleshwar. Thalner was at the height of its prosperity and important commercial centre on the Surat-Burhanpur road.

Thalner fort is described as with one side rising out of the Tapi and the three other sides surrounded by a hollow way. The walls rise to the height of about 18.28 metres. Thalner fort is witness of flood on Tapi river. Now a day Thalner is a large village in surrounding region.

MANJROD:

Manjrod is located on right bank of Tapi river. Prime business of village is farming. Manjrod is known for sugar cane production in Dhule district. Due to floods of 1950-60 Manjrod was rehabilited to new place. Ram Temple which is still in old Manjrod is another holy place in Manjrod. Some of the most remembering things about the old Manjarod were really remarkable. The old Manjarod was surrounded by the scenic atmosphere of small hills. The particular group of community used to live there on hill was said to the ‘wada’ and there were many wada’s to name some as bhilwada, Koliwada, Kumbharwada, Rajputwada, Gujarwada and many such others. ‘Unity in Diversity’ had always been seen in the villages at the time of celebrating as like Pola, Dasara people again gathered to dance the ‘kathi’. Holi the colour festival was also celebrated. The old Manjrod has been shifted to a new one for last two decades still it has its own glorious past. Photo No.4.1 shows the residuals of deserted village Manjrod which is affected by flood of river Tapi. (Photo-4.1)
4.7 DISCUSSION WITH FLOOD AFFECTED PERSONS:

For the understanding of flood hazard extensive discussion was taken with the villagers of flood affected settlements. Several visits arranged with villagers on different dates to understanding the views and opinions of the villagers.

15/07/2012

Researcher visited the flood affected settlements for understanding the view of villagers about the floods along the river Tapi coast. Villagers are very much interested and giving fruitful information about the flood.

Balade:

Village Balade is located at the confluence of the river Tapi and Arunavati. According to Shri Nathu Devchand Patil and Shri Mansaram Ravji Patil High flood is experience at the village ‘Balde’ in 1969, 1996 and 2006 (Photo- 4.2 ). In the flood of 2006 village Balade loose the contact Photo No. 4.3 shows the H.F.L. in 2006 at agriculture field of Balade shivar. According to the villagers all crops were drained by the flood water.
Rudavali:

Village Rudavali located on right bank of river Tapi. According to Shri Sittaram Ragho Koli and Shri Vasant Onkar Patil situation of high flood occurred in
1968. In 1968 whole village is surrounded by the flood water. There is a demarcation of H.F.L. on ‘Hanuman temple’. Photo- 4.4

Photo – 4.4

Photo – 4.5
Vanaval:

Village Vanaval located on right bank of river Tapi. Shri Tukaram Uttam Patil and Shri Bhushan Gulabrao patil (Photo – 4.5) says that high floods recorded in 1968 and 1977 of rail the length and velocity of water is very high. In the local languages they use the word ‘Rail’. ‘Rail’ means very large flood, it is circle of flood water to surrounding village, and washed in large amount of houses as well as agricultural land.

Uperpind:

Village Uperpind located on right bank of river Tapi. Shri Bansilal Dodu Patil is a citizen of village ‘Uperpind’ He says that, High flood is occurred in 1968, 1993 and 2006. According to him in his life of 70 years he experienced long and high flood in 2006.

Location of visited villages dated on 15/07/2012

Fig No. 4.2
Varkhede:

Village Varkhede is located at Duab of the Anwar nala and river Panzara. It is on the right bank. Right bank of the river is high than left bank, so the site of Village Varkhede is free from flood. In the flood of 2006 water of flood enter up to village. There is need of rehabilitation for safe from future floods. According to Hussain Pinjari and Shri Narayan Shivram Patil, (Photo- 4.6) Flood are occurred in 1944, 1969, 1977, 1978, 2006. Flood 1944 is very large in local language it is called as ‘Rail’.

Photo – 4.6

Shirdane:

Village Shirdane is located at right bank of the river Panzara. Shirdane is located on the high bank of the river Panzara.

Japi:

Khoothal:

This village is located on the left bank of the river Panzara. According to villagers flood are occurred on the year 1944, 1969, 1971, and 2006.

Dnyhlod:
Dnyhlo is located on the left bank of the river Panzara. The mark of H.F.L. is found at Mahadev temple which is situated at the bank of river. High flood is recorded on 1971. (Photo- 4.8)

**Location of visited villages dated on 16/12/2012**

![Map of the area showing the location of Sukuwad](image)

**Fig. No.4.3**

**29/12/2012**

**Sukwad:** Old settlement Sukwad Situated on left bank of river Tapi and new resettlement is 2 Km away towards south from old settlement. Sukwad is climatology center to monitoring weather phenomena as well as floods of the river Tapi. (Photo- 4.9)
Adhe: This settlement is away from the river Tapi. Due to high flood water of river Tapi is entered in local Nala which is flowing through the village Adhe. High flood is recorded in 2006. (Photo- 4.10) The process of rehabilitation is going on away 1.5 Km. from the present village.
**Tonde**: Flood affected settlement ‘Tonde’ is rehabilitated on new side. The distant between new and old settlement is 500 meter. This village is fully rehabilitated. (Photo- 4.11) Government gives maximum facilities to new village. Old village Tonde is affected by flood water, it is located on the right bank of river Aner. (Photo- 4.12)
29/01/2013

Ranjane:

Village Ranjane located on left bank of river Tapi. According to villager’s high flood recorded on 1959 and 2006. The expected rehabilitation of village is 1.5Km. away from existing village. Land is not available for the rehabilitation because surrounding land is highly fertile black cotton soil so cost of land is very high. People are ready to rehabilitate. (Photo- 4.13) shows the H.F.L.2006.

Kalgaon:

Kalgaon is located on left bank of river Tapi. (Photo- 4.14) The proposed rehabilitation of village is 1Km. away from the present location. Land is acquired but people didn’t want to rehabilitate, reason behind it is agricultural fertile land.
Kumbhare:

Kumbhare is located on left bank of river Tapi. This village is highly affected by flood water. For the purpose of rehabilitation land is acquired by government at 1.5 Km. away from the present location. In the rehabilitation plots are not allotted to the villagers, people are ready to rehabilitate, if the government gives all facilities to villagers, at the village Kumbhare high flood recorded in 2006. (Photo- 4.15)
Lohgaon:

Lohgaon is located on the left bank of river Tapi. According to the villagers (Photo- 4.16) flood water never entered in the village. Because location of village is on high land therefore no need of the rehabilitation.

Vasmane:

Lohgaon is located on the left bank of the river Tapi. According to the villagers flood water never entered in the village. Because location of village is also on high land as like Lohgaon therefore no need of the rehabilitation of such village but it is include in flood affected settlement.

June Langane:

It is old settlement located on the left bank of the river Tapi. This village is fully affected by flood water. After high flood-2006 this village is completely rehabilitated at nearest site which is 6 Km. away from June Langane. (Photo- 4.17) shows the residual site of this village.
June Kolade:

June Kolade located on the left bank of the river Tapi. This village is also fully affected by flood. After high flood-2006 this village is also completely rehabilitated as like June Langane at nearest site which is 4 Km. away from June Kolade.

Location of visited villages dated on 29/01/2013
4.8 DURATION OF HIGH RAINFALL:

According to high rainfall chart of Dhule, Sakri, Shindkheda, and Shirpur tehsil from 1987 to 2007, the year 1998, 2003 and 2006 are high flooded year due to very high amount rainfall respectively 155%, 153%, and 162%. Table No.1.2

Table No.4.3

High Rainfall Chart of Dhule District from 1987 to 2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Dhule</th>
<th>Sakri</th>
<th>Shindkheda</th>
<th>Shirpur</th>
<th>Total</th>
<th>Average</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>529.00</td>
<td>706.80</td>
<td>507.00</td>
<td>495.00</td>
<td>2237.80</td>
<td>559.45</td>
<td>103</td>
</tr>
<tr>
<td>1988</td>
<td>581.00</td>
<td>638.00</td>
<td>686.70</td>
<td>676.00</td>
<td>2581.70</td>
<td>645.42</td>
<td>118</td>
</tr>
<tr>
<td>1989</td>
<td>507.50</td>
<td>559.50</td>
<td>578.00</td>
<td>646.00</td>
<td>2291.00</td>
<td>572.75</td>
<td>105</td>
</tr>
<tr>
<td>1992</td>
<td>682.60</td>
<td>453.40</td>
<td>521.00</td>
<td>642.00</td>
<td>2299.00</td>
<td>574.75</td>
<td>106</td>
</tr>
<tr>
<td>1994</td>
<td>683.10</td>
<td>535.00</td>
<td>588.00</td>
<td>551.90</td>
<td>2358.00</td>
<td>589.50</td>
<td>108</td>
</tr>
<tr>
<td>1996</td>
<td>642.00</td>
<td>396.00</td>
<td>554.00</td>
<td>725.00</td>
<td>2317.00</td>
<td>579.25</td>
<td>106</td>
</tr>
<tr>
<td>1997</td>
<td>506.00</td>
<td>412.00</td>
<td>559.00</td>
<td>814.00</td>
<td>2291.00</td>
<td>572.75</td>
<td>105</td>
</tr>
<tr>
<td>1998</td>
<td>783.00</td>
<td>756.00</td>
<td>682.00</td>
<td>1167.00</td>
<td>3388.00</td>
<td>847.00</td>
<td>155</td>
</tr>
<tr>
<td>1999</td>
<td>497.00</td>
<td>481.00</td>
<td>550.00</td>
<td>704.00</td>
<td>2232.00</td>
<td>558.00</td>
<td>102</td>
</tr>
<tr>
<td>2003</td>
<td>705.00</td>
<td>621.00</td>
<td>852.00</td>
<td>1154.00</td>
<td>3332.00</td>
<td>833.00</td>
<td>153</td>
</tr>
<tr>
<td>2004</td>
<td>841.00</td>
<td>532.00</td>
<td>703.00</td>
<td>792.00</td>
<td>2868.00</td>
<td>717.00</td>
<td>131</td>
</tr>
<tr>
<td>2006</td>
<td>663.00</td>
<td>863.00</td>
<td>1009.00</td>
<td>1137.00</td>
<td>3672.00</td>
<td>918.00</td>
<td>162</td>
</tr>
<tr>
<td>2007</td>
<td>664.00</td>
<td>755.00</td>
<td>701.00</td>
<td>1012.00</td>
<td>3132.00</td>
<td>783.00</td>
<td>142</td>
</tr>
</tbody>
</table>

Source- Flood Management Plan of Dhule District

4.9 FLOODS RECORDED BY THE VARIOUS CLIMATOLOGY CENTRES:

For the monitoring of weather phenomena and flood there is an establishment of some climatology centres by the climatology department, these all centres continuously monitoring and giving up-to-date data about weather condition and floods. These centres are located at Sukwad, Akkalpada and Dhule station.
### 4.9.1 Tapi River at Sukwad centre:

**Table No.4.4**

Record of high flood level at ‘Sukwad’ centre

<table>
<thead>
<tr>
<th>Date</th>
<th>Maximum Height of the High Flood Level in meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/09/1994</td>
<td>15.20</td>
</tr>
<tr>
<td>16/09/1998</td>
<td>14.50</td>
</tr>
<tr>
<td>16/06/2001</td>
<td>2.50</td>
</tr>
<tr>
<td>26/08/2002</td>
<td>9.40</td>
</tr>
<tr>
<td>28/07/2003</td>
<td>6.25</td>
</tr>
<tr>
<td>06/08/2004</td>
<td>6.20</td>
</tr>
<tr>
<td>07/08/2005</td>
<td>5.60</td>
</tr>
<tr>
<td>07/08/2006</td>
<td>19.80 (High Flood)</td>
</tr>
<tr>
<td>09/07/2007</td>
<td>12.90</td>
</tr>
<tr>
<td>06/07/2008</td>
<td>10.10</td>
</tr>
<tr>
<td>23/07/2009</td>
<td>05.40</td>
</tr>
<tr>
<td>09/09/2010</td>
<td>06.40</td>
</tr>
<tr>
<td>28/08/2011</td>
<td>05.70</td>
</tr>
<tr>
<td>06/09/2012</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Source: Climatology Centre Sukavad (Shindkheda)

### 4.9.2 Panzara River at Dhule Centre:

**Table No.4.5**

Record of high flood level at Dhule centre

<table>
<thead>
<tr>
<th>Date</th>
<th>Maximum Height of the High Flood Level in meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/10/98</td>
<td>0.02</td>
</tr>
<tr>
<td>9/8/1999</td>
<td>0.05</td>
</tr>
<tr>
<td>25/08/2003</td>
<td>1.30</td>
</tr>
<tr>
<td>4/8/2004</td>
<td>1.50</td>
</tr>
<tr>
<td>9/8/2007</td>
<td>0.10</td>
</tr>
<tr>
<td>20/9/2008</td>
<td>0.80</td>
</tr>
<tr>
<td>6/10/2009</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Source: Climatology Centre Dhule
### Table No.4.6

**Record of high flood level at Akkalpada centre**

<table>
<thead>
<tr>
<th>Date</th>
<th>Maximum Height of the High Flood Level in meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/09/2002</td>
<td>1.70</td>
</tr>
<tr>
<td>28/07/2003</td>
<td>1.60</td>
</tr>
<tr>
<td>11/08/2004</td>
<td>1.75</td>
</tr>
<tr>
<td>03/07/2005</td>
<td>1.95</td>
</tr>
<tr>
<td>06/08/2006</td>
<td>1.50</td>
</tr>
<tr>
<td>19/09/2007</td>
<td>1.60</td>
</tr>
<tr>
<td>09/07/2009</td>
<td>0.10</td>
</tr>
<tr>
<td>02/09/2011</td>
<td>0.02</td>
</tr>
</tbody>
</table>

*Source: Climatology Centre Akkalpada*