

The InFocus Programme on Crisis Response and Reconstruction (IFP/CRISIS) has among its objectives:

- Promoting socio-economic integration and poverty alleviation among conflict-affected groups;
- Tackling unemployment, social inequalities, exclusion and other priority concerns in crisis situations; and
- Developing a knowledge base and relevant tools on different types of crises.

The INDISCO Programme in the Cooperative Branch of ILO, supports self-reliance of indigenous and tribal peoples, through participatory community driven approaches to:

- Institution building, bringing the community into an organizational fold;
- Capacity building through skills, literacy and awareness, for socio-economic empowerment;
- Enabling a policy dialogue, bringing grassroots experiences to the notice of local, state and central administrations.

COPING STRATEGIES AND EARLY WARNING SYSTEMS OF TRIBAL PEOPLE IN INDIA IN THE FACE OF NATURAL DISASTERS

Case studies in
Mayurbhanj, Orissa
and Dungarpur, Rajasthan,
India.

AN IFP/CRISIS - INDISCO STUDY



International Labour Office
New Delhi

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India.

Synthesis Report by
New Concept Information Systems Pvt. Ltd.

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Dr. Devinder Sharma

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International Labour Office
New Delhi

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October 2001

Foreword

Tribal communities, generally characterised by geographical as well as social exclusion tend to remain marginalised. This is despite appreciable efforts made by Government at both Central and State levels, which are promoting their socio-economic upliftment. Their livelihoods being closely dependant upon local natural resources and environment, renders them particularly vulnerable to any adverse effects upon their ecology. The occurrence of any natural calamity therefore hits tribal communities much harder than the rest of the population.

A super cyclone in Orissa, closely followed by the earthquake in Gujarat has led the government as well as civil society, to work towards an organised disaster management plan. While these events claimed global attention as well as assistance of unprecedented magnitude, they tend to divert attention from the more recurrent, almost continuous phenomena such as drought and flooding in certain regions of India. It is being increasingly felt by all concerned that these recurring hazards should receive their fair share of attention.

Relief and Rehabilitation measures need to be developed with the active involvement of the beneficiaries. This is especially true in the case of remote tribal communities, which even when they receive assistance, this may not correspond to their particular needs.

The survival of tribal communities in the face of recurring natural disasters and despite the odds against them, seems to indicate the existence of their own systems in terms of early warnings, coping and preparedness. These need to be assessed with a view to reviving, strengthening and perhaps even incorporating the positive traditional systems into the local support structures, while helping them out of negative coping mechanisms with their attendant ill effects.

Taking these factors into account, the International Labour Office (ILO) has made a modest start in studying the coping mechanisms of tribal people in the face of certain recurring natural hazards and their needs identification, particularly in terms of livelihoods and survival strategies.

Two case studies were undertaken which focused on two of the most commonly recurring disasters of concern namely drought and flood. The predominantly tribal, drought prone region of Dungarpur, Rajasthan and a flood-affected region in Mayurbhanj, Orissa, were identified to conduct preliminary work in this area.

The study was conducted by the ILO Area Office in New Delhi with technical inputs and financial support from two ILO Programmes based in the Employment Sector, ILO Headquarters, Geneva. These are:

- ▶ The InFocus Programme on Crisis Response and Reconstruction (IFP/CRISIS), which has the following objectives:
 - promotion of socio-economic reintegration and poverty alleviation of crisis affected groups;
 - tackling unemployment, social inequalities, exclusion and other priority concerns in crisis situations;

- development of a knowledge base and relevant tools through research on different types of crises. One area of its interest relates to the coping capacity and strategies of vulnerable groups in crisis situations;
- The INDISCO Programme in the Cooperative Branch of ILO, which supports self-reliance of tribal peoples through cooperatives and self-help organizations. INDISCO recognises the need to preserve the ethnic identity and age old traditions of each tribal community, while at the same time, working towards their socio-economic development, to bring them at par with the rest of society. The process is wholly participatory.

The two programmes have developed a joint approach to understanding the coping strategies of indigenous and tribal populations in crisis contexts. Mr. J. Krishnamurty, Senior Economist, IFP/CRISIS, developed the design of the Indian studies. He was also responsible for providing and coordinating technical inputs, working closely with Mr. H. Polat, INDISCO Programme Coordinator in Geneva and the ILO Area Office in New Delhi.

Two elements make this study different:

- It concentrates exclusively on tribal people in recognition of their particular vulnerability and socio-cultural practices;
- It has ensured close participation of tribal representatives right through the planning of methodology, logistics, the process of data collection, participation in State/District level consultations, as well as the National Workshop upon termination of the study.

This work is viewed as a first phase exercise which has been rather small in scale and concentrates only on tribal groups without considering non-tribal population as control groups. However, the synthesis report which emerges from the two case studies is expected to: create a better understanding of the social and economic dimensions of natural disasters in tribal communities, provide recommendations for wider application at policy as well as programme levels, and explore possibilities for a joint action programme in the next phase.

Herman van der Laan
Director
International Labour Office for India

Abbreviations

AWC	Anganwadi Centre
BBSR	Bhubaneswar
BPL	Below Poverty Line
FCRA	Foreign Exchange Control Regulations Act
FFW	Food For Work
FGD	Focus Group Discussion
GO	Government Organization
GP	Gram Panchayat
HH	Household
HIA	High Intensive Agriculture
IAY	Indira Awas Yojana
ICITP	Indian Confederation of Indigenous and Tribal People
ILO	International Labour Organization
INGO	International Non- Government Organization
ITP	Indigenous and Tribal People
LIKA	Low Intensive Kharif Agriculture
MFP	Minor Forest Produce
NCIS	New Concept Information Systems Pvt. Ltd.
NGO	Non- Government Organization
NTFP	Non Timber Forest Produce
NWC	National Water Commission
OSDMA	Orissa State Disaster Mitigation Authority
PDS	Public Distribution System
PEDO	People's Education & Development Organization
PHC	Primary Health Centre
PHED	Public Health & Engineering Department
PRA	Participatory Rural Appraisal
PRI	Panchayati Raj Institution
PWD	Public Works Department
SHG	Self Help Group
SODA	Society for Developmental Action
SRC	State Resource Centre
TOT	Training of Trainers
UN	United Nations
UNDMT	United Nations Disaster Management Team
UNDP	United Nations Development Programme
VLW	Village Level Worker
WHO	World Health Organization

Glossary

Chaitra	People in Dungarpur refer to the month of May as 'Chaitra'
Chua	A two to three feet deep water hole dug by the people of Mayurbhanj for drinking
Denotified tribes	Communities notified as "Criminal Tribes" during colonial rule were officially denotified after independence
Gadia	A small pond
Garbi	The monsoon cloud reader is known as a Garbi
Gaon–O–Tain	People came together to form a community fund
Gameti	The social leader is known as a Gameti in Dungarpur
Gram Panchayat	Smallest unit of self-governance, at the village level
Phalias	Hamlets/Units of the Revenue village
Primitive tribes	Government of India classification of tribes characterized by pre-agricultural modes of survival, declining or stagnant population, extremely low levels of literacy and economic development
Hende Munjh	Big black ants
Kadam	A type of flower
Mankadias / Ujhias	Tribes of Mayurbhanj
Machharanka	Kingfisher
Ojha	Local Tribal medicine man
Dikus	Traders are called 'Dikus' in Mayurbhanj
Patidar	Patidar is a farmer who practices High Intensity Agriculture System
Pala	Green leaves found in the forests of Dungarpur used for fodder
Patangga	Flying insect
Panji	Yearly calendar of the priest of the tribal people
PDS	Public distribution system
Ratanjot, (Jatropha Curcas)	Forest seeds used as preservative
Sabai	People of Mayurbhanj make ropes from 'Sabai' grass and sell them in the market.
Siju	A cactus flower.
Sal	A tree whose leaves and seeds are utilised for various purposes.
Tehsil	A revenue district

Executive Summary

I. Background

1. The frequency of disasters of all types in India is increasing, resulting in a great amount of socio-economic burden to the already impoverished people.
2. What impact do natural disasters have on the tribal people? How vulnerable are they to ecological changes? When do they learn about disaster warnings? Do they benefit from government-sponsored relief measures? If and when they receive assistance, does it meet their needs? What are their coping strategies? This study attempts to understand and answer these questions.
3. The International Labour Organization (ILO) undertook this study to understand and address the needs of tribal people during natural disasters, with a special focus on employment and protection of the most vulnerable sections of society. Two areas in India were selected for this study —Dungarpur in Rajasthan, which is a drought-prone area, and Mayurbhanj in Orissa, which faces frequent floods.

II. The Situation

4. Dungarpur district has faced three major droughts in the last three decades, the most recent in 1999-2000. The severity of drought can be assessed from three major indicators — low rainfall, scarcity of food and fodder and loss of crops and cattle. In a normal year, the tribal people get employment in agricultural activities and cattle rearing. But during a drought, they become totally dependent on government-run relief activities. During the 1985-87 drought years, 125,000 people were engaged as labourers in drought relief activities, costing the government Rs. 300 million. In 10 out of the last 17 years, there has been almost no rainfall. People are often forced to migrate to other places in search of work. In the 1985-1987 drought, a 22 percent loss of livestock was recorded.
5. Mayurbhanj is located 270 km from the state capital of Bhubaneswar. Though the entire district is not susceptible to floods, flash floods do occur frequently in villages near the rivers and the foothills of the Simlipal Hills. The infrastructure of the district is poor. Conditions of the roads in the interior villages are very bad and there is no rail transport. Health facilities are inadequate.
6. Both areas have predominantly tribal population and poverty is rampant. However, it must be acknowledged that not all tribal people are poor and for that matter, not all the poor are tribals. This being a small preliminary study, it did not venture into studying coping behaviour of the non-tribal population. For the purpose of making a comparative analysis of coping behaviour of tribals vis a vis the general population, a larger study would be required with controls.

III. Findings – Early Warning, Coping and Preparedness

7. Tribals everywhere have special strengths such as social capital or solidarity and ability to survive on a wider variety of nutritional sources. But successive disasters and destruction of ecology has eroded their capacity to cope. A declining natural resource base is making the life of the tribal people difficult

- even in normal times. Ecological imbalances, on the other hand, are increasing the frequency and severity of disasters. The combined effect of these has severely eroded their coping capacity.
8. A wealth of traditional knowledge exists for predicting natural disasters. In both Dungarpur and Mayurbhanj, the tribal people depend on nature to provide early warnings. They observe cloud movements, movements of animals and changes in the flora. Though the tribal people in both the study areas get disaster warnings from the government, they often come too late.
 9. The two areas have their own coping patterns. There are similarities in approach but there are significant differences too. The differences are mainly due to the kind of disasters they face. In Dungarpur, people adopt the following measures.
 - Households immediately reduce their daily food consumption to conserve whatever food they have.
 - They search for the seeds of short duration crops, like minor millets.
 - They start storing fodder for future.
 - Households dry fish gathered during the rainy season and store it for the drought period.
 - When they foresee a drought, they start using a single well for water instead of multiple sources as in normal situations. They start digging new wells or deepening the existing ones.
 - When their land can no longer support them, they begin migrating in search of wage employment.
 - They start collecting non-timber forest produce, such as forest seeds (*Ratanjot*, *Jatropha Curcas*) for sale.
 - People borrow cash from moneylenders or self-help groups wherever they exist, to tide over the tough period.
 10. Coping strategies adopted by the people in Mayurbhanj are slightly different in view of the kind of disaster threats they face. Their main concern is the safety of family members, food and whatever assets they have.
 - Children, elderly family members and livestock are moved to higher ground or safe places such as school buildings. In some cases, livestock is sold before the floods.
 - Available food, roasted rice and tamarind seeds etc. are moved along with this advance vulnerable group while clothing and utensils are put in safe places.
 - Food intake is reduced. Children are given priority and are fed three meals a day whereas the adults eat only one meal. No gender difference was, however, reported.
 - Temporary bamboo shelters are built on elevated areas and rope cots are readied to carry people to safer places.
 - Sandbags are stacked at weak points to prevent the entry of floodwaters into the village.
 - Hard cash and food are borrowed from moneylenders, traders (*dikus*), relatives and friends. Debts are repaid the next year if the crop is good.
 - Minor forest produce like *Sa*/leaves collected in other seasons is sold to supplement family income.
 - Country boats are kept ready for ferrying people to safer places.
 - Land and other assets such as jewellery, brass utensils, etc. are sold or mortgaged.
 - People begin to seek wage employment outside the village.
 - Children are pulled out of school and put to work in order to supplement family income.

IV. District Response

11. While Dungarpur District is working on its own district level plan, the Mayurbhanj district administration has formed five sub-groups to develop a 'Disaster Preparedness Plan'. Various departments at the district level are involved and have been provided with specific roles.

V. Issues

12. The immediate issues faced by the tribal people as a result of drought and flood are the following:
 - Crop yields are low due to lack of irrigation facilities, lack of resources for inputs, and fragmentation of land.
 - The period of distress migration prolongs during disaster.
 - Assets of households such as livestock and ornaments are dwindling due to repeated disasters.
 - Damage and destruction of houses.
 - Severe water scarcity.
 - Lack of medical facilities.
 - Pulling out children from school and putting them to work.

13. A priority issue identified by the tribal people of Mayurbhanj was the need for proper river *bunds* (raised banks) and stronger *pucca* (brick) houses that could withstand the ravages of floods. The tribal people of Durgapur stressed upon the need for proper land and water management for better agricultural yield. Despite all odds, they still wish to derive sustenance from their own land.

VI. Recommendations

14. The basic thrust of government action for mitigating the impact of natural disasters should be two-fold — make the tribal people self-reliant by restoring the natural resource base and provide timely and effective relief and rehabilitation packages during disaster. Tribal regions, especially those prone to natural disasters need combined efforts on the part of government, non-government and private sector organizations, and the tribal people themselves.
15. At the policy level there is a need to:
 - Review economic policies. The new economic policies of liberalisation and open market economy are not consistent with subsistence level activities of the tribal people, who are being further pushed out of the market economy.
 - Rehabilitate agriculture. Improved agricultural technologies suited to the specific regions need to be promoted.
 - Develop a participatory approach to planning, development and disaster management. Existing legal provisions for *Gram Panchayat* level planning should be extended to disaster management and preparedness. Special provisions need to be made for tribal populations in view of their particular vulnerability.
 - Take policy level decisions to resolve conflicting interests such as mining activities and use of exhaustible natural resources.
 - Some legal enactments like the Land Acquisition Act of 1894 and the Forest Tenancy Act of 1927 need to be reconsidered and reviewed so as to empower the tribal people and remove hurdles in the way of traditional livelihoods.
 - The Famine Relief Code which is over a hundred years old, needs to be reviewed in the light of the present day context and possibly, special provisions may need to be added relating to the problems of tribal communities.
16. At the programme level, the situation needs to be tackled at two levels — immediate measures and long term measures. The following steps need to be taken immediately.
 - A scientific approach is needed to streamline the information management system. Local skills should be developed so that the information is intelligible to all and reaches quickly. It

- should also include time-tested traditional warning systems for better acceptability by the tribal people.
- Each Gram Panchayat should be involved in evolving preparedness, relief and rehabilitation plans. These plans should clearly outline what the people's committees will do and what support is needed from the administration.
 - A code of conduct should be evolved for all participants like the government agencies, voluntary agencies and people's committees for the integrated approach to work smoothly.
 - There is need to provide immediate employment opportunities. This is essential for preserving individual dignity and for reviving the local economy. Reconstruction measures should involve the local people most affected by the disaster. Employment opportunities in non-agricultural areas and micro-enterprises need to be explored.
17. Long term measures should be taken towards disaster-'proofing' the regions so that damage to life and property can be minimised and self-reliance of the people strengthened.
- The natural resource base of the regions, which include water, forest and land, should be restored. This should be done not as part of relief work but as a normal activity to build the community's capacity to fight disasters.
 - Water harvesting and conservation schemes with a blend of traditional and modern technologies, should be launched.
 - Local people should be involved in regeneration and protection of forests.
 - Efforts should be made to build and integrate traditional people's institutions for building people's capacity, including life saving skills.
 - A district level calamity relief fund should be set up. Monitoring and evaluation mechanisms should be built at village and district levels ensuring transparency, accountability and social audit.
 - The concept of grain and fodder banks should be revived and saving habits promoted.
 - Policies should be framed to provide sustainable employment opportunities. Increased employment opportunities in labour intensive and agro-based industries need to be created, keeping in view the tribal peoples' preference for land and forest related activities.
 - There is a need to document the traditional disaster warning systems. The time-tested systems could be incorporated into the local warning systems for disaster forecasts.
18. In conclusion, tribal regions, especially those subject to recurring natural hazards, call for a convergence of efforts on the part of government, non-government, private sector and the tribal people themselves. While immediate preparedness and relief measures form an important part of natural disaster management, it is the longer term measures that would mitigate the effects through strengthening the coping capacity and self reliance of tribal people. However, it needs to be stressed that self-reliance of the community by no means absolves the Government of its responsibility. A synergy needs to be developed between the State and the people, building effective partnerships for development.



I. Background and Study Objectives

1.1 Background

Natural disasters generally have the severest impact on excluded social groups such as tribal people (TP). High level of dependence on natural resources and close linkage with the natural environment makes them more vulnerable to ecological changes. TPs are often the last to learn about government warnings, or benefit from government sponsored arrangements. If and when they receive assistance, it may not correspond with their needs. Hence they are highly dependent on their own coping strategies. Vulnerable communities living in regions frequently visited by severe weather conditions often develop some mechanism to sustain themselves during minor disasters. However, in the event of repeated disaster conditions like floods or droughts, the mechanism fails to deliver and they become dependent on others. Help may not always be forthcoming, or it may reach too late. This increases their suffering manifold.

The International Labour Organization (ILO) undertook this study to understand and address the needs of the tribal people in times of disaster. The ILO commissioned two case studies, in specially selected locations in India, where natural disasters have severely affected tribal people. The main concern here was to:

- ▶ Assess the level and nature of impact that natural disasters have on TPs.
- ▶ Assess government and NGO support as well as the need for technical assistance to TPs affected by natural disasters.
- ▶ Assess TPs' perception of assistance/support that they receive or can obtain.
- ▶ Examine the nature and pattern of information flow as also the knowledge dissemination to and within TPs (including their own early warning systems).
- ▶ Assess the coping strategies, further needs and possible support modalities for TPs affected by natural disasters.

All this would create a substantial baseline data and analysis, which would facilitate the following:

- ▶ The development of guidelines on 'rapid response approaches', longer-term prevention and rehabilitation strategies for natural disaster management.
- ▶ The next phase of collaboration, which will cover the formulation of joint activities in India and elsewhere to support tribal people facing natural disasters and other kinds of crises, as well as support GO & NGO institutions in providing appropriate forms of assistance.

1.2 Study Objectives

The study had three main objectives :

- ▶ To strengthen knowledge and understanding of coping strategies
- ▶ To suggest preliminary guidelines on natural disaster management policies directed towards TPs.

- To identify areas for technical assistance at grassroots, policy and programme levels, in order to strengthen the TPs' coping strategies and the capacity of the government and non-government programmes to respond more effectively to their needs.

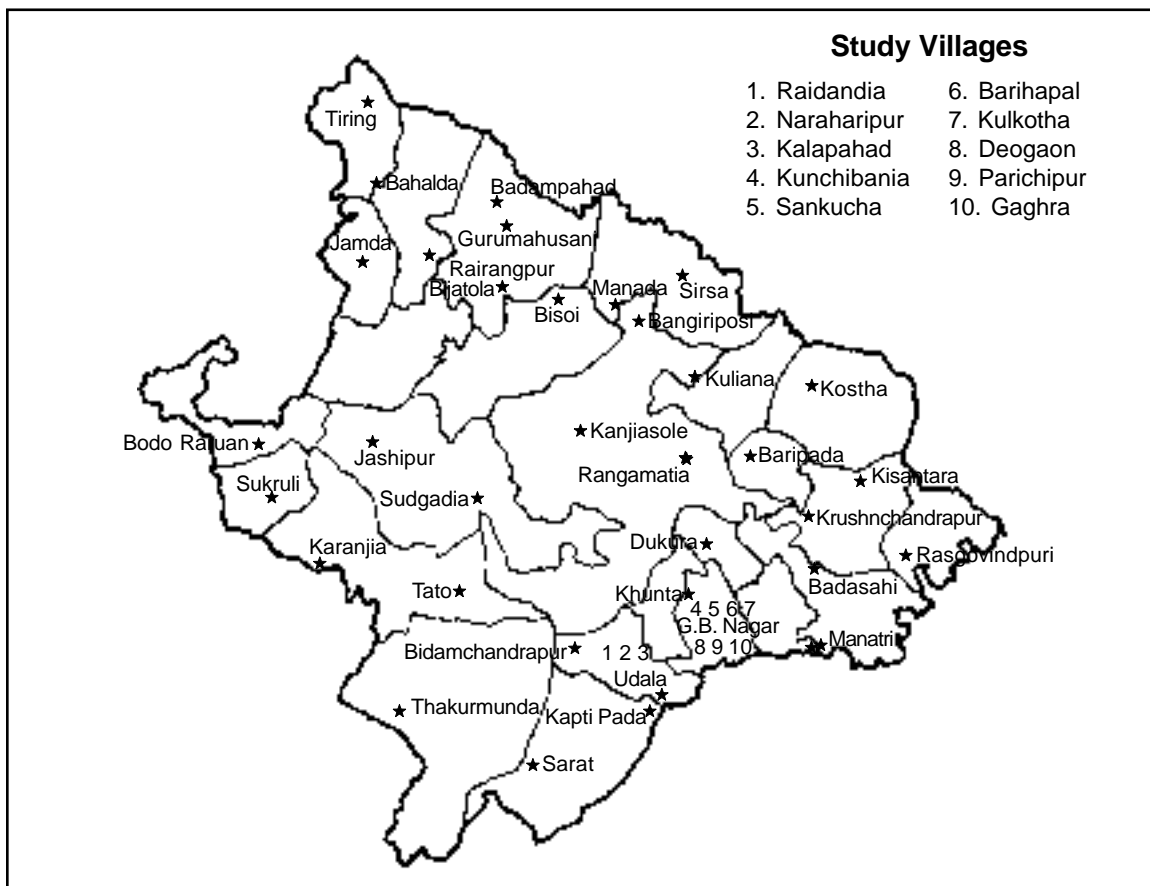
The idea was to find out how tribal people live in normal times, how they live through such disasters, whether they follow any special coping strategy and how they use traditional systems to prepare themselves. It was also meant to understand their linkages with the rest of the system and what implications these could have on policy and programme development.

1.3 Profile of the Study Districts

1.3.1 Mayurbhanj (Orissa)

Located 270 km from the state capital, Mayurbhanj is the largest district of the state, having a geographical area of 10,418 sq. km. It is situated close to the coastal districts of Balasore in Orissa and Midnapur in West Bengal. The district has mountainous terrain, plains as well as picturesque rising and falling gentle slopes. The Simlipal hills have diverse flora and fauna, waterfalls and tall Sal trees with many parts still unexplored. The area has been declared a biosphere reserve.

According to the 'vulnerability atlas' of Orissa, Mayurbhanj is prone to storms and cyclones. It also falls in the moderate to low risk seismic zone. Officially, the district is not prone to floods but this is contradicted by the secondary data available from the district contingency plans and disaster timeline.



Flash floods do occur frequently in the villages closer to rivers as well as those situated at the foothills of the Simlipal Hills. Cyclonic storms that originate in the Bay of Bengal during the monsoons pass over the district in their westward movement, causing heavy rains in the catchment areas. As many as 1,200 villages were affected by flash floods between 1995 and 1999.

The provisional data of 2001 census shows the total population of the district at 2,221,782. The sex ratio of 980 is above the state average. The combined proportion of Schedule Castes (SC) and Schedule Tribes (ST) is more than 60 percent of the total population. SC population is 6.99 percent (1,31,765) and the ST population 57.87 per cent (1,090,626). The total literacy rate of the district is 52.43 per cent. Male literacy is 66.38 per cent while female literacy is 38.28 per cent. There are 45 tribal groups in the district, which include primitive tribes like the Mankadias and denotified tribes like the Lodhas.

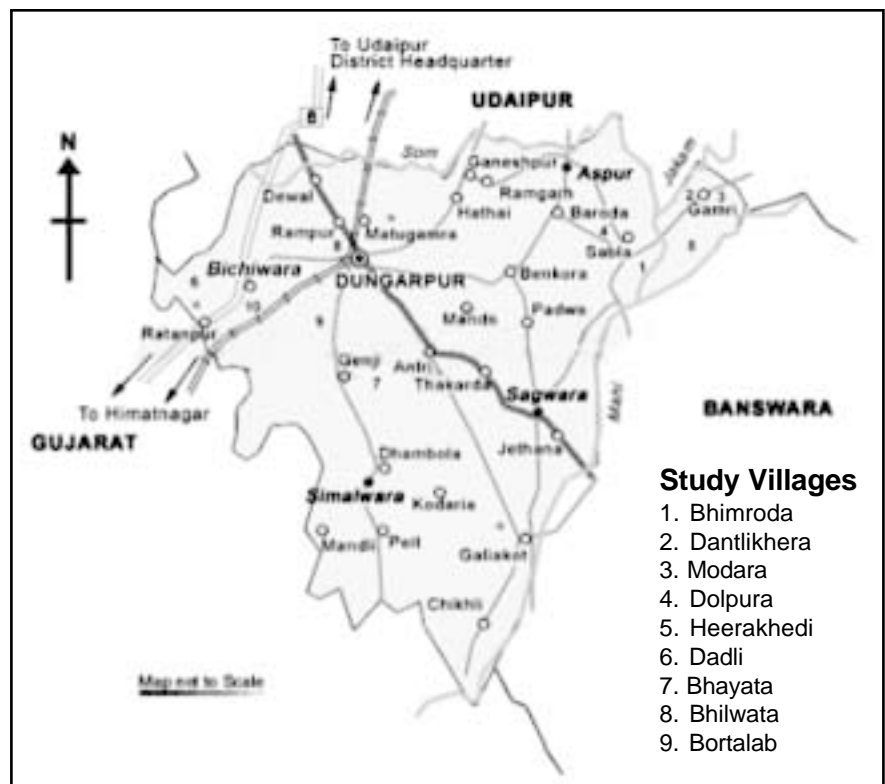
The main occupation of the people is agriculture. Major crops grown are paddy, oilseeds and pulses. The tribal people depend mostly on subsistence farming, which does not yield any commercial surplus. Irrigation facilities are inadequate and the TPs are the worst sufferers during the lean season (an annual feature) and in times of disasters. A large number of people are involved in mining and industries. Some caste groups pursue fishing and hunting and there is a small handicraft industry. Animal rearing is also a common occupation. Villagers rear cattle, sheep, goats, poultry, ducks and pigs for sale as well as their own use.

Administratively, the district is divided into four sub-divisions, nine *Tehsils*, and 26 Community Development Blocks. There are a total of 3,945 villages having 316 Gram Panchayats. Infrastructural development is very poor. There are very few good roads and there is no railway link. Many villages are usually cut off during the rainy season. Around 55 percent of the villages have electricity.

The Public Distribution System (PDS) is in existence but there are only 1,911 retail shops catering to 3,718 villages. Tribals living at the foothills and in the forest areas of Simlipal Hills hardly get any benefit from this service. Public health services are inadequate and almost non-existent in the forest areas.

1.3.2 Dungarpur (Rajasthan)

Dungarpur is the southernmost district of Rajasthan. It is the smallest district in the state, covering 3,770 sq. km (1.1 per cent of the total area of Rajasthan). It borders Banswara district in the east, Udaipur in the north and Gujarat state in the south and west. It is located in a physiographic sub-region called the "Rajasthan Hills and Plateaus." on the southern edge of the Aravalli Hills. Soils



are red to brown loamy type, medium textured, non-calcareous and well-drained and can be classified into sandy loam, clay loam, red clay and heavy clay. The fertility of the soils in the district is considered high but the productivity is rated as low for the whole district. Somewhat better conditions prevail in the south-eastern and western parts. Forests existed in the region earlier but they are today almost completely denuded, producing polanda grass at the most, along with some bushes.

There are three rivers and their tributaries running through the district. Of more importance, though, are traditional dug-wells. Control over water varies with the scale of installation and the purpose for which it is being used. Irrigation water tends to be regarded as a private commodity while water for drinking is regarded as common property.

The average annual rainfall in the district is 651.2 mm, which is higher than the average rainfall of 586.4 mm for the state. As much as 92.5 percent of this rainfall comes from southwest monsoon and is highly erratic. The district has faced 24 drought years in a span of 45 years from 1963 to 2000. In the drought of 1999-2000, all the 871 villages of the district were affected.

Rajasthan is the only state of India where half of its 32 districts suffer from scanty and erratic rainfall. In Dungarpur, deficit rainfall for three consecutive years has severely affected humans as well as cattle.

The provisional figures of 2001 Census record a population of about 1.1 million. The sex ratio of the district is 1027 women per 1000 men in sharp contrast to the state's average of 922. Only 7.3 per cent of the population lives in the two towns of the district — Dungarpur and Sagwara. As much as 66 percent of the population is tribal, the majority of them Bhils.

The literacy rate (48 per cent) in the district is among the lowest in the country. It is well below the state average of 61 percent and national average of 65 percent. Even this figure hides considerable disparities among different sections of the society.

The skills and capacities of the tribals in Dungarpur are subsistence oriented. Uncertainty of agriculture and easy availability of work through seasonal migration to the neighbouring state of Gujarat have reinforced this tendency. Only 12 percent of the total cropped area in the district is irrigated and land holdings are very small. Mostly dryland agriculture is possible and there is a strong emphasis on livestock rearing. Primary crops are maize, rice, jowar, wheat, various 'small grains' and bajra. Secondary crops are lentils and oilseeds. Cash crops include groundnut, sugarcane and chillies.

During a drought year, the tribals are more severely affected. They manage with difficulty even in a normal year. Apart from deficient rainfall, there are several other causes for the increasing drought conditions in the area. They include: depleting forests, depleting pastures, decreasing ground water, low investment on water conservation and mismanagement of natural resources.

Administratively, the district is divided into four *tehsils* — Dungarpur, Aspur, Sagwara and Simalwara — and five development blocks.

1.4 Methodology

The study was carried out in 10 villages of selected blocks of each district. Twenty households were selected in each village for detailed study using participatory methods. The key research areas were:

- The way of life of TPs, employment opportunities and the socio-cultural context.
- History of disasters and their impact on people and their lives.
- Knowledge about impending disasters.
- Preparedness – inward and outward flow of information.
- Emergency relief.
- Post disaster – immediate and long term.

Qualitative and quantitative tools were used to gather information. These included household interviews, transect walk, social and resource mapping, seasonality exercise, prioritising and ranking, timeline method, Venn exercise and focus group discussions.

The choice of blocks and villages was made on the basis of certain criteria. The main criteria were a predominant population of tribal people, size of village, level of dependency, and close linkages with natural resources. District and state authorities were also consulted during the selection process.

Involvement of concerned NGOs and tribal representatives was an integral part of the approach to the study. Right from the finalisation of tools, selection of study villages and training and placing of teams in the field, to sharing of outcomes, everything was carried out in a participatory manner. (See annex 1 for a brief profile on persons/organizations involved in the study). This team went through an orientation process at Delhi.

Both the NGOs further conducted the training of field investigators at their respective district headquarters. The training included introduction to the study, its objectives, the sampling and selection criteria, tools and exercises to be administered at the village and household level and the expected results and outcomes.

Other than primary data collection, data and information relevant to the study was also collected from the state and national sources. Discussions were held with individuals connected with and working on disaster management.

During the fieldwork, the team members faced some problems and constraints at various levels:

- People were concerned about present needs rather than what happened to them in the past, and therefore, could not entirely appreciate the timeline exercise.
- In a few places, they were apprehensive that as a result of the information they provided, their names would be struck off the Below Poverty Line list.
- Availability of people for discussions and interviews was not easy due to large scale migration and preoccupation with seeking local employment.

Attempt was made to retain some uniformity in the presentation of findings. However, this was not always strictly possible on account of non-availability of data at secondary level as well as differences in prioritisation of issues by the people at primary level. For instance, while early warning systems were given greater importance for impending flood in Mayurbhanj, this found relatively less mention in drought affected Durgapur, where people are constantly aware of this ongoing 'simmering' problem.



2. Coping Mechanisms in the Face of Natural Disasters

2.1 Overview of the Study Area

Two districts were selected for the study. These were frequently hit by two different kinds of natural disasters — flood and drought. At the same time, these districts fulfilled the condition of having a large proportion of tribal population. Within each of these districts, 10 villages were selected where the effects of disasters were the most severe.

The other main features of the two study areas are rampant poverty, close affinity to land, dependence on the dwindling natural resources and the resultant vulnerability to natural hazards of recurrent flood or drought. Some key features of the blocks covered under the study are outlined below. (Details in Annexures III and IV).

2.1.1 Mayurbhanj

The study covered three blocks of Mayurbhanj district in Orissa. Ten villages were selected for their proximity to the Subarnarekha and Budhabalang rivers. They were therefore prone to frequent flooding. The three blocks are:

Udala: Situated 48 km from district headquarters, the block has 81 villages, of which 16 are prone to flash floods. Three of these villages — Raidanda, Narharipur and Kalapahad, were selected. The average ST population of these villages is 78 percent.

Barasahi: This block, 32 km from the district headquarters, has 225 villages. Of these, 49 experience flooding. Four of these villages included in the study were Kunchibania, Sankucha, Barihapal and Kulkotha, with an average tribal population of 83 percent,

G. B. Nagar: Situated 28 km from the district headquarters, the block has 129 villages, 22 of which are flood-prone. Three of these villages selected were Deogaon, Parichipur and Gaghra with an average tribal population of 52 percent.

The average tribal population in the study villages was 72 percent, much higher than the district average of 58 percent, comprising the Santhal, Bathudi, Bhumij and Khol tribes. Six of the 10 villages did not have any irrigation facilities. The tribals practise subsistence farming on small land holdings of less than one hectare. They are thus heavily dependent on forest produce and animal husbandry. All 10 villages have 'ticketed land', i.e. encroached forest land. A majority of houses are 'kuccha', i.e. made of mud and thatching.

The lean season extends from June to September, which is also the flood season. Migration in search of wage labour is a common feature, especially during this period.

2.1.2 Dungarpur

In the Dungarpur district of Rajasthan, two blocks most severely hit by recurring drought were covered under the study.

Aspur: Situated 105 km from the district headquarters, the block has an average 49 percent tribal population and receives low to medium rainfall. Five villages selected from the block are: Bhimroda, Dantikheda, Modara, Dolpura and Heera khedi.

Bicchiwara: Located 67 km from the district headquarters, 83 percent of the population was tribal. It receives little rainfall. Five villages from the block are Dedli, Bhayata, Bhilwata, Bor Talab and Kodiya gunn.

The average tribal population in the two blocks taken together is representative of the district average of 66 percent. The tribal population is composed of a broad ethnic category called Bhils.

About four droughts during the last decade have lowered the water table in all the study villages. Though the tribals attempted soil and water conservation and afforestation through forest protection committees, successive droughts seem to have neutralized all efforts since no results were visible. Livestock holding has decreased by more than 30 percent over the decade.

The cropping pattern in the region is changing. Farmers in Aspur block are taking to mixed cropping, long practised in the Bicchiwara block. Tribals in Bichiwara are now looking for local seeds and minor millets. August to October is the main lean season with crop prices rising moderately between January and mid April. Festivals account for high expenditures in the months of October and January.

While the primary occupation still continues to be agriculture, drastic reduction in yields has forced people to look for alternative employment avenues. Better transportation facilities have encouraged migration in search of employment and better wages. Infrastructure development works such as community buildings, hand pumps, construction and repair of roads undertaken by the state government provide opportunities for wage labour. NGOs have helped in setting up credit groups, especially in Bicchiwara where the people's dependence on moneylenders has decreased. In the entire Aspur Block, there are only seven brick houses. The rest are all mud houses.

2.2 Coping Behaviour

Coping behaviour is built into the culture of the tribal people. Tribals have some special strengths such as social capital or solidarity, and the ability to survive on a wider variety of nutritional sources. However, this traditional strength has been consistently eroded by recurring disasters, poverty, low asset base, indebtedness and limited employment opportunities. This is true generally for those who are below poverty line, and many are tribals. The main coping strategies, triggered off by early indicators of impending disaster, are reduction in food consumption, pulling out children from school and putting them to work, borrowing, sale and mortgaging of assets, and increased dependence on

forest produce. The following trends emerged in an analysis of the findings of the study. (Detailed findings are provided in Annexures III B and IV B)

2.2.1 Changes in food consumption

A marked reduction in food intake as well as a change in food consumption patterns was noticed during times of scarcity. The type of food consumed depends greatly on what is available from the PDS. Low value foods from collected minor forest produce are widely used to substitute staple foods.

In Mayurbhanj, the normal staple diet of the tribal community is rice, consumed three times a day with some vegetable like potato or green leaves collected from the nearby open fields, backyard or forest. Generally, onion and chillies are the only supplement to rice. During the vegetable harvest season, when vegetables are cheaper, the villagers buy affordable vegetables like brinjal, pumpkin and leafy vegetables. Villagers who have backyards also grow vegetables for their own consumption. Items like eggs, chicken and goat or pig meat are consumed occasionally during festivals or visits of relations.

In times of floods and scarcity, elders reduce their food intake in order to feed the children. They also switch to non-traditional food items made from wheat, such as roasted flour or *chapatti*. There are two reasons for this switch. First, wheat flour is supplied in the PDS during the relief period and secondly, cooking of rice requires more fuel, which is scarce during and after the flood. Rice intake is reduced by as much as 80 percent. The number of meals per day is also reduced. In the normal period, reduced number of meals were reported by 24 percent of households, and this went up to 85 percent during the lean period.

Another response during times of scarcity is substitution of staple food with low value foods such as wild berries, roots and other forest produce. Consumption of these items during the disaster period went up to 52 percent from 17 percent in normal times.

Dungarpur presents a far grimmer picture. There is hardly a 'normal' period in this region afflicted by continuous drought. The change in food consumption is therefore not so stark. People in these villages have been subsisting on low food intake for years. However, 44.5 percent of households reported further cuts in food intake during acute drought periods. Here again, adults cut down their intake more so that children can eat.

Over 80 percent households face food shortage for 4.5 months. They had stored food for 3.8 months. If this stored food is not available, the shortage would go up to 8.3 months.

The staple food of the people in this region has changed over the years. Traditionally, maize and minor millets were the preferred food. Maize and wheat are the two main foodgrains consumed now. Availability of wheat from the PDS has also changed the food habits. There is also a 28 percent increase in the consumption of substitute low-value foods such as roots and berries.

2.2.2 Reduced expenditure on education and health

One would expect health and education to be the first to be hit by a reduction in expenditure. But the situation is not vastly different from so-called 'normal' times. Since there are no savings, people cannot afford to spend on health even in normal times. If a member falls ill, the households normally resort to home remedies and local traditional healers. Lack of availability of health services or large distances of Primary Health Centres from the villages are also contributing factors. Hence the question of expenditure on health does not arise even in normal times. Health problems are further compounded during and soon after a flood, when the incidence of water borne diseases is much greater.

Though education is as good as free, children are taken out of school for either supplementing the family income or helping the family in household chores or gathering food and fuelwood. Natural disasters typically lead to withdrawal from school, increased incidence of child labour and increased household work for children.

In Mayurbhanj, about 8% of the families reported that they could not afford to send their children to school during and after the floods. Their children were, in most cases, put to gainful employment. This incidence increased from 9% in normal times to 16%. Sometimes the children are also forced to leave school as both the parents have to go out to work and older children have to look after their younger siblings or old grandparents.

In Dungarpur, the introduction of the *Shiksha Karmi*¹ has had a salutary effect on regular school attendance. This clearly indicates the positive impact of outside interventions, if undertaken with sincere commitment. Only 2.5 percent of the families removed their children from school at the time of dire need so that they may look after their younger siblings, and also assist in fetching water from far off sources.

2.2.3 Other employment, occupations and migration

The main occupation of the people in both regions being subsistence farming, it is bound to be adversely hit by flood and drought. Therefore, people look for alternative employment and resort to migration in search of wage labour. The assurance of well-remunerated employment was low even in normal periods in both the districts. The absence of this option means that the impact of disasters is more severe.

In Mayurbhanj, about half of the families (47%) had to seek alternative employment and this increased to 65% during disaster period. Availability of work is mostly in the months of July, August and September, except in Narharipur where people said that work is also available sometimes in April, May and June. Distress migration increased to 27% from a normal rate of 10%. Normally, migration starts during the harvesting period, i.e. from November till February. The extent of migration, however, varies from village to village.

¹ Shiksha Karmi- is a school system, where local youth are trained as teachers. The local schools encourage children to come as the teachers are committed and regular. Panchayat support has also been forthcoming in terms of basic infrastructure.

In Dungarpur, if rains are good, people engage themselves in agricultural work for 50 percent of their time. In drought conditions, people reduce their time on agriculture-related work by more than 40 percent and look for alternative employment in the non-agricultural sector.

Tribal people are also dependent on wage labour for their livelihood. Under normal conditions, they migrate for three to four months. But in drought conditions, migration lasts for more than six months. Drought conditions also force the entire families, including children, to migrate. (The trends are illustrated in Annexures III B and IV B.) Such large-scale migration is likely to depress wages in the receiving areas.

2.2.4 Borrowing

Poor tribals are the victims of exploitation by moneylenders. They normally fall into the vicious trap of debt bondage. This situation worsens in times of disaster.

In Mayurbhanj, 59 percent of the respondents reported that they had borrowed food from relatives and affluent people, compared to 27 percent during normal times. Repayment for food is sometimes in the form of daily wage labour. Three kg of borrowed rice is equivalent to one day of labour. If the value of rice is taken as Rs 6 a kg, a person receives the food equivalent of only Rs 18 for a day's labour, whereas the standard daily wage norm is Rs 60. About 22 percent of respondents in Mayurbhanj borrowed money in normal times. The proportion increased to 47 percent during and after floods. In the absence of any institutional credit facilities, they are forced to resort to private moneylenders at exorbitant interest rates ranging between 30 and 100 percent.

In Dungarpur, the tribals in the past used to depend on the local moneylender and were caught in a vicious debt cycle. But now some NGOs have initiated small savings through self-help groups and credit mechanisms, especially in Bichhiwara. Still, between 8 and 13 percent of tribals borrowed food and money in normal times, which increased to about 14 percent during drought periods.

2.2.5 Sale/mortgage of assets

In both the districts, assets like silver ornaments, brass or aluminium utensils were sold or mortgaged for food. In some cases, families were also forced to sell their meagre farm implements, cattle and other livestock. The sale of livestock increased in the lean season, i.e. from July to September, while it is low in January, a festival month. Livestock prices are high in the lean months of July-October, moderate in April-June while low from December to mid-February. Mortgage of land was reported by 3 percent of households.

2.2.6 Dependence on forest produce

For the tribal people, the forest has always been the main source of livelihood apart from being their home and habitat. It would therefore be expected that at times of distress the tribals would first turn to the forest for survival.

In both the study areas, this was the major recourse available to the people. However, denuding of forests has hit the tribal people the most. In both districts, deforestation has had an impact on their coping mechanisms. Earlier, they could depend on forests for wild berries and roots and *mahua* as

well as for fuel wood. Today “the forest has gone too far away” from their villages. In Dungarpur, the recurrent drought has put further pressure on the already dwindling natural resources and hence on the self-reliance of the tribal people.

2.2.7 Government assistance

Considering the vulnerability of tribal people to natural disaster situations, one would expect this to be a priority area for Government assistance during crisis events.

But it was found that by and large the tribal people did not have access to government assistance. The assistance depended largely on where they were located. If there was an NGO presence, as in the case of Dungarpur, then efforts were made to bring government officials and the tribal people in touch with each other. Education and economic position may have made it easier for the non-tribal population to access government assistance more easily.

In Mayurbhanj, dependence of the people on the government-run public distribution system (PDS) increased during the lean season and floods. Before the disaster, around 26 percent availed of PDS, which increased to 40 percent during the flood period. While the tribal people of this region hardly depended on outside support (1 percent) during the normal period, this increased to 45 percent during the troubled times. Apart from PDS, they looked for support by way of credit facilities and alternative employment.

2.2.8 Key responses

The coping mechanisms in both study areas can be summed up as follows:

- ▶ Reduction in food intake and number of meals, adults ensuring provision for children, and substitution of staple food with non-traditional food, etc.
- ▶ Borrowing of food or cash, sale/mortgage of meagre assets.

Table 1

Key Responses (figures represent percent of households)						
Coping response	Normal period		Lean/DisasterPeriod		Change	
	Mbhnj	D.pur	Mbhnj	D.pur	Mbhnj	D.pur
Reduced number of meals	24	8	85	45.5	61	37.5
Reduced portion size	19	8.5	81	44.5	62	36.5
Substitution with low value food	17	19.5	69	47.5	52	28
Gathering wild food	1	13.5	2	13	1	0.5
Use of Stocks/ PDS/ grain bank	23	49	35	62	12	13
Change in composition of seed stock	15	15.5	51	56	36	40.5
Borrowing money for food	22	12.5	47	25.5	25	13
Borrowing food directly	27	7.5	59	21.5	26	14
Alternative local employment	51	23	66	41	15	18
Migration	10	27.5	27	34.5	17	7
Children from School	1	1.5	8	3.5	7	2
Children in gainful employment	9	NA	18	NA	9	NA

- ▶ Migration for additional months in search of employment and better wages.
- ▶ Removal of children from school for gainful employment
- ▶ Dependence on relief measures, assistance from government departments and NGOs

All these measures reflect a high degree of helplessness among the tribals. Their previous self-reliance has been severely affected with the steady disappearance of their land and forests, which have always been the backbone of tribal economy. This, coupled with dire poverty and no reserves, renders them more dependant than ever on external support, which again is scarce, thus driving them to resort to coping mechanisms that would have a negative long term impact.

2.2.9 Difference between the tribal and the non tribal population

While non-tribal people also resort to the above coping measures, the extent or degree to which tribal people resort to such mechanisms is likely to be much more. To start with, the economic and social condition of the tribal people is far worse compared to that of the non-tribal people. For example, in the *Juda* watershed area in neighbouring Udaipur district², low water level forces most of the farmers to grow only a single crop. Low crop yields and farm income raises the twin issues of food scarcity and livelihood security. The evidence here is that tribal people are more severely affected. The non-tribal people have much better options, better quality land and higher nutrition levels. This is probably true of non-tribal people in Dungarpur too.

The tribals are exploited to a greater extent by moneylenders and are charged higher interest rates compared to non-tribal people. Both tribal and non-tribal people migrate in search of work. However, the extent of migration is much more among the tribal people. They have very few assets and are used to migrating in search of work, unlike the non-tribal communities who use this form of coping as a last resort.

Historically, the non-tribal people have had closer interaction with the administration and local governance structures. Tribal people, on the other hand, have had fewer interactions and are wary of government representatives and officials. The tribal people reported that they found it hard to get enough work at the relief centres. Non-tribal people tend to get work more easily. Tribals are not in a position to articulate their situation strongly. Moreover, because they are not 'credit-worthy', they are unable to get loans to invest in irrigation sources like wells.

² *Juda* Watershed – case studies on rural livelihoods, framework and practice, CARE India, 2000



3. Early Warning, Preparedness and Relief

Advance warning of impending disaster, preparedness and institutional relief are all necessary to minimize the impact on life and property of the people. It was found that the government system was inadequate in important respects. It was not tailored to help those who are in greater need — the tribal people.

3.1 Early Warning Systems

Tribal people have their own early warning systems woven into their culture. Their experience is that the government system is either inadequate or the warnings come too late when they have already set in motion their own coping mechanisms. Focus group discussions held with the tribal people in the study villages revealed a wealth of interesting information on warning systems and preparedness.

3.1.1 Traditional early warning systems

In both the study districts, the tribal people place a lot of faith and depend heavily on their traditional warning systems. They observe nature and the changes that take place in the flora, the behavior of animals, the rivers and the clouds. These changes, according to them, provide signals of impending disasters.

Respected elders and 'wise persons' within the community are consulted who normally make forecasts based on traditional wisdom and their experience. For instance, in Dungarpur, the *Garbi* (monsoon cloud reader) observes movement of clouds and makes predictions. The people in Mayurbhanj believe that if there is abundant production of mango and tamarind in the month of March, then heavy rains are bound to follow. The sound of the river — a roar that shuts out all other sounds — also indicates the arrival of floods. In both districts, and especially in Mayurbhanj, a particular type of movement of birds, ants and other insects are also accepted as traditional signs. Some of nature's signals are listed below. (village-wise details are provided in the Annexure).

- ▶ When the *Patangga* (flying insect) flies in the opposite direction of the river flow, it indicates heavy rain and flooding.
- ▶ Sighting of unusually large numbers of the *Hende Munjh* (big black ants) moving around with eggs indicates heavy rain.
- ▶ Unseasonal flying of the *Machharanka* (Kingfisher) means heavy rain and flood.
- ▶ Water falling from a thatched roof and forming bubbles indicates heavy rain and flood.
- ▶ Profuse flowering of the *Kadam* (a type of flower) and the *Siju* (a cactus flower) are symbols of impending floods.

3.1.2 Government early warning system

While the tribal people in Dungarpur area listen to the radio and read newspapers, besides depending

on traditional warning systems, they feel that the warning system of the government is weak and never in time. In Mayurbhanj, announcements are sometimes made through megaphones asking people to vacate their homes and move to safer levels. But these announcements are not clear and have little meaning if the traditional warning signs do not confirm the warning.

People in Dungarpur feel that the government warning is almost always too late. The district faced perpetual drought for several years. The official declaration of drought in September makes people wonder the purpose of announcement so late. By that time, the signs of drought — rivers and water sources drying up, low water tables — are starkly evident and people have lived through them for several months. When the rainfall data is available during the monsoon period, the government does not follow the definition of drought suggested by the National Water Commission. The Commission has clearly stated that: "...if in the rainy season, there are four such consecutive weeks which have less than 5 mm of rainfall per week, then that area will be classified as being drought affected".

3.2 Preparedness

Once the impending disaster is signaled, people prepare to face it in their own way. Preparedness depends on the perceptions of difficulties to be faced during the crisis. Therefore, it depends on the type of crisis and the economic level of the families. Some of the problems faced during the two kinds of crises — drought and flood— are common and some are vastly different due to the nature of the crisis. The phenomena common to both regions are acute scarcity of food and fodder, and migration. Therefore, one immediate measure common to both regions is reduction and change in food consumption pattern aimed at conserving food. Fodder is stored for the future and livestock is fed with available green leaves. Mortgaging of sale of assets is also common to both regions in view of increase in distress migration in search of employment.

3.2.1 Drought preparedness

In Dungarpur, farmers resort to cultivating short duration crops like minor millets, which are more suited to drought conditions and were grown traditionally there before the newer varieties were propagated. Increased efforts at soil and water conservation as well as afforestation are also reported. Tribal people start collecting non-timber forest produce such as *Ratanjot*, *Jatropha* and *Curcas* for use during the lean period. They sell this seed which is used as a preservative. People start digging new wells and deepening the existing ones to take care of the drinking and irrigation water needs.

People resort to borrowing food and money from moneylenders at high interest rates. However, saving and credit activities of self-help groups promoted by NGOs enable people to avail of easier credit in the villages of Bicchiwara block.

When crop failure looks certain, alternative employment becomes the main concern of the people. The first preference is wage labour through the State's infrastructure development program.

Non-tribal and better-off families also prepare for the crisis, but their priorities are different. They start stocking food for the lean period. They adopt secondary or alternative occupations like trade and flour milling.

3.2.2 Preparations to face flood

Tribal people in Mayurbhanj resort to some community measures in the face of impending flood. Sandbags are stacked at weak points to prevent or delay the entry of floodwaters into the village. Temporary shelters with bamboo are built on elevated roads and rope cots are readied to carry children and old people to safer ground. Country boats are also kept in readiness to ferry people to safer ground. All households contribute towards the purchase of these boats. More vulnerable members of the households, i.e. infants, young children and elders, are moved to safer ground at a height, or safer structures such as the local school building in advance. Livestock is also moved along, or sold off before the onset of flood.

At the individual family level, essentials such as rice and kerosene are stored. Dry food items such as roasted rice and minor forest produce such as tamarind seeds and dried *mahua*, are taken along. Necessary clothing and utensils are carried and kept in safe places. Cash and food are borrowed from moneylenders and families migrate to safer villages in search of wage labour.

3.2.3 Government Initiatives

Following the super cyclone in 1999, the Orissa government formed the Orissa State Disaster Mitigation Authority (OSDMA) with the support of the United Nations. As a result, District Disaster Management Plans are under preparation. In Mayurbhanj, the District Collector has formed five subgroups consisting of various heads of departments to formulate the 'Disaster Preparedness Plans'. The groups are based on guidelines provided by the High Powered Committee of the Government of India. The district planning exercise for Dungarpur is expected to be taken up in the near future.

3.3 Relief

The responsibility of providing relief during natural disasters falls on the government, which has the proper machinery, logistics and resources for this. But in areas frequently visited by disasters of a kind, local communities and NGOs have also been active in providing relief and rehabilitation services.

Since the nature of the two types of crises is different, the nature of the relief is also different. As the drought intensifies, those who stay behind need relief and assistance. But people in Dungarpur complained that the government relief was provided for a very short duration. The problems of Mayurbhanj are different. People have to be provided food and medicines during the floods. Once the floods recede, measures have to be taken to repair damages.

3.3.1 Drought relief

The relief measures undertaken by the government in Dungarpur include:

- Afforestation programs run by government and non-government organizations, road construction and repairing work by Public Works Department (PWD) and *Panchayat*.
- Self-help groups run by NGOs disburse credit and banks give some assistance to a limited number of families.
- Government launches support programs for families below the poverty line (BPL).
- *Indira Awas Yojana* (housing project) provides wage employment to people as they are engaged in masonry work.
- Government and NGOs start projects for deepening of wells

3.3.2 Flood relief

The relief and rehabilitation steps taken by the government in Mayurbhanj include:

- Monetary assistance for rebuilding of houses. Relief was to the tune of Rs. 1,000 for partly damaged houses and Rs. 2,000 for partly collapsed houses. This is found inadequate. Replacement of thatched roofs that get swept away cost Rs. 3,000. But as per government norms, the compensation is only Rs. 1,000.
- Government launches Food for work (FFW) programs to raise the embankments of affected villages, under which part of the wages are given out as foodgrains.

3.3.3 Community initiatives

Traditionally, tribal cultures have their own norms that reflect cohesive relationships. Poor and badly affected families are assisted in cash and kind. Several communities have also found ways and means to provide loans to those in need. Here are a few examples:

In Barihapal village of Mayurbhanj, people came together to set up a community fund (*Gaon-O-Tain*) and bought tribal musical instruments. After the flood, these instruments were rented out and the income accrued was loaned to members so that they could buy food for their families.

In Dungarpur, self-help groups put aside their savings (sometimes running into hundred thousands of rupees) and used them to assist families badly affected by the drought, through timely loans.

3.3.4 Relationships with service delivery systems

People's relationship with government and other institutions are important in accessing relief funds and supplies. The study obtained measures of the strength of the relationship between tribal people and different government agencies and institutions.

In Dungarpur, the findings were:

- People gave more importance to the government education department than *Gram Panchayats*. Out of the 10 villages studied, seven reported a 'high' level of relationship with schools and five with *Panchayats*. Banks have the same high score, especially in Bichhiwara block where all five villages had good relationships due to the existence of credit groups. This was not the case in Aspur block, where credit groups have been formed only recently.
- People in six villages said that the public distribution system provided benefit earlier, especially in times of crisis. But now only BPL families (15 per cent) are getting benefits. Five villages termed their relationship as 'medium' while the other five said the relationship was nothing much.
- Five villages have a high to medium level relationship with health department and the remaining five do not have much of a relationship.
- PWD, veterinary, police & postal services only provide occasional services and therefore these institutions do not mean much to them.

- All 10 villages have a high to medium relationship with one NGO. This institution is working towards women's empowerment, formation & strengthening of credit groups, establishment of linkages with banks and sustainable development of natural resources.
- Seven out of 10 villages have high to medium relationship with the social leader called "*Gameti*." People follow his instructions and advice. But, this relationship has changed now because of the new political environment.
- Moneylenders were important in six out of 10 villages. The relationship becomes stronger at times of crisis. This is changing now due to micro-credit mechanisms, which have been put in place.

In Mayurbhanj, peoples' experience of support services was less positive.

- The school teacher was described as the main source of information bringing in news from the block office.
- Panchayat representatives and block officials are approached only occasionally when the need arises
- Child Health Centres and Primary Health Centres are located too far and during illness people prefer to be treated by the village medicine man or 'Ojha'.
- People were generally not aware of Village Level Workers (VLW) and health workers.
- People viewed the Public Distribution System (PDS) with skepticism on account of its performance during the 1999 cyclone. Most people had lost or damaged their ration cards and the PDS stopped providing essential commodities like rice and kerosene when these were needed the most. Even in normal times, poor tribals can seldom avail of this service as the PDS dealer is reported to be selling these commodities at higher price to the "Dikus/Babus" i.e. the general category people.



4. Summary of Major Findings and Recommendations

4.1 Overall Findings

Two aspects of findings emerge from the study. One, the declining natural resource base is making the life of the tribal people difficult even in normal times and ecological imbalance is increasing the frequency and severity of disasters. The combined effect of these has severely eroded their coping capacity. Two, tribal people have their own traditional strengths which can be capitalised upon, such as – social capital or community solidarity, the ability to survive on a wide variety of nutritional sources and a wealth of indigenous knowledge systems and practices, both to predict disasters and to face the challenge.

4.1.1 Capacity erosion

4.1.1.1 Deforestation

Deforestation and over-extraction of natural resources has resulted in vulnerability and disintegration of families. This is eroding the ability of the tribal people to cope with the crises.

4.1.1.2 Lower production capacity

Crop yields in Dungarpur have decreased significantly as a result of recurrent drought. Fragmentation of land holdings has further complicated the matter for both the areas. Agriculture can now provide only four to five months' grain requirement of a family.

4.1.1.3 More migration

The harsh conditions have resulted in forced migration for longer periods. In Dungarpur, male members are forced to migrate to far away cities, mainly in Gujarat and Maharashtra, for up to six months in a year to eke out a living. This means that women and children are left behind to fend for themselves for a larger part of the year. Non-farm employment opportunities are not locally available in both the study areas.

4.1.1.4 Dwindling assets

Repeated natural disasters have led to dwindling of assets of the tribal people. People have to sell off or mortgage assets in the face of crises. In the last 10 years, the herd size in Dungarpur has decreased by more than 30 percent. The composition of livestock has also changed.

4.1.1.5 Drinking water scarcity

In Dungarpur, women and children have to trudge longer distances to get water. Poor people sometimes have to borrow money to buy water, pushing them into further debt. In Mayurbhanj, safe drinking

water is not available in the villages. No measures are taken to disinfect the drinking water sources after floods.

4.1.1.6 Poor health services

Health services are very poor or non-existent. For most of the villagers in Mayurbhanj, primary health centers are of no use since they are far away from their villages. People depend on local traditional healers. Modern health services are most needed after the floods when the incident of water-borne diseases is very high.

4.1.1.7 Inadequate relief

In times of natural disaster, the relief is not timely. Even if the relief reaches the tribal people, it is either too late or does not meet their requirements.

4.1.2 Coping behaviour

4.1.2.1 Traditional knowledge

There exists a wealth of traditional knowledge on early warning systems. The information yielded by this small case study is a clear indication of the existence of greater indigenous knowledge on natural disasters¹.

4.1.2.2 Community coping mechanisms

Tribal people have their own mechanisms for coping with the crises. But in times of natural disasters, these mechanisms sometimes break down. If there were sufficient grain production or income for the year, the normal coping strategy would be to store the food for difficult times. But with food available for only part of the year, the family coping mechanisms centre round reduction in food intake and distress migration in search of alternative employment.

4.1.2.3 Traditional water harvesting

Tribal people have learned to live in inhospitable conditions over the centuries. For instance, people in the low rainfall or drought-prone areas depended on traditional water-harvesting techniques and had built structures. These structures are now in disuse because of misplaced priorities of the government and lack of support.

4.2 Recommendations

The basic thrust of government action for mitigating the impact of natural disasters should be two-fold — make the tribal people self-reliant by restoring the natural resource base and provide timely and effective relief and rehabilitation package during disaster. Tribal regions, especially those prone to natural disasters need a convergence of efforts on the part of government, non- government and private sector organizations, and the tribal people themselves. Communities should be involved in

¹ A clear example of this is borne out in the study on The Flower-Rat-Famine connection in Mizoram “Tribals, Rats, Famine, State and the Nation”, Economic and Political Weekly, special article, March 24, 2001; Another study done by ActionAid provides indicators for indigenous early warning systems – “Indigenous Early Warning Indicators of Cyclones: Potential Applications in the Coastal Chars of Bangladesh” Intensive Community Disaster Preparedness Programme, Action Aid – Bangladesh, July 2000.

deciding the steps that would affect their lives. This would require both policy level as well as program level interventions.

4.2.1 Policy level interventions

4.2.1.1 Economic policies

There is a need to develop special strategies for economic development in disaster prone settings which focus on the special needs of vulnerable groups such as tribal people.

4.2.1.2 Rehabilitate agriculture

There is an urgent need to provide improved agricultural technologies suited to the specific regions rather than replacing the traditional crops and practices with technologies perfected elsewhere.

4.2.1.3 Tribal component

The relief and rehabilitation plans should have a special tribal component so that the aid relates to their particular situation and needs. For instance, the famine relief code needs to be reviewed not only in the light of the present day context, but also with a view to incorporating special provisions for tribal regions.

4.2.1.4 Community-centered approach

The government needs to develop a participatory approach to planning, development and disaster management. Legal provisions already exist for *Gram Panchayat* level planning. They should be extended to disaster management and preparedness.

4.2.1.5 Legal issues

Some legal issues like Land Acquisition Act of 1894 and the Forest Tenancy Act of 1927, need to be reconsidered and reviewed so as to empower the tribal people and remove hurdles in the way of traditional livelihoods.

4.2.2 Programme level interventions

4.2.2.1 Immediate measures

A community based disaster management plan and a timely and effective relief and rehabilitation strategy is needed immediately. It should have the following elements.

4.2.2.1.1 Streamlining of information systems

There is need for a scientific approach to information management, especially in the tribal areas. Local skills should be developed so that the information is intelligible to all members and reaches quickly. An attempt should be made to integrate time-tested traditional warning systems to ensure better acceptability by the tribal people of early warnings.

Such a disaster management information system must take into account the following components:

I. Pre-disaster:

- Risk Assessment, (including hazard assessment and vulnerability analysis)
- Hazard Detection
- Hazard Prevention

Communication and Dissemination
Public Awareness
Co-ordination

II. Post-disaster support

A scientific approach to capacity building at two levels:

- a) Strengthening the technical side of information systems. This is essential in the creation, development and maintenance of a well-oiled DMIS.
- b) Developing skills at the local level so that the early warning derived from the DMIS can be disseminated to the community and masses. This requires empowering people and building skills that could be instrumental in enhancing their preparedness for a calamity. People must also be seen as both contributors to and users of disaster information.

Thus, in addition to the technological skills, communication and interpersonal skills are critical to effectively disseminating information. Concerted efforts have to be made to mould the complex information system in a manner that appeals to the local population and can be easily assimilated by them. This process may reduce information asymmetries that exist now. In the areas particularly vulnerable to natural calamities, networks of schools and colleges can be utilised as effective agents of dissemination of information, to develop well-functioning early warning systems.

4.2.2.1.2 Integrated approach

Each Gram Panchayat should be involved in preparation of a preparedness plan and a relief and rehabilitation plan. These plans should clearly outline what the people's committees will do and what support is needed from the administration.

4.2.2.1.3 Code of conduct

For the integrated approach to work smoothly, a code of conduct for government agencies, voluntary agencies and people's committees should be drafted, discussed and approved by all three concerned parties. Such a code should include payment of minimum wages.

4.2.2.1.4 Immediate employment opportunities

Reconstruction measures should involve the local people most affected by the disaster. Proper implementation of minimum wages, food-for-work scheme and credit facilities need to be ensured. Tribal sub-plans at the state and national levels have to address special problems of tribal people in disaster-prone areas. Employment opportunities in non-agricultural areas and micro-enterprises need to be explored. Employment schemes should be such that they build permanent useful assets for the communities. For instance, as stated by the tribal respondents, road building is carried out after every drought as part of Food for Work Programme, whereas what may be more useful is deepening of wells. This points to the need for better consultation processes at the local level.

4.2.2.2 Long term measures

The following are measures aimed at developing the capacity to prevent or mitigate disasters and strengthen preparedness, so that damage to life and property can be minimised and self-reliance of the people strengthened.

4.2.2.2.1 Restoration of natural resource base

The government and other actors treat most disaster events as inevitable and as part of the normal cycle. The answer is restoration of the natural resource base, not as part of relief, but as a normal development activity. This is necessary to build the community's capacity to fight back a disaster in terms of resources as well as ability.

Water harvesting and conservation schemes: There is an urgent need for launching water conservation schemes. Traditional water harvesting structures should be built and existing ones be made operational. This is not only needed in drought-prone Dungarpur but also in Mayurbhanj. When there are no floods, Mayurbhanj suffers from water scarcity. Traditional water harvesting systems should be complemented with modern technology to maximise the benefits of both systems.

Forest protection: Receding forests in both the study areas are on the one hand aggravating the severity of the disasters and on the other hand limiting the capacity of the tribal people to cope with these disasters. There is an urgent need to launch programmes for regeneration and protection of forest by involving the local people.

Sustained economic growth: Economic growth, poverty reduction and employment expansion directly increase the capacity of communities and individuals to cope with natural hazards. In tribal areas this has to be achieved without damaging traditions and values.

4.2.2.2.2 Building people's institutions

Integrating traditional institutions: District authorities should request the voluntary agencies to come up with a plan to promote self-reliance through village level institutions and for building people's capacities (including life saving skills). A district level calamity relief fund should be set up. Monitoring and evaluation mechanisms should be built at village and district levels ensuring transparency, accountability and social audit.

Set up grain and fodder banks: The concept of grain and fodder banks should be revived and saving habits promoted. Grain banks set up by self-help groups and NGOs are operating in several villages. There should be an institutional support for covering all at-risk villages through grain banks wherein villagers save and deposit grain in the common bank for use in times of need. To start with, the government can donate or loan the excess grain lying in its godowns. These grain banks can be replenished and sustained by the people during normal crop years.

4.2.2.2.3 Sustainable employment opportunities

Increased employment opportunities in labour intensive and preferably agro-based industries need to be created, keeping in view the tribal peoples' preference for land and forest related activities. Value addition to agricultural as well as minor forest produce of the region with simple technology would help augment their incomes. Self-employment opportunities in areas identified by the people, including traditional handicrafts, need support with capacity building, skill upgradation to suit market requirements, and micro credit.

4.2.2.2.4 Documentation of traditional warning systems

There is need to document the time tested traditional disaster warning systems and consider incorporating them into the local warning systems for disaster forecasts.

4.3 Conclusion

Tribal regions, especially those subject to recurring natural hazards call for a convergence of efforts on the part of government, non-government institutions, the private sector and most importantly, the tribal people themselves. Preparedness measures need to integrate traditional systems with modern technology in order to build crop and water reserves for future contingency.

There has to be openness and transparency, dialogue and discussion between government and people on development plans. Community management of natural resources and creation of new assets have to be given top priority. Convergence and coordination of various departments will go a long way in optimal utilisation of resources.

While immediate preparedness and relief measures form an important part of natural disaster management, it is the longer term measures for disaster proofing that would strengthen the coping capacity and self reliance of tribal people. An environment of economic growth, reduced poverty and expanding employment would greatly improve coping capacity of the tribal people, provided it does not destroy their values and community structures. At the same time, it must be stressed that self-reliance of the community by no means absolves the government of its responsibility. A synergy needs to be developed between the state and the people, building effective partnerships for effective development.

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Annexure 4B : Participatory Learning and Action (PLA) Outputs – Mayurbhanj

- Seasonal Calendar Analysis
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- Other Assets Management
- Wage Labour

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Key Data - Dungarpur

(Source: District Statistical Handbook, Dungarpur, 2000)

1. Population status in study area (1991)

Total Population	Dungarpur District			Bichhiwara Block			Aspur Block	
	Male	Female	Total	Male	Female	Total	Male	Female
874549	438324	436225	180805	91491	89324	146507	71377	75130
S.T. Population 5,75,805 (65.8%)	288537	287268	150269 (83%)	75844	74425 (48%)	71056	34928	36128
Total Literate 2,14,352 (24.5%)	160325 (74%)	54027 (25%)	35921 (20%)	29081 (80%)	6840 (20%)	32305 (22%)	24416 (75.5%)	7889 (24.5%)

The 1991 census indicates a total population of 8,74,549, that is 2% of the total population of Rajasthan. The decennial growth of the population 1981-91 was as high as 28.8%, against a national average of 24%. The average population density is 232 persons per sq. km.

2. Spread of Tribal population in District (1991)

Total District	Total ST population in District	Dungarpur Tehsil	Aspur Tehsil	Sagwara Tehsil	Simalwara Tehsil
874549 (100%) (83%)	575805 (66%)	222842 (73%)	71056 (48%)	124539 (53%)	157368

Dungarpur district has a heterogeneous population with a predominantly tribal presence, the great majority of whom are Bhils. 92.7% of the population is rural of which 70% is tribal. There is also a relatively larger concentration of tribal population in Dungarpur, Bichhiwara and Simalwara tehsils.

3. Block wise population (1991)

Sl.	Name of Block	Total	S.T	S.C	Others	% S.T
1	Dungarpur	133212	110702	3807	18703	83%
2	Bichhiwara	180809	150269	5286	25254	83%
3	Sagwara	160585	86746	8195	65644	54%
4	Aspur	146507	71056	8980	66471	49%
5	Simalwara	195519	148349	9543	37607	76%

4. Land use in Dungarpur and Rajasthan

	Dungarpur		Rajasthan		
	Hect. of 1988-1989 (Total)	% of 1988-1989 (Total)	Hect. of 1979-1980 (Total)	% of 1979- 1980 (Total)	1981% of (Total)
1- Agriculture/ Culturable Land	229164	59	222827	59	81
a- Net Sown Area	124187	32	120015	32	46
b- Fallows	35203	9	34634	9	12
i- Current Fallows	12197	3	-	-	6
ii- Old Fallows	23006	6	-	-	6
c- Other Cultivated Land other than Fallows	42617	11	43689	12	12
i- Misc. Tree Crops and Groves					
ii- Pasture and Grazing Land	2859	1	-	-	1
d- Cultivable Waste					
2- Non Cultivable Land	39758	10	-	-	5
a- Forest	27157	7	24489	7	18
b- Wasteland	156426	41	141398	37	19
c- Land put to Non Agriculture Use	61481	16	66480	18	6
Total	79909	21	74918	20	9
	15036	4	14975	4	4
	385590	100	379200	100	100

Table 4 provides the breakup of land use in Dungarpur for 1988/89 and 1979/80. For comparison the figures for the whole of Rajasthan, and the relative percentages are also given. Figures show that Dungarpur has proportionately less agricultural land, a little less land in fallow, and less cultivatable waste than Rajasthan in general. On the other hand there is more grazing land, 'forest', and un-cultivable waste in Dungarpur than is found in the rest of the state.

5. Decline of Forests in Dungarpur

S. No.	Year	Forest area in km.	Decline in the area %
1	1972-1975	309	
2	1980-1984	167	- 46

Forest Types

S. No	Type of the forest	Area	%
1	Teak Forest	22819	46.8
2	Miscellaneous Forest	2163	4.5
3	Blanks or depleted Forest	23778	48.8

These are official statistics and should be treated with some caution. 'Forest', for instance, do not denote forests in a vegetative sense, but only land vested with the Forest Department. Even then Dungarpur has proportionately less 'forest' compared to the official national average of 22%.

Forests are still of great importance to the people of Dungarpur providing fuel wood, grazing, fodder, some small timber and minor forest produce. All this is mainly for domestic consumption, although some products illicitly also enter the market. Minor Forest Produce mainly tendu leaves, mahua and ratanjot seeds are of marginal importance.

6. Rain Fall Status (Last 17 Years)

Year	Expected Rainfall (mm)	Actual Rain fall (mm)	Difference from actual (high/below mm)
1984	794.6	892.2	(+) 98.3
1985	790.3	401.0	(-) 389.3
1986	794.7	555.0	(-) 239.6
1987	794.7	588.0	(-) 260.7
1988	619.0	761.7	(+) 142.7
1989	761.7	655.1	(-) 106.6
1990	761.7	1022.5	(+) 260.8
1991	761.7	634.0	(-) 127.7
1992	761.9	653.2	(-) 108.7
1993	702.8	740.7	(+) 37.3
1994	761.7	724.3	(-) 3.74
1995	653.9	559.7	(-) 9.42
1996	653.9	804.8	(+)150.9
1997	732.9	815.2	(+) 82.5
1998	737.1	732.0	(-) 5.1
1999	728.9	530.2	(-) 198.7
2000	728.0	402.0	(-) 326.0

In the last 10 years, 1990, 1993, 1996 and 1997 were reasonable years as far as rainfall is concerned. The normal annual rainfall of the district is 651.2 mm., which is higher than 586.4 mm. being average rainfall for the state. The district gets 573. Mm. Rainfall or 92.52% of the total rainfall from the south west monsoon.

7. District wise villages affected by Drought (1999-2000)

	Total Village	affected Villages		Total affected Village
		50-74%	75-100%	
Ajmer	1056	143	906	1049
Alwar	1987	240	182	422
Banswara	1472	-	1455	1455
Bara	1216	199	204	403
Badmer	1941	1185	586	1771
Bharatpur	1392	1	21	22
Bhilwara	1780	191	1586	1777
Bikaner	783	373	261	634
Bundi	863	364	312	674
Chhittorgarh	2415	1688	658	2346
Churu	990	358	600	958
Dosa	1060	489	479	968
Dholpur	584	-	-	-
Dungarpur	871	-	871	871
Sri Ganga nager	3026	10	51	61
Hanumangarh	1912	76	330	406
Jaipur	2312	68	2158	2226
Jaisalmer	637	16	567	583
Jalor	712	46	666	712
Jhalawara	1613	1364	221	1585
Jhunjhunu	865	534	331	865
Jhodhapur	637	16	567	583
Karoli	799	696	76	772
Kota	937	339	22	361
Nagor	1502	772	373	1145
Pali	968	30	916	946
Rajsamand	1004	31	973	1004
Sawai madhopur	800	503	76	579
Sikar	1000	585	414	999
Sirohi	474	18	447	465
Tonk	1102	7	1095	1102
Udaipur	2375	251	2123	2374
Total	41528	10768	19817	30585

In the year 1999-2000 all villages in Dungarpur district were totally affected by drought.

8. Drought in a period of 45 years in Rajasthan (1963 to 2000)

Name of District	No. of Drought Years
Ganga Nagar	26
Bikaner	30
Churu	31
Jhunjhunu	28
Sikar	25
Alwar	23
Bharatpur	21
Dholpur	21
Jaipur	26
Nagor	28
Jodhpur	31
Jaisalmer	32
Badmer	31
Jalor	29
Sirohi	24
Pali	27
Ajmer	30
Tonk	28
Karoli, Sawai Madhopur	24
Bundi	24
Bhilwara	30
Kota	19
Chhittorgarh	22
Udaipur	28
Jhalawara	30
Dungarpur	24
Banswara	25

Dungarpur has faced 24 drought years in 33 years. There are other districts, which have also been severely and repeatedly affected in the last 33 years.

9. Demographic Data of 10 Sampled Villages

The Table below shows salient demographic features of the sampled villages. Striking features are:

- Tenant farmers are there in each of the households.
- Arable land holding is very low per household.
- All households do possess a certain number of livestock.
- 2 out of 10 villages show low percentages in terms of boys and girls attending schools.
- In 4 out of 10 villages, the percentage of family members seeking wage work is less than 33%. In 3 others, it is as high as 73, 80 and 96 percent respectively.
- 3 out of 10 villages are not electrified and water resources in all the 10 villages are largely wells.
- While all 10 villages have SHGs, except for 1 village, the remaining nine also depend on local money lenders.

S. No.		Bhimroda kheda	Dantli	Modara	Dolpura	Heera khedi	Dedli	Bhayata	Bhilwata	Bor talab	Kodiya gunn
1	Households / population	124/670	33/149	135/762	180/1074	67/349	122/702	56/308	28/139	78/418	197/970
2	No. of Castes	4	1	5	5	2	4	7	3	4	3
3	Own arable land (in hect.)	12.6	42.4	20.48	10.6	6.8	4	12.9	6.3	13.8	7.1
4	Total Land owing among HH (in hect.)	108	68.64	122.4	113	20.9	48.6	37.1	12.2	90.7	184.8
5	Tenant Farmers	124	33	135	176	67	123	57	28	78	202
6	Type of housing										
	Mud house	122	33	132	174	67	123	57	28	78	202
	house	2		03		02					
7	Livestock ownership	752	363	1201	2235	403	763	368	147	409	824
8	Average no of family members	5.4	4.5	5.64	6.1	5.3	5.7	5.4	4.96	5.35	4.80
9	Percent of boys attending school (6-14 yr.)	69	15	68	72	41	76	45	24	58	59
10	Percent of girls attending school (6-14 yr.)	29	08	57	58	32	77	25	16	29	37
11	Percent Members working outside community	96	12	73	80	23	45	29	15	36	58
12	Primary Occupation	Agri.	Agri.	Agri.	Agri.	Agri.	Agri.	Agri.	Agri.	Agri.	Agri.
13	Education-Adults	Nil	-	10	-	Nil	-	-	-	-	-
14	Market Facilities (Distance)	Sabla-15 km Richha-05 km	Nithauva 9 km	Nithauva 7 km	Sabla 7 km	Bhatwara 1 km	Ratapur 7 km	Genji 3 km	Dpr. 5 km	Mada 6 km	Mewada 7 km
15	Block office (Distance)	Aspur 30 km	Aspur 44 km	Aspur 42 km	Aspur 23 km	Aspur 24 km	Bichhiwara 17 km	Bichhiwara 36 km	Bichhiwara 25 km	Bichhiwara 26 km	Bichhiwara 25 km
16	Leadership	Bopa, Sarpanch	Bopa, Sarpanch Gameti	Sarpanch Gameti	Sarpanch Kotwal	Gameti	Gameti	Gameti Sarpanch	Gameti Sarpanch	Gameti Sarpanch	Sarpanch V.L.C.
17	Water Resources	River Wells	Stream wells	Pond, well Hand-pump	Pond, river, wells	Wells	Wells	Wells Hand-pump	Wells	Wells	Dam, Wells
18	Health Services (Distance)	Oda-2 km Nithauva- 9 km	Malaria worker Nithauva- 9 km	P.H.C. Nithauva- 7 km.	P.H.C. Sabla-7 km.	A.N.M.	A.N.M. Ratanpur 7 km	A.N.M.	A.N.M.	A.N.M.	A.N.M.
19	Credit & Loans (Control & Access)	Through Mahajan system Through S.H.G.	Through S.H.G. Through Bank	Through S.H.G. Bank], Money leader	Through Mahajan S.H.G.	Through S.H.G. Mahajan					
20	Electrification	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(SHG – Self Help Group; PHC – Primary Health Centre; ANM – Auxiliary Nurse Midwife)

Participatory Learning and Action (PLA)

Outputs: Dungarpur

Wealth Ranking

As per the criteria defined by the people (below), 126 families (12%) fell in the 'better off category', 107 families (40%) in the "medium category" and 484 families (48%) in the "poor category". The coping mechanism of these 3 categories is indicated in Table 3B.3.

A. Criteria for better off category

1. Foodgrain available for more than a year.
2. Own land up to 15 bighas (2.4 hectare) and Rs 2000-3000 investment on irrigation.
3. Live in large size brick house of up to 33-35 feet length.
4. Cash money available up to Rs 5000.
5. High social status in the village/community.
6. All children attending school.
7. Easy access to credit.
8. Engaged in employment (private or Govt.)
9. Own additional business.

B. Criteria for medium category families

1. Foodgrain available for 6 to 8 months.
2. Land holding up to 10 bighas (1.6 hectare) and Rs 500 investment on irrigation facility.
3. Medium size mud house of 22-25 feet length.
4. Participate in the village/community level functions regularly.
5. Send children to school according to family convenience
6. No family savings

C. Criteria for poor families

1. Foodgrain available for only 3-4 months.
2. Depend on borrowing from moneylenders.
3. Small huts of up to 15 feet length.
4. Land holding less than (0.8 hect).
5. Children do not attend school.
6. Depend on wage labour for livelihood.

Coping mechanism with respect to wealth status

Wealth Ranking of villages		Coping Mechanism
Better off Category		
- Bhimroada - 29*	- Dadli – 6	- Use stored food.
- Datlikhera -0	- Bhilwata – 0	- Alternative secondary occupation (Like shops, flour mill)
- Modara -	- Bhayata – 19	- Undertake private Jobs
- Dolpura -27	- Bortalab – 14	- Sell goats and sheep
- Hirakheri-7	- Kudiya gun- 22	- Mortgage the ornaments.
Medium Category -		
- Bhimroada - 36	- Dadli – 26	- Reduce food consumption (oil, vegetables)
- Datlikhera -9	- Bhilwata -8	- Put off purchasing of cloth.
- Modara – 31	- Bhayata – 32	- Collect & sell NTFP.
- Dolpura –105	- Bortalab – 45	- Avail PDS facility.
- Hirakheri-62	- Kudiya gun-53	- Approach credit groups for loans.
		- Mortgage ornaments or land
		- Migrate for employment
Poor Category -		
- Bhimroada - 59	- Dadli – 90	- Cut down food consumption.
- Datlikhera - 24	- Bhilwata –20	- Avail food from PDS.
- Modara - 97	- Bhayata – 5	- Work in nearby villages and towns.
- Dolpura -48	- Bortalab – 19	- Approach the credit groups for loans.
- Hirakheri-0	- Kudiya gun-122	- Mortgage land
		- Migrate to big cities.

(* Number of households)

Time Line

The Table below shows village-wise time line of events between 1990 and 2000, the effect of these events on villagers and their coping mechanisms.

S.No.	Name of Village	Types of event	Effect of the event	Coping mechanism
1	Bhimroda	<ul style="list-style-type: none"> ▶ 1990 Excessive Rainfall ▶ Drought ▶ 2000 Storm. 	<ul style="list-style-type: none"> ▶ Mud houses collapsed ▶ Low crop production ▶ Large scale damage to houses 	<ul style="list-style-type: none"> ▶ Reconstruction of Houses ▶ Migration to cities ▶ Mortgage of ornaments
2	Datli Khera	<ul style="list-style-type: none"> ▶ 1995 Cattle disease ▶ 1998 to 2000 Drought ▶ 2000 Foot and Month Diseases 	<ul style="list-style-type: none"> ▶ Decrease in cattle productivity ▶ Large scale death of cattle ▶ Acute fodder scarcity ▶ Acute water shortage 	<ul style="list-style-type: none"> ▶ Use of traditional medicine ▶ Migration for employment ▶ Use tree leaves as fodder
3	Modra	<ul style="list-style-type: none"> ▶ 1998 Low Rainfall ▶ 1999 Drought ▶ 2000 Drought 	<ul style="list-style-type: none"> ▶ Low crop production ▶ Water reservoir dried up ▶ Fodder scarcity ▶ Increase in migration 	<ul style="list-style-type: none"> ▶ Use stored food ▶ Migration for employment ▶ Mortgage ornament and land. ▶ More people migrate in search of employment

S.No.	Types of event	Effect of the event	Coping mechanism
4	Dolpura <ul style="list-style-type: none"> ▶ 1999 Drought ▶ 2000 Severe drought 	<ul style="list-style-type: none"> ▶ Crop yield decreased ▶ Reservoir dried up ▶ Scarcity of fodder 	<ul style="list-style-type: none"> ▶ Mortgage ornaments and land. ▶ Migration for employment ▶ Menial work
5	Hirakheri <ul style="list-style-type: none"> ▶ 1998 Low Rainfall ▶ 1999 Drought ▶ 2000 Severe drought 	<ul style="list-style-type: none"> ▶ Low crop production ▶ No rice production ▶ Increase in male migration. 	<ul style="list-style-type: none"> ▶ Borrow food ▶ Linked with PEDO ▶ Credit group formed ▶ Migrate to big cities
6	Dedli <ul style="list-style-type: none"> ▶ 1998 – Low rainfall ▶ 1999 - Drought ▶ 2000 - Drought 	<ul style="list-style-type: none"> ▶ Only Kharif crop ▶ Low Production ▶ Water resources dry up 	<ul style="list-style-type: none"> ▶ Ornaments mortgaged ▶ Labour work ▶ Migrate to big cities
7	Bhayata <ul style="list-style-type: none"> ▶ 1994 Cattle disease ▶ 1998 Low rainfall ▶ 1999 Drought ▶ 2000 Severe drought 	<ul style="list-style-type: none"> ▶ Large number of cattle affected by disease ▶ Low crop production ▶ Water resources dried up 	<ul style="list-style-type: none"> ▶ Vaccination ▶ Ornaments mortgaged ▶ Labour work ▶ Migration
8	Bhilwata <ul style="list-style-type: none"> ▶ 1993 Flood ▶ 1998 low rainfall ▶ 1999 Drought ▶ 2000 Severe drought 	<ul style="list-style-type: none"> ▶ Water entered the houses ▶ Low crop production ▶ Fodder scarcity ▶ Foodgrain shortage ▶ Water scarcity 	<ul style="list-style-type: none"> ▶ People vacate houses temporarily ▶ Borrow food ▶ Labor work in cities ▶ Help from the credit group
9	Bortalab <ul style="list-style-type: none"> ▶ 1990 NRM works launched with PEDO help ▶ 1995 Fire in houses and barns ▶ 1998 Low rainfall ▶ 2000 Low rainfall 	<ul style="list-style-type: none"> ▶ Reduction in migration due to availability of employment ▶ Stored wheat and fodder burnt 	<ul style="list-style-type: none"> ▶ Affected people helped by villagers with food & fodder ▶ Search for employment ▶ Irrigation through other sources ▶ Temporary migration
10	Kudiyagun <ul style="list-style-type: none"> ▶ 1994 V.L.C. formed ▶ 1999 construction of dam, low rainfall ▶ 2000 Drought & cattle disease 	<ul style="list-style-type: none"> ▶ Work done on NRM ▶ Employment from dam ▶ Cattle died ▶ Scarcity of food & fodder 	<ul style="list-style-type: none"> ▶ Migration

Ranking of Problems (Village wise)

Note: The number denotes rank:

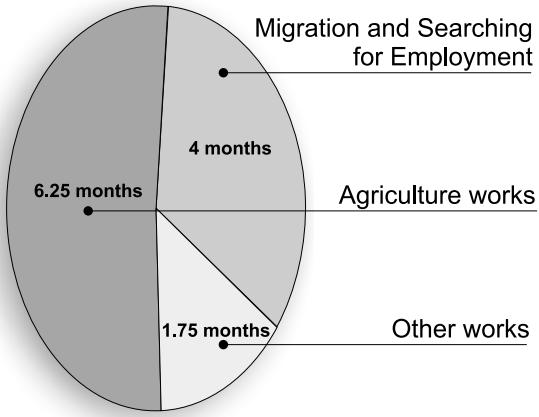
- 1 – most acute
- 2 – acute
- 3 – less acute
- 4 – least acute

Villagers were asked to list their main problems and to rank them as 'most acute', 'acute', 'less acute', and 'least acute'. Table 3B.5 shows village-wise results. The problems listed as priority problems included – water, fodder, foodgrain availability and employment. Water was ranked as the most acute problem in 3 out of 10 villages, fodder as most acute and acute in 7 out of 10 villages, foodgrain availability as most acute and acute in 3 out of 10 villages and employment as most acute and acute in 8 out of 10 villages.

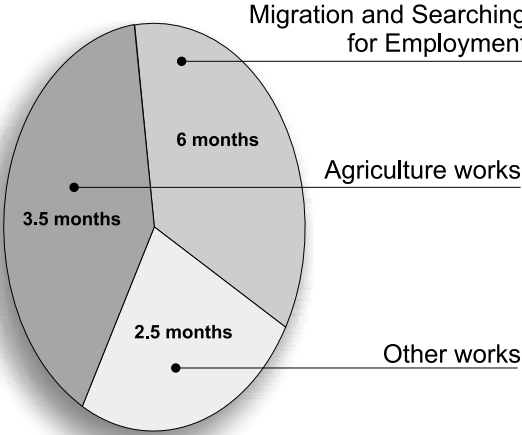
Name of village	Water	Fodder	Food	Employment
Bhimroda	1. <ul style="list-style-type: none"> ▶ Only one community well ▶ 3 Hand pumps dried up & 2 in working condition ▶ Most of private wells dried up 	3. <ul style="list-style-type: none"> ▶ Fodder not available as required ▶ Depend on tree leaves 	4. <ul style="list-style-type: none"> ▶ Low production due to low rainfall ▶ Food taken on credit 	1. <ul style="list-style-type: none"> ▶ Local employment not available
Datli Khera	1. <ul style="list-style-type: none"> ▶ All 3 wells dried up ▶ Depended on hand pumps ▶ Mahi river also dried up 	1. <ul style="list-style-type: none"> ▶ Because of drought people depend on forest 	1. <ul style="list-style-type: none"> ▶ Food production low. People depend on PDS and market 	1. <ul style="list-style-type: none"> ▶ People employed in drought relief work ▶ Some work in mines also
Modra	4. <ul style="list-style-type: none"> ▶ Low water output from hand pumps as water table drops ▶ Little water in wells ▶ Only two hand pumps working 	2. <ul style="list-style-type: none"> ▶ Not much fodder available in local forest 	1. <ul style="list-style-type: none"> ▶ Foodgrain shortage ▶ Dependent on market 	1. <ul style="list-style-type: none"> ▶ All the people are not getting employment in local relief works.
Dolpura	3. <ul style="list-style-type: none"> ▶ Water scarcity due to lowering of water table ▶ Only 3 wells and 2 hand pumps have water 	1. <ul style="list-style-type: none"> ▶ Dependent on outside availability 	4. <ul style="list-style-type: none"> ▶ Dependent on P.D.S. ▶ Borrowing food from market 	1. <ul style="list-style-type: none"> ▶ Everyone is not getting employment in local relief works

Name of village	Water	Fodder	Food	Employment
Hirakheri	3. <ul style="list-style-type: none"> ▶ Water level low in reservoirs ▶ Low water table 	1. <ul style="list-style-type: none"> ▶ Fodder available only in rainy season ▶ Dependent on outside availability 	4. <ul style="list-style-type: none"> ▶ Dependent on P.D.S. ▶ Low crop production due to lack of rainfall 	1. <ul style="list-style-type: none"> ▶ Employment opportunities not available locally ▶ Not all get employment in relief works
Dedli	4. <ul style="list-style-type: none"> ▶ Water table very low 	2. <ul style="list-style-type: none"> ▶ Dependent on tree leaves 	2. <ul style="list-style-type: none"> ▶ Dependent on P.D.S. 	1. <ul style="list-style-type: none"> ▶ Low employment opportunity in relief works ▶ Migration to big cities
Bhayata	3. <ul style="list-style-type: none"> ▶ Most wells dry up ▶ Less water in hand pumps 	1. <ul style="list-style-type: none"> ▶ Dependence on forest leaves 	4. <ul style="list-style-type: none"> ▶ Dependence on P.D.S. and moneylender 	1. <ul style="list-style-type: none"> ▶ All family members not getting employment. ▶ Migration to cities.
Bhilwata	1. <ul style="list-style-type: none"> ▶ Water table low ▶ Hand pumps produce less water 	1. <ul style="list-style-type: none"> ▶ Completely dependent on outside supply 	1. <ul style="list-style-type: none"> ▶ Food from market and P.D.S. 	1. <ul style="list-style-type: none"> ▶ Migration to cities for employment
Bortalab	3. <ul style="list-style-type: none"> ▶ Water available but quantity low 	2. <ul style="list-style-type: none"> ▶ Dependence on outside supply 	3. <ul style="list-style-type: none"> ▶ Dependence on P.D.S. 	1. <ul style="list-style-type: none"> ▶ Low opportunity for employment in local relief works
Kudiyagun	4. <ul style="list-style-type: none"> ▶ Water available but water table low 	3. <ul style="list-style-type: none"> ▶ Dependence on tree leaves 	2. <ul style="list-style-type: none"> ▶ Dependence on P.D.S. 	1. <ul style="list-style-type: none"> ▶ Local employment not available ▶ All member not getting employment.

Migration (Time Management)



In Normal Year



In Drought Year

Key Data - Mayurbhanj

1. Population status

Sl. No	Name of Block	Name of G.P.	Name of Village	Composition				% of ST
				S.T.	S.C.	OC	Total	
1	Udala	Khaladi	Raidandia	508	150	124	872	58.26
			Naraharipur	205	nil	66	271	75.65
			Kuchuladiha	170	nil	nil	170	100
2	Barasahi	Mangovindpur	Kunchibania	312	16	nil	328	95.12
			Chandanpur	400	76	nil	476	84.03
			Durgapur	379	nil	36	415	91.33
			Kulkotha	330	14	185	529	62.38
3	G.B.Nagar	Baradihi	Deogaon	788	145	258	1191	66.16
			Parichipur	101	97	69	267	37.83
			Pasuda	269	221	19	509	52.85

2. Ethnic composition

Sl. No	Name of Block	Name of Village	Total Number of households	Total Population	Av. Family Size	Names of the Schedule Tribes in the village
1	Udala	Raidandia	235	872	3.7	Bathudi, Santal,
2		Naraharipur	63	271	4.3	Santal
3		Kalapahad	35	170	4.8	Santal and Bhumija
4	Barasahi	Kunchibania	95	328	3.4	Khol, Santhal
5		Sankucha	109	476	4.4	Bathudi, Santal
6		Barihupal	72	415	5.8	Bathudi, Kolh, Santal
7		Kulkotha	102	529	5.2	Kolh, Bhumija
8	G.B.Nagar	Deogaon	219	1191	5.4	Bathudi
9		Parichipur	89	267	3.0	Bathudu, Khol, Santal
10		Gaghra	65	509	7.9	Bathudi
	Total		1084	5028	47.9	
	Average				4.8	

1. Land use pattern

Sl. No	Name of Block	Name of Village	Own arable Land (ac.)	Land Owning pattern	Tenant Farmers (HHs)
1	Udala	Raidandia	160	Ticketed land	15
2		Naraharipur	98	Ticketed land	8
3		Kalapahad	67	Ticketed land	2
4	Barasahi	Kunchibania	Na	Ticketed land	0
5		Sankucha	200	Ticketed land	10
6		Barihapal	67	Ticketed land	5
7		Kulkotha	16	Ticketed land	22
8	G.B.Nagar	Deogaon	3	Ticketed land	69
9		Parichipur	17	Ticketed land	77
10		Gaghra	20	Ticketed land	8

2. Own Land

Sl. No.	Name of Block	Name of <2 hect.	Landless the Village		# having >		# having 1 hect.		# having 1-2 hect.	
			#	%	#	%	#	%	#	%
1	Udala	Raidandia	3	15	12	60	4	20	1	5
2		Naraharipur	4	20	7	35	6	30	3	15
3		Kalapahad	2	10	7	35	8	40	3	15
4	Barasahi	Kunchibania	4	20	13	65	2	10	1	5
5		Sankucha	0	0	7	35	5	25	8	40
6		Barihapal	2	10	5	25	10	15	3	15
7		Kulkotha	7	35	7	35	4	20	2	10
8	G.B.Nagar	Deogaon	19	95	0	0	1	5	0	0
9		Parichipur	18	90	1	5	1	5	0	0
10		Gaghra	5	25	9	45	4	20	2	10

5. Housing

Sl. No	Name of Block	Name of Village	Total Number of households	Type of Housing	Pucca/tiled	Kuccha
1	Udala	Raidandia	235		5	230
2		Naraharipur	63		3	60
3		Kalapahad	35		0	35
4	Barasahi	Kunchibania	95		0	95
5		Sankucha	109		4	105
6		Barihapal	72		2	70
7		Kulkotha	102		0	102
8	G.B.Nagar	Deogaon 9h)	70		0	70
9		Parichipur	89		5 (IAY)	84
10		Gaghra	65		4 (IAY)	61
			935		23	912

6. Rainfall statistics

Year	Expected	Actual Rainfall	Deviation	Year	Expected	Actual Rainfall	Deviation
1981	1633.1	1476.72	-156.38	1991	1633.1	1306.11	-326.99
1982	1633.1	1224.3	-408.8	1992	1633.1	1070.82	-562.28
1983	1633.1	1768	134.9	1993	1633.1	1461.79	-171.31
1984	1633.1	1455.1	-178	1994	1633.1	1674.88	41.78
1985	1633.1	1861.9	228.8	1995	1633.1	1604.34	-28.76
1986	1633.1	1329	-304.1	1996	1633.1	1187.76	-445.34
1987	1633.1	1107.5	-525.6	1997	1633.1	1729.55	96.45
1988	1633.1	1456.3	-176.8	1998	1633.1	1251.4	-381.7
1989	1633.1	1477.9	-155.2	1999	1633.1	1670.42	37.32
1990	1633.1	1815.3	182.2	2000	1633.1	1287.16	-345.94

(Source: District Emergency office)

The data for 20 years shows rainfall deviation over the normal and the sequence of flood and drought faced by the district. Mayurbhanj received deficit rainfall in 9 out of 10 years from 1981 to 1990. This may not have created drought situation all over the district but has affected some pockets. In the year 2000 the overall deficit in rainfall was 345.95mm and it lead to drought in only 4 blocks out of 26 blocks as declared by the government.

According to the vulnerability atlas of Orissa, Mayurbhanj is prone to wind and cyclone hazard and it also falls under Moderate/low damage risk zone caused by Earthquake but is not flood prone. This was disputed by the secondary data available from the district contingency plans and disaster timeline.

Timeline of Disaster in the District

1990	Flood
1907	Famine
1916	} Scarcity due to less rain
1919	
1920	
1927	Flood
1940	Flood
1943	Flood
1954-55	Drought
1959	Cyclone
1965	Drought
1970-71	Cyclone/Flood
1972	Cyclone/Flood
1985	Flood
1992	Drought
1994 (in month of July)	Flood
1995	Flood & Drought
1996-97	Drought

7. Flood and Drought Statistics

Floods

Year	Month and date	No. of Block/Municipality or Ward	No. of GP	No. of Villages	Loss	Value of Loss	Relief Provide by Govt.
1995	9.11.95 to 10.11.95	4+1					Rice, Chuda, Guda
1995	May 95	1					Rice, Chuda, Guda
1997	4.8.97 To 5.8.97	7	42	193	640 pvt. Houses 497 public utilities	16 lakhs 1.4822 crores	Rice, Chuda, Guda, candle, matchbox, Sugar, Kerosene oil
	20.8.97 to 22.8.97				45 pvt. Houses 167 Public utilities	1.37 lakhs 70 lakhs	Rice, Chuda, Guda, candle, matchbox, Sugar, Kerosene oil
1998	12.9.98 to 14.9.98	1		16	43 pvt. Houses 5 public utilities	19,500 50,000	Chuda, Guda
1999	27.7.99 to 6.8.99 to 7.8.99	6+6	23	73	244 pvt. Houses 5 public utilities	18.77 lakh 2 lakh	Not available
	29.10.99 to 30.10.99	18+11	171	929	7 Human Casualty 581 Livestock loss 12,653 pvt. Houses 1355 public utilities	10.55 lakhs 238.750 crores 3,18,34,843 crores	Emergency office not able to provide Information on relief provided to the affected people

(Emergency office and Deputy Director Agriculture)

Drought

Year	No. of Block/Municipality/ward/NAC	No. of GP	No. of Villages	Loss	Value of Loss	Relief Provide by Govt.
1996-97	26+1	307	2817	Over 50% crop loss		
1998-99	24	242	2226		-	-
2000-2001	4	-	-		-	-

(Emergency office and Deputy Director Agriculture)

8. Irrigation facilities

Sl. No	Name of Block	Name of Village	Access to Irrigation
1	Udala	Raidandia	Water point-1, dugwell-3
2		Naraharipur	Na
3		Kalapahad	Nil
4	Barasahi	Kunchibania	River lifting through private pump
5		Sankucha	River lifting through private pump-3, Dag.-
2			
6		Barihapal	River lifting through private pump
7		Kulkotha	Nil
8	G.B.Nagar	Deogaon	Nil
9		Parichipur	Nil
10		Gaghra	Nil

9. Education

Sl. No	Name of Block	Name of Village	Adults	School age children attending school	
				Boys	Girls
1	Udala	Raidandia	25	25	35
2		Naraharipur	5	25	10
3		Kalapahad	3	12	8
4	Barasahi	Kunchibania	4	53	27
5		Sankucha	28	70	50
6		Barihapal	59	50	50
7		Kulkotha	10	22	20
8	G.B.Nagar	Deogaon	4	3	3
9		Parichipur	5	14	15
10		Gaghra	50	20	30
		193	294	248	

10. Working outside the community

Sl. No	Name of Block	Name of Village	Total Population	# of people working outside	# of persons migrated
1	Udala	Raidandia	872	50	12
2		Naraharipur	271	39	10
3		Kalapahad	170	70	13
4	Barasahi	Kunchibania	328	95	10
5		Sankucha	476	70	72
6		Barihapal	415	65	10
7		Kulkotha	529	292	40
8	G.B.Nagar	Deogaon	1191	270	50
9		Parichipur	267	170	12
10		Gaghra	509	230	50

11. Agriculture Production

Sl. No	Name of Block	Name of the Village	Av. Production in qt.	Av. Storage	Av. Consumption	Av. Repayment
1	Udala	Raidandia	4.7	0	4	0.5
2		Naraharipur	7.15	0	6.25	0.7
3		Kalapahad	6.38	0	5.5	0.7
4	Barasahi	Kunchibania	5.5	0	4.28	1.2
5		Sankucha	9.4	0	8.6	0.5
6		Barihapal	5.9	0	5.5	0.2
7		Kulkotha	5.5	0	4.9	0.65
8	G.B.Nagar	Deogaon	6.95	0	3.5	3.4
9		Parichipur	2.5	0	1.5	0.9
10		Gaghra	4.57	0	4.05	0.27

The average production is very low. Households reported that they had to repay produce against loans and none of them are able to store for next the crop.

12. Livestock

Sl. No	Name of Block	Name of the Village	Av. Buffalo	Av. Bullock	Av. Cow	Av. Goat	Av. Sheep	Av. Pigs	Av. Poultry
1	Udala	Raidandia	0	0.7	0.45	0.7	0.4	0	1.6
2		Naraharipur	0	1.4	0.45	1.5	0.25	0.25	2.85
3		Kalapahad	0.2	1.25	0.45	1.35	1	0.5	1.85
4	Barasahi	Kunchibania	0	1	0.1	0.85	0	0	3.3
5		Sankucha	0.6	1.4	0.2	1.05	0.1	0.35	1.85
6		Barihapal	0	1.8	0.7	1.5	0	0.05	1.55
7		Kulkotha	0	1.05	0.35	0.75	0.8	0.1	0.75
8	G.B.Nagar	Deogaon	0	0.7	0	0.35	0	0.1	0.5
9		Parichipur	0	1	0.3	0.55	0.4	0.05	1.3
10		Gaghra	0	0.5	0.3	1.25	0	0	1.25

Salient features of the demography of the sampled villages are:

- out of 10 villages have between 75 and 100 percent tribal population.
- Average family size is 4.79.
- In all 10 villages, the people have 'ticketed land' – meaning encroached forestland and in 2 villages the number of tenant farmers is very high.
- Size of land holding is less than one hectare.
- Majority of the households have kuccha houses.
- Six out of 10 villages do not have irrigation facilities.

Participatory Learning and Action (PLA) Outputs: Mayurbhanj

Seasonal Calendar Analysis

Seasonal calendar below shows that July-October (4 months) is a heavy-rainfall period. The calamity period (flood or drought) begins from May and goes up to October (half of the year). Employment opportunities are high only for 3 months in a year. Family expenditure is very high in November, December and January and this is the time migration takes place.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Rainfall			===	===	Xxxx	xxx*	****	****	****	****	**	
Festivals	.....		.....	.....		....				....	.....	.....
Lean Season					.....	.....	.....	.....	.....	.....
Calamity/Disaster (Flood/Drought)					Xxxx	xxxx	xxxx	xx***	****	***		
Diseases				==	====	====	==**	****	****	**		
Availability of works				....	.....	.....	.....	....
Migration Patterns	.....	.....									....	.....
Food Prod. (Paddy)										****	****	
Food Crop Price (Paddy)	====	====	===	==**	****	****	****	****	****x	xxxx	xxxx	xxxx
Livestock Sales (Cattle)	====						****	****	****	**		
Livestock Prices (Cattle)	====	==		Xx	xxxx	xxxx	****	****	****	****	**==	====
Main Food Consumed												
▀ Rice	****	****	****	****	****	****	****	****	****	****	****	****
▀ Pulses										**	****	**
▀ Tubers												
▀ Meat	****		****	****		****		****		****	****	****
▀ Dairy	Xxxx	xxxx	Xxx	Xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Main Sources of Cereals												
▀ Purchases (Seeds)					*	****	****	****	**			
Main Rice price	====	Xxxx	Xxx	Xxxx	xxxx	xxxx	xx**	****	****	**==	====	====
Expenditure	****	Xxxx	Xxx	Xxxx	====	====	====	====	====	==**	****	****
Income				**	****	****	****	**				
Month of Occurrence	(.....)	High	(*****)		Moderate		(xxxx)	Low		(====)		

direction ie. <i>Managandia Megha</i>	✓								✓
Mud spotting on the back of <i>Sadhababahu</i> (a red velvety insect)					✓				
Singing of bird called " <i>Dakua</i> "					✓				
Prediction of <i>Panji</i> (Oriya calendar) about future rain & flood							✓		✓

Preparedness Pattern

Safety measures adopted by the people in the sampled villages. In all 10 villages people moved children and livestock to safer heights and in 6 out of 10 they also carried food and utensils along.

Responses	Villages									
	Kalapahad	Kulkuntha	Kunchhabania	Narharipur	Parichipur	Raidandia	Sankucha	Deogoan	Barihupal	Ghagra
Take children family members & livestock to uplands or school	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Carry food & utensils with them	✓	✓	✓	✓					✓	✓
Prepare temporary shelter on roads slightly at high attitude			✓					✓		
Household contribution for purchase of boat every year. & use it during flood					✓			✓	✓	
Move to nearby safer villages							✓			
Store rice & kerosene before flood								✓		

Coping Responses

Immediate response is to ration out food in terms of cutting number of meals (61% variation) and portions at each meal (62% variation). Substitution by low valued food showed 52% variation between normal and disaster times. Borrowing food or money for food showed a variation of 26% and use of grain banks / PDS 12% variation.

Village Name	Number of Households															
	Reduced No		Reduced		Substitution		Gathering		Use of Stocks		Composition		Borrowing		Borrowing	
	N	L/D	N	L/D	N	L/D	N	L/D	N	L/D	N	L/D	N	L/D	N	L/D
Raidandia	7	20	6	20	7	17	0	0	3	4	4	11	5	11	4	7
Parichhipur	7	17	9	17	7	11	0	0	13	13	5	8	6	8	13	17
Narharipur	2	15	3	14	1	16	0	0	5	8	5	12	7	13	5	14
Kunchbania	4	19	5	19	4	17	0	1	3	4	4	16	4	13	6	14
Bariapal	10	5	0	1	3	2	2	2	0	0	0	0	0	1	2	1
Debgan	0	18	0	18	1	18	0	0	1	13	0	14	0	6	0	1
Ghagra	13	19	10	18	6	14	0	0	5	6	8	9	13	13	12	13
Kalapahad	3	19	3	20	5	19	0	0	9	9	2	15	7	13	7	15
Kulkutha	1	20	1	15	0	11	0	0	5	8	2	8	0	10	1	10
Sankuchia	1	18	1	19	0	13	0	0	2	4	0	9	1	6	3	13
Total	48	170	38	161	34	138	2	3	46	69	30	102	43	94	53	105
Average	24%	85%	19%	81%	17%	69%	1%	2%	23%	35%	15%	51%	22%	47%	27%	53%
Change		61%		62%		52%		1%		12%		36%		26%		26%

(N - Normal Period & L/D - Lean / Disaster Period)

Labour Responses

Coping mechanisms at the time of disaster and during lean period with respect to employment. Although, distress migration does take place in normal period (about 10%), it increases by about 17% and goes up to 27% during crisis period. Dependence on alternative local employment increases from 47% to 65%, a variation of 18%.

Villages	Number of Households							
	Alternative Local Employment		Petty Trading		Firewood / Charcoal Collection		Migration for Employment	
	N	L/D	N	L/D	N	L/D	N	L/D
Raidandia	9	13	0	0	0	1	1	4
Parichhipur	9	15	0	0	9	9	0	0
Narharipur	7	15	0	3	4	4	3	8
Kunchbania	14	16	3	6	0	2	3	5
Bariapal	0	0	0	0	2	2	1	1
Debgan	2	8	1	1	0	1	0	11
Ghagra	16	17	11	5	0	0	0	0
Kalapahad	19	19	0	0	1	1	10	13
Kulkutha	6	10	1	1	2	2	0	6
Sankuchia	11	16	0	1	1	1	2	6
Total	93	129	16	17	19	23	20	54
Average	47%	65%	8%	9%	10%	12%	10%	27%
Change		18%		1%		2%		17%

(N = Normal Period & L/D - Lean / Disaster Period)

Livestock

During the disaster period, people usually let their livestock, which is an important asset, wander around in search of fodder and water and sometimes abandon them due to lack or availability of fodder.

Villages	Number of Households							
	Unusual migration pattern		Alternative food/ water resources		Sales/ Slaughter/ Abandonment		Redistribution to F/R for keeping	
	N	L/D	N	L/D	N	L/D	N	L/D
Raidandia	3	7	1	2	0	2	2	2
Parichhipur	0	1	0	0	0	0	0	1
Narharipur	1	7	1	1	0	0	0	0
Kunchbania	1	3	2	4	0	0	1	0
Bariapal	3	3	1	1	0	0	0	0
Debgan	1	14	0	0	0	3	0	0
Ghagra	0	0	0	0	3	4	1	0
Kalapahad	2	6	2	2	0	2	0	3
Kulkutha	1	4	0	0	0	1	1	1
Sankuchia	0	6	0	0	0	0	0	0
Total	12	51	7	10	3	12	5	7
Average	6%	26%	4%	5%	2%	6%	3%	4%
Change		20%		2%		5%	1%	

(N - Normal Period & L/D - Lean / Disaster Period)

Family Response

During the time of disaster and during lean period, the immediate response of families is to remove children from school and engage them in gainful employment. The households, which have the option, send their members to relatives in order to reduce the hardships.

Villages Name	Number of Households							
	Remove Children from School		Sending Family member to relatives		Splitting families for other reasons		Putting children for gainful employment	
	N	L/D	N	L/D	N	L/D	N	L/D
Raidandia	0	1	4	0	2	4	4	
Parichhipur	0	1	0	2	0	1	0	2
Narharipur	1	3	0	1	0	1	1	3
Kunchbania	1	2	0	1	1	0	3	7
Bariapal	0	0	0	0	1	1	2	5
Debgan	0	0	0	1	0	0	2	3
Ghagra	0	2	2	0	0	0	2	2
Kalapahad	0	2	1	9	0	3	3	7
Kulkutha	0	2	0	0	0	1	0	1
Sankuchia	0	3	0	1	0	1	1	2
Total	2	16	4	19	2	10	18	36
Average	1%	8%	2%	10%	1%	5%	9%	18%
Change		7%		8%		4%		9%

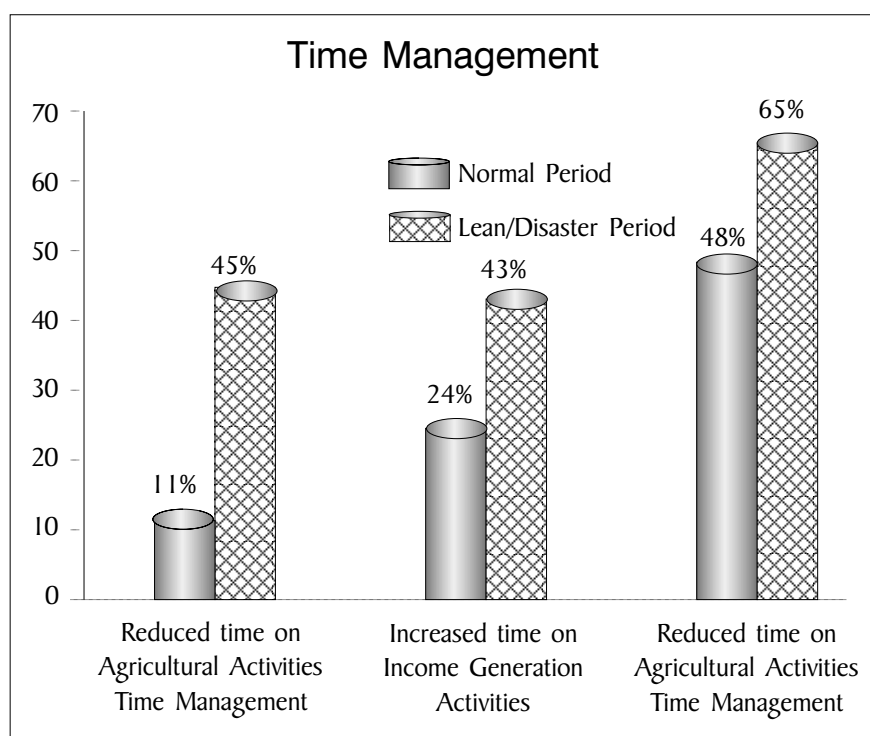
(N - Normal Period & L/D - Lean / Disaster Period)

Community Response

About 19% variation was found in dependence on loans from various sources. From 15% in normal period it went up to 34% during disaster. Immediate response is to look for the assistance from government programs (35% variation) such as food for work, etc.

Villages Name	Number of Households					
	Community Savings/ disaster funds		Loans from Various sources		Access to assistance from Govt. NGOs	
	N	L/D	N	L/D	N	L/D
Raidandia	0	0	2	7	0	4
Parichhipur	0	0	0	4	1	15
Narharipur	0	0	5	15	0	9
Kunchbania	0	0	3	10	0	11
Bariapal	9	9	9	6	0	0
Debgan	0	0	2	4	0	14
Ghagra	0	0	3	7	0	13
Kalapahad	0	0	6	8	0	0
Kulkutha	0	0	0	4	0	0
Sankuchia	0	1	0	2	0	4
Total	9	10	30	67	1	70
Average	5%	5%	15%	34%	1%	35%
Change		1%		19%		35%

(N - Normal Period & L/D - Lean / Disaster Period)



Other Assets Management

Immediate response to disaster or during lean period is to sell jewellery (8%) and cattle (7%).

Village Name	Number of Households					
	Sale of Jewellery		Sale of Cattle		Sale/ Mortgage of other key/ productive assets	
	N	L/D	N	L/D	N	L/D
Raidandia	0	2	0	0	1	1
Parichhipur	0	1	0	0	0	0
Narharipur	0	2	1	5	1	1
Kunchbania	0	2	0	1	0	1
Bariapal	0	2	0	0	0	0
Debgan	0	3	0	2	0	1
Ghagra	0	0	0	0	0	0
Kalapahad	0	2	0	5	0	2
Kulkutha	0	1	0	1	0	0
Sankuchia	0	1	0	0	0	0
Total	0	16	1	14	2	6
Average	0%	8%	1%	7%	1%	3%
Change		8%		7%		2%

(N - Normal Period & L/D - Lean / Disaster Period)

Other Income Pattern

Families do depend on local employment during the normal period (30%). This dependence increases to about 43% in the disaster period. Similarly, reliance on loans (cash) increases from 6% to 15% from normal to disaster period.

Village Name	Number of Households									
	Increased reliance on alternative local employment		Increased reliance on petty trading activities		Increased reliance on sale of firewood/charcoal		Increased reliance on gift/loans (cash)		Increased reliance on other income sources (specific sources)	
	N	L/D	N	L/D	N	L/D	N	L/D	N	L/D
Raidandia	7	10	0	0	0	0	2	3	1	1
Parichhipur	3	5	1	0	0	1	1	0	0	0
Narharipur	8	13	0	2	0	0	2	8	6	6
Kunchbania	8	12	4	5	0	1	2	6	1	1
Bariapal	0	0	0	0	0	0	0	0	0	0
Debgan	3	5	1	0	0	0	1	3	0	3
Ghagra	5	9	6	1	0	0	0	1	0	0
Kalapahad	17	19	0	0	0	1	3	7	3	5
Kulkutha	4	5	2	2	0	1	0	1	3	4
Sankuchia	5	8	0	0	0	0	0	0	0	0
Total	60	86	14	10	0	4	11	29	14	20
Average	30%	43%	7%	5%	0%	2%	6%	15%	7%	10%
Change		13%		-2%		2%		9%		3%

(N - Normal Period & L/D - Lean / Disaster Period)

Wage Labour

The average wages is higher among males (Rs.26.10) compared to females (Rs.22.71). However, there are variations among the villages.

Village Name	Male	Amount	Avg.	Female	Amount	Avg.	Male & Female	Total Amount	Avg.
Raidandia	23	597	25.96	4	85	21.25	27	682	25.26
Parichhipur	23	578	25.13	12	288	24.00	35	866	24.74
Narharipur	18	450	25.00	9	190	21.11	27	640	23.70
Kunchbania	21	655	31.19	3	70	23.33	24	725	30.21
Bariapal	23	625	27.17	10	235	23.50	33	860	26.06
Debgan	25	491	19.64	20	373	18.65	45	864	19.20
Ghagra	22	625	28.41	9	230	25.56	31	855	27.58
Kalapahad	23	646	28.09	18	421	23.39	41	1067	26.02
Kulkutha	25	610	24.40	15	365	24.33	40	975	24.38
Sankuchia	17	465	27.35	17	400	23.53	34	865	25.44
Total	220	5742	26.1	117	2657	22.71	337	8399	24.92