Adaptive Strategies for Responding to Floods and Droughts in South Asia

Cooperative Agreement: 367-A-00-02-00211-00
Institute for Social and Environmental Transition

Fourth Program Performance Report
to

U.S. Agency for International Development – Mission to Nepal
July 1, 2003-September 30, 2003

comparison of actual accomplishments with goals established for period

As outlined in the original proposal, the project timeline is given in the table below:

Project Time Line: Years	Year 1				Year 2	
Phases	Phase					
*Assuming the start is October 2002.	Oct-Dec*	Jan-Mar*	Apr-Jun*	Jul-Spt*	Oct-Dec*	Jan-Mar*
Harvesting International Lessons						
Global Experience Review & site visits						
Development of Guiding Framework						
Field & Regional Institutional Documentation and Implementation Activities						
Initial visits to identify partners						
Project initiation meeting & finalization of partners						
Coordination and Training Meetings						
Coordination and Document Production Meeting						
Field & Institutional documentation by Partners						
Major Dissemination Activities						
Major regional dis. and training conferences						
Local (pilot area) dis. and training meetings						
Major Report Milestones						
Month end of period	3	6	9	12	15	18

Legend:
Periods of intensive activity
Periods when work continues at a low intensity
Internal project meetings
Major conferences
Major report milestones

In line with the original timeframe given above, July through September was a period of intense activity in field and institutional documentation, combined with low intensity

activity in global experience review and site visits. Site visits and field documentation

- PROGRESS REPORT FROM VIKSAT –

1.0 Introduction

VIKSAT is one of the collaborating partners in the research project on *Adaptive Strategies for Flood and Drought Mitigation* in South Asia, financed through USAID, Nepal and led by the Institute for Social and Environmental Transition (ISET), USA.

2.0 Selection of the Study Area

VIKSAT is currently engaged in field documentation of coping and adaptive responses to drought in Gujarat. The Gujarat study is being carried out in three field locations. They are:

- 5 Villages in Satlasana Taluka, Mahesana District;
- 5 Villages in Bhiloda Taluka, Sabarkantha District; and
- 10 Villages in Bhuj Taluka, Kachchh District.

The study areas were selected based on the diversity in resource endowments, geo-climatic variations and cultural characteristics. They are as follows:

- ***Satlasana:*** Frequency of drought (3-5 in a 10-year cycle); extreme groundwater depletion; natural resource degradation (land, forestry), quality deterioration; major OBC communities such as Thakore and Chauhan, Forward Caste Patels present in small percentage. Mahesana breed (buffalo); Kankrej cow; Rainfall: 650mm.
- ***Bhiloda:*** Frequency of drought (3 years in a 10-year cycle), groundwater depletion, degradation of natural resources and inhabited predominantly by tribal communities. Low productive Livestock breed. Rainfall: 750mm.
- ***Bhuj:*** Long spells of droughts; examples of how people coped with and adapted to water scarce conditions; poor endowment of natural resources; and inhabited by mixed communities. Rainfall: 350mm.

2.1 Questionnaire Preparation and Fieldwork

A set of questionnaires for data collection which was developed by IDS Jaipur, was tested in the field and necessary modifications were made subsequently. The questionnaires were prepared to collect data at the household and village levels. A set of Participatory Rural Appraisal techniques was also applied for information gathering. In the first stage, the team completed data collection in Bhiloda and Satlasana and then moved on to Bhuj.

It was decided to complete part of the fieldwork before the monsoon, as it was likely that perceptions would change after the rains. Almost 50% of data collection was completed before the monsoon in both Bhiloda and Satlasana.

The primary survey consists of study of sample households and information gathering through participatory methods. A total of 400 households are being interviewed (at the

rate of 20 households each from a total of 20 villages in the three field locations (see the location map). The secondary data and information are collected from the government officials at the village, taluka and district levels. The field surveys in Satlasana and Bhiloda talukas are completed. Fieldwork in Bhuj is nearing completion.

2.2 Selection of Sample Households

The sample households were selected using a stratified random sampling technique. Village survey was done to select sample households. Both social and economic criteria were used for this purpose. The criteria are:

- Size of landholdings (landless, marginal, small, medium and large landholders);
- Social groups (caste/tribal sub-groups/religion);
- Women headed households, divorced, destitute and widows; and
- Availability of government employees in the household (particularly for Bhiloda due to job reservations for tribals).

Study Villages in Satlasana taluka

1. Bhanavas
2. Nana Kothasana
3. Kubada
4. Vansada
5. Umri

Study Villages in Bhiloda Taluka

1. Bhanver
2. Oda
3. Darasan
4. Bhutaval
5. Abhapur

Study Villages in Bhuj taluka

1. Hajapur
2. Mota Reha
3. Mota Bandra
4. Sanosara
5. Vinchia
6. Kuvathra
7. Makhna
8. Payarka
9. Natarkui
10. Mota Varanora

Size of land holding is a proxy indicator of economic status of the household in rural areas and being member of a particular caste/tribe/religion indicates a perceived social status. The women headed households and widows have been purposely selected for the study partly to look into the gender dimensions of drought and more specifically the vulnerability of this class of people.

The availability of government employees in the household was particularly used as a criterion in the context of Bhiloda, where due to the reservation policy of the government many people in the Scheduled Tribe community have got government jobs. This has ensured steady cash flow in those families implying their ability to withstand droughts or other contingencies.

2.3 Participatory Methods for Information Gathering

In addition to the household survey, participatory methods have been used for information gathering to get more qualitative information about the social, economic and gender dimensions. Some selected PRA techniques were used for this purpose. They are:

- Key Informant Interviews
- Focus Group Discussions
- Resource and Social Mapping
- Seasonality Calendar
- Crop Calendar
- Venn Diagram
- Timeline of the village
- Daily Routine diagram for man and woman
- Livelihood Change Analysis through case study method – short term and long term
- Mobility Maps

2.4 Collection of Secondary Information

In addition to the collection of primary data and information secondary data are also collected from the government sources at the village, taluka and district levels. This includes data regarding rainfall, land use, natural resources, services and facilities, migration patterns, livestock, government programmes for drought relief and drought proofing, prices, cropping pattern and agricultural production, water resources and related problems.

2.5 Literature Review

The work on review of relevant literature is in progress. Published information about drought and water management issues with special reference to Gujarat and the South Asia region in general is being reviewed. This includes information about the approaches, strategies and policies of the government to address drought; existing knowledge and

mainstream thinking on adaptive and coping strategies, aspiration and perceptions of the people in the context of globalisation; and major social, economic and demographic trends at the regional level.

2.6 Mapping and Use of GIS

Two types of maps are being used for the purpose of analysis. They are the sketch maps prepared during PRA exercises and the village level cadastral maps collected from government sources. The cadastral maps are digitised by using advanced GIS software. The socio-economic and geographical information collected during the fieldwork will be represented on these maps. The GIS maps can be used as analytical and decision making tools. The digitisation of maps is nearing completion. The data from the questionnaire survey will be linked to the GIS platform.

2.7 Progress in Data Collection

Data collection work has been nearly completed in Satlasana and Bhiloda talukas. Currently the data collection work is progressing in Bhuj. The details of work completed so far are given in the following table.

Components / Village	Household surveys		Village level data	PRA
	Planned	Completed		
Satlasana taluka				
1. Bhanavas	20	20	✓	✓
2. Nana Kothasana	20	20	✓	✓
3. Kubada	20	20	✓	✓
4. Vansada	20	20	✓	✓
5. Umri	20	20	✓	✓
Bhiloda taluka				
1. Bhanver	20	20	✓	✓
2. Odh	20	20	✓	✓
3. Dharasan	20	20	✓	✓
4. Bhutaval	20	20	✓	✓
5. Abhapur	20	20	✓	✓
Bhuj taluka				
1. Hajapur	20	20	*	✓
2. Mota Reha	20	20	*	*
3. Mota Bandra	20	20	*	✓
4. Sanosara	20	20	*	✓
5. Vinchia	20	20	*	✓
6. Kuvathra	20	20	*	✓
7. Makhna	20	20	*	✓
8. Payarka	20	19	*	✓
9. Natarkui	20	20	*	✓
10. Mota Veranora	20	**	*	*

✓ Completed
** Partly completed*
*** Remains to be done*

3.0 People's perception about change in natural resources

This section presents some of the preliminary findings about the people's perceptions regarding changes with respect to natural resources and the coping responses to drought and depletion of groundwater in Satlasana and Bhiloda.

The people in the study area perceive drought primarily as the result of failure of rainfall. Some attribute the failure of rainfall to vagaries of nature (which no one could influence as they feel) and some others perceive it to be manmade. Those who feel that it is man-made, reason it to the loss of vegetative cover in the region. People recall that the Aravali mountain segment seen in Satlasana, for example, was covered with good forest cover 20-25 years ago. The forests contained a rich diversity of fauna (including tigers) and flora. They find that all that has vanished now due to the widespread cutting of trees for various purposes. It was also recollected that there were perennial rivers and streams that originated from these hills. Groundwater was accessible at 5 to 10 feet depth even in summer. Even though there were cyclical failures of rainfall in the past, it never affected the livelihoods of the people. Agriculture was the mainstay of rural livelihoods and this activity was expanding in terms of cropping intensity, area under cultivation and other activities it supported such as animal husbandry.

The situation has now changed drastically. There have been consecutive droughts in the last 4-5 years in North Gujarat. The extraction of groundwater increased even though water levels dipped rapidly. According to the people, the following factors have contributed in various degrees over a period of time to the hydrological drought in the region:

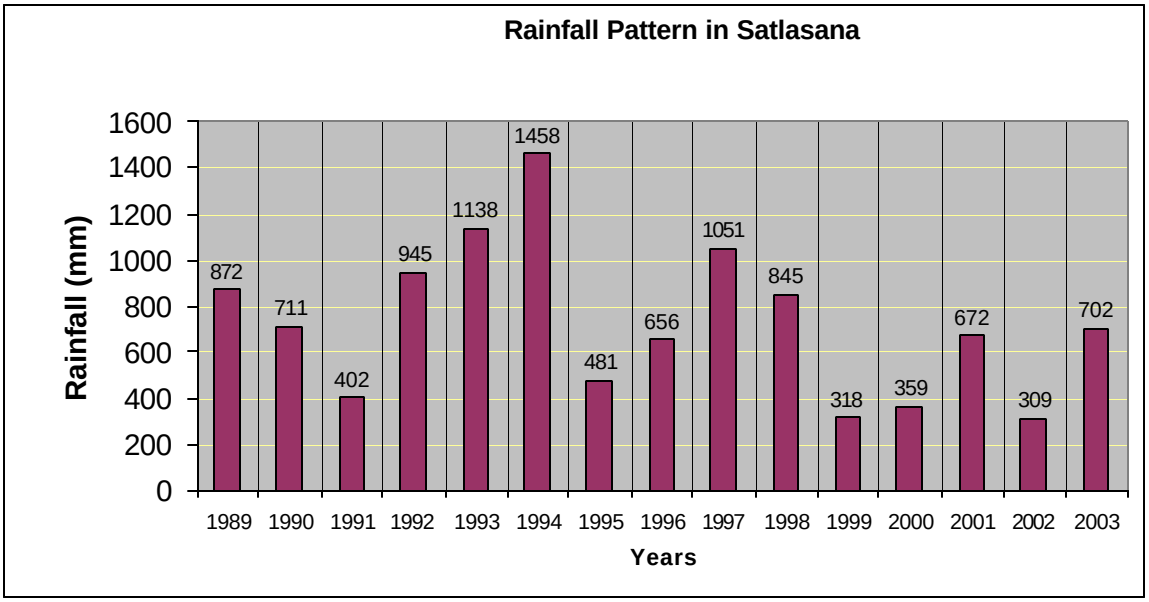
- Consecutive failure of monsoon in the last 4-5 years and reduction in natural recharge of groundwater led to drought conditions.
- Traction practices led to reduction in rate of recharge to groundwater.
- Erratic rainfall led to use of ground water even during kharif in recent years.
- Increase in land under cultivation and consequent demand for irrigation.
- Cost effective and efficient technologies (WEM) for groundwater withdrawal enabled farmers to tap water from deeper aquifers.
- Inefficient water use practices (e.g. flooding, field channels, seepage losses) in irrigation resulted in wastage of water.
- Local irrigation water market leading to increased withdrawal.
- Lack of any government regulations regarding the use of groundwater.

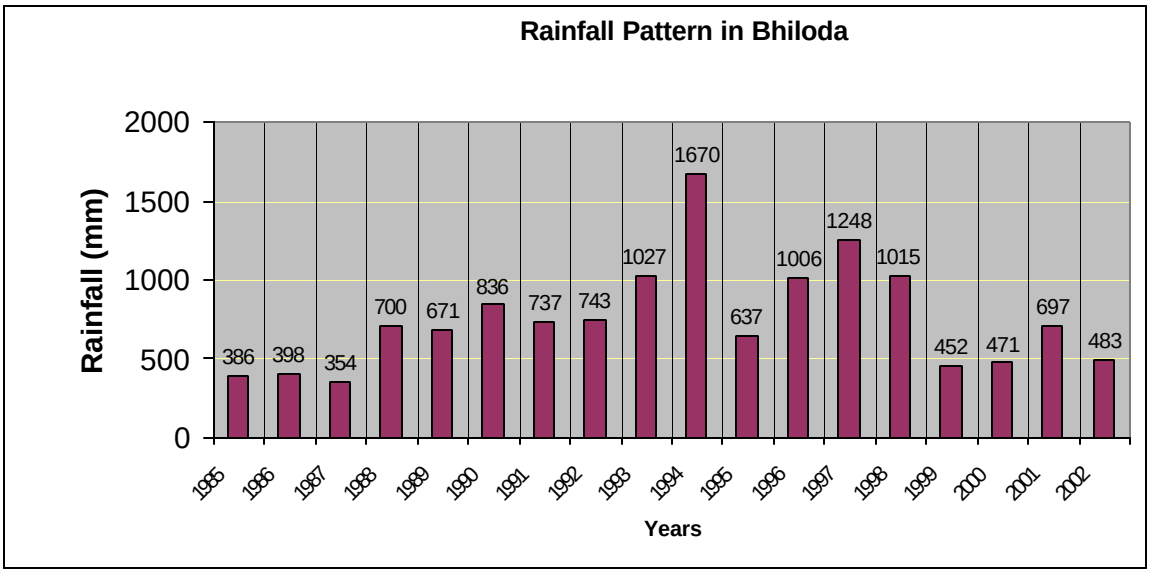
The year 1999-2000 was a turning point of sorts. The water levels began to dip drastically. The immediate response of the people to this groundwater depletion was deepening of existing wells, drilling boreholes and drilling radial boreholes in the already deepened wells. All these eventually met with little success. It is reported that there are instances where some farmers have drilled up to 600 ft. depth but have failed to trace any water and even when they did, the water available at that depth was not suitable for human/cattle consumption or for irrigation (a case in Mota Kothasana village).

Everybody was looking forward to a good rainfall, which has crossed 700 mm level by the end of August. They hope this good rainfall would solve many of the drought related problems.

3.1 Drought

All the three study areas were facing consecutive drought situation during the last 4-5 years. During this period, rainfall has been erratic and the study areas were getting less than half of the average annual rainfall. Among other natural and manmade factors such as deforestation in the catchment area, lack of adequate number of run off control structures, over-extraction of groundwater and prevailing water use practices led to drastic depletion of groundwater. The rainfalls have been erratic and droughts occurred with a frequency of 3-4 years in a 10-year cycle. The rainfall patterns in Satlasana and Bhiloda area over a period of time are given in the following diagrams.

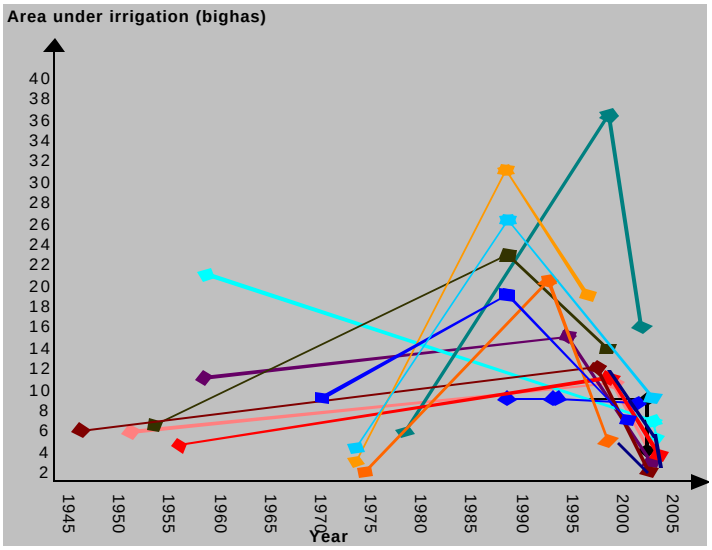




3.2 Depletion of Groundwater

As stated earlier, there has been drastic depletion of groundwater in the study area during the drought period. The people resorted to deepening the existing dug wells, drilling boreholes in the dug wells and drilling new boreholes. Even though there was some success in increasing the availability of water, eventually the water levels declined in all the dug wells and most of the boreholes. The diagram given bellow illustrates the cases of 14 dug wells – the area irrigated with successive deepening events.

Events of well deepening and area irrigated with well water

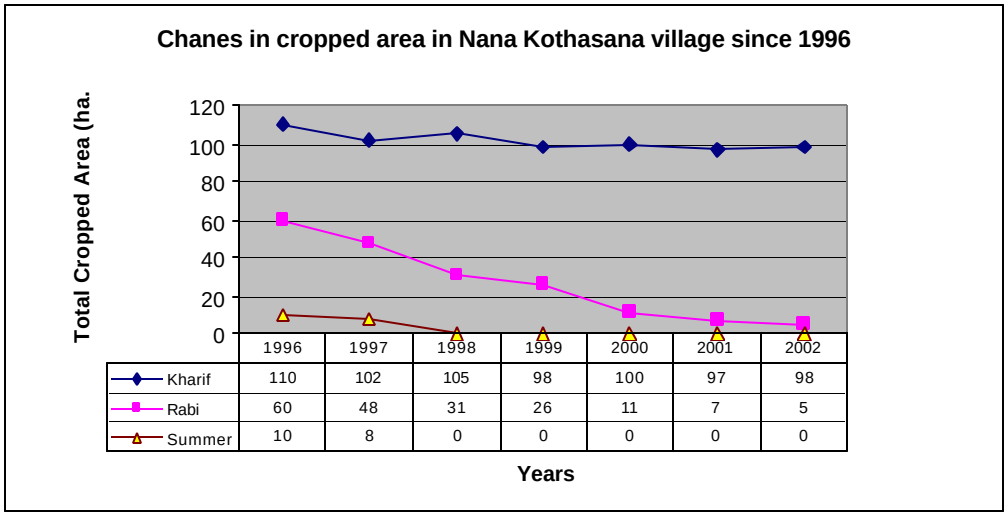


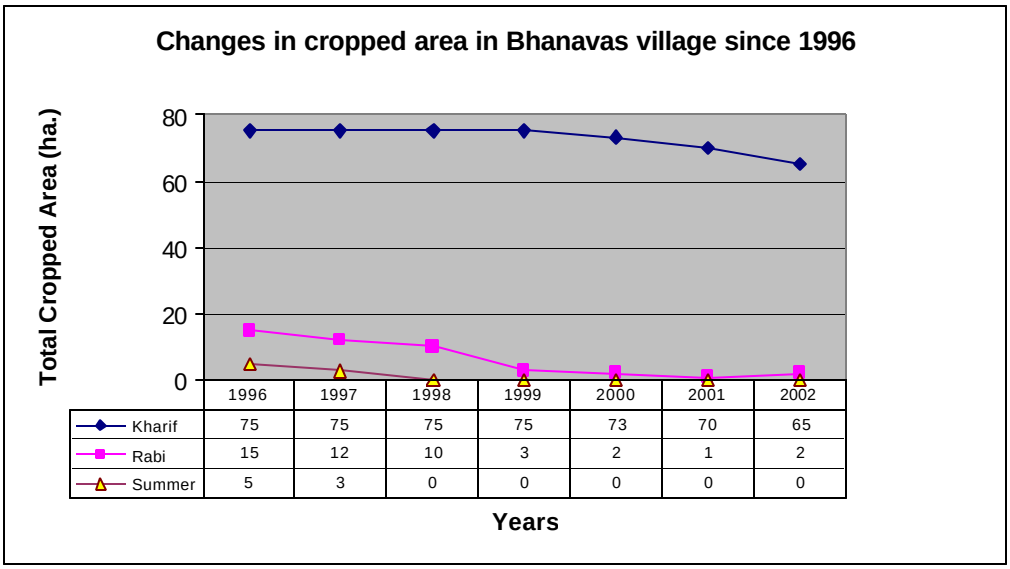
Note: Each coloured line represents a dug well and the points represent periods of well deepening and the area irrigated with the well water available during that period.

The above diagram shows that in the post 1995 period the events of well deepening intensified and initially the farmers obtained more water to irrigate crops. However, in the subsequent events of well deepening the quantity of water available for irrigation declined. The depletion of groundwater has been drastic during the drought period (1999-2003). The immediate effect of groundwater depletion was felt in agriculture and allied activities. A brief description of the drought impacts are given below:

Drinking water shortage: There was severe drinking water shortage in all these areas. However, in Satlasana area, a drinking water scheme was implemented in 2001-2002 period. This helped alleviate the drinking water problems of the area to some extent. In Bhuj and Bhiloda, people had to walk long distances to fetch water from wells located in private farms. Government had resorted to tanker service, though not regularly.

Decline in area under irrigation: The monsoon crops failed in many cases and area under winter and summer crops reduced drastically. Irrigation was confined to kitchen gardens, fodder crops with whatever water available. The declining trends in cropped area in two villages of Satlasana taluka are given as an example in the following diagrams.





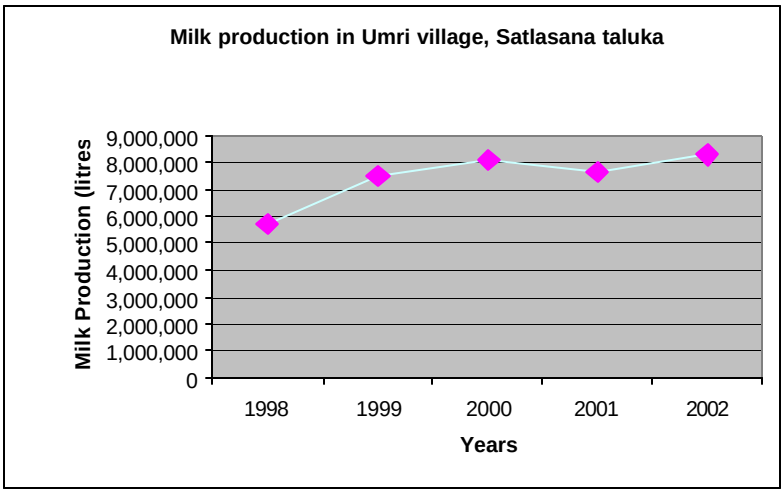
Crop failures and decline in productivity: There are frequent crop failures and drastic reduction in agricultural productivity. Total annual agricultural production has reduced by 60-70% during kharif and 80-95% during rabi. Area under summer crops has been reduced to 5-10% of the cropped area and in many cases nearly nil according to the official data. The consultations with the farmers in Bhanavas village of Satlasana taluka area revealed the crop failures and drastic decline in crop yields (refer to the following table).

Decline in Production of Selected Crops in Bhanavas Village

Years / Crops	1998	1999	2000	2001	2002
Monsoon crops					
Groundnut	100%	50%	Did not cultivate	Did not cultivate	Crop failed
Cluster beans	100%	30%	Did not cultivate	Did not cultivate	Crop failed
Maize	100%	50%	Did not cultivate	Did not cultivate	Crop failed
Minor millet (Bajra)	100%	70%	50%	25%	Crop failed
Winter crops					
Wheat	100%	50%	25%	10%	5%
Mustard	100%	50%	Did not cultivate	Did not cultivate	Did not cultivate
Tobacco	100%	10%	Did not cultivate	Did not cultivate	Did not cultivate

Source: VIKSAT Primary survey, Focus Groups Discussions, 2003.

Fodder shortage and milk production: Due to drought and consequent fodder scarcity, milk production had reduced in some areas. In Satlasana, however, it has been observed that with the decline in agriculture, people have placed more emphasis on animal husbandry as one of the major livelihood options and therefore the milk production has more or less remained the same. And of late, the production has been showing an increasing trend. People fetch fodder from distant places and in most cases, they purchase fodder at high prices. As an example, the trend in milk production in Umri village of Satlasana taluka is given in the following diagram.



Fodder shortage has led to incidences of cattle mortality in all the three study areas. In many cases, people have sold some of their cattle at cheap rates to purchase fodder for other cattle.

Decline in food consumption: The preliminary findings from the survey shows that consumption of vegetable, milk, ghee and oil drastically reduced. Many people are maintaining a bare minimum level of consumption that enables them to survive. The option to buy nutritious food is not available for majority of the families.

4.0 COPING RESPONSES AND MECHANISMS

The following were generally the responses of the people to cope with drought and the resulting depletion of livelihoods.

4.1 Agriculture

- ***Use of past savings and borrowing:*** Many people have used up past savings and borrowed heavily from banks and moneylenders to finance the drilling of boreholes and deepening of dug wells. The rates of interest charged by moneylenders vary from 3% to 5% per month. Most people have not completely repaid the money borrowed from moneylenders and other private sources. They have been paying small sums to the creditors in irregular instalments. In many cases this amount is not enough even to meet the interest payments. In effect, this amounts to a 'debt trap' from which they could escape only if they get sustained agricultural yields in the coming 2-3 years.
- ***Adopting water efficient irrigation technologies:*** Some people have resorted to water saving technologies of irrigation such as sprinklers, drip irrigation and small border irrigation. In the Gadhwada region of Satlasana, for example, about 150 farmers have bought sprinkler sets during 2000-02. Government subsidy of 40% on the cost of the equipment is also available. In a few villages such as Umari where groundwater is still available, sprinkler sets are being used for irrigation. Sprinklers are said to be

very effective and save about 60% of the water otherwise used in conventional irrigation practices.

- ***Changes in cropping pattern:*** The people have changed the cropping pattern in favour of less water intensive crops. An example is the shift from groundnut and tobacco to less water intensive food grain crops such as jowar and maize with the available water.
- ***Reduction in area under irrigation:*** Area under irrigation has reduced drastically and confined to irrigating only fodder crops.
- ***Employment of own labour:*** Many people have resorted to employing family members to carry out agricultural operations so that they could save money which otherwise would have been spent on hired labour.

4.2 Relative Significance to Animal Husbandry

- Shifting over to animal husbandry as the main source of livelihood.
- Pawning or even selling of women's jewellery to purchase fodder for cattle. There are instances where a few households have sold some of their cattle and used that money to purchase fodder for the milch animals.
- Women travelling long distances (6 km one way) to collect fodder (either green or dry). They have already used up whatever foliage available in the nearby forests.
- Many people have kept the cattle with their relatives who live in nearby districts where fodder is still available. Some of them have brought their cattle back as there is plenty of green fodder available in the village with this year's good monsoon.
- Keeping cattle in Gaushalas for a minimum amount towards maintenance is one option. These cattle would be brought back in monsoon when fodder is available. However the cattle that once kept in the Gaushala are not allowed to be sold for slaughter.
- Many people have let loose their cattle so that they won't die in their premises. They have left the cattle into the forest. Hindus consider cattle death in one's premises as inauspicious.

4.3 Meeting Contingencies

- ***Sale of trees*** to meet contingencies such as expenses on childbirth, death, marriages and other rituals.
- ***Sale of land*** at a lower price. However, selling land to meet contingencies are rare cases. People prefer to mortgage the land instead of outright selling it off. In the case of mortgages, the creditor is allowed to raise crops on the given land whereas the land owner gets no right on land until the loan amount is repaid.
- ***Sale of cattle*** as a last resort to raise money.
- ***'Bonded' or contract labour:*** There are incidence of bonded or contract labour in which the adolescents are pledged to work for specific number of years depending on the amount of money borrowed. The going rate is 5,000 rupees per year. In such cases, the labourer is expected to stay in the master's house and do whatever work given to him and the master provides for all maintenance requirements of the labourer. This practice is based on agreement from both sides. In normal situation in a

drought year, it is difficult for an adolescent to earn 5,000 rupees in a year. This is one reason why there are many incidences

4.4 Alternative Sources of Livelihoods

- ***Migration for non-farm employment:*** Many people have migrated to nearby towns and distant cities (Satlasana, Visnagar, Ahmedabad, Surat and Bombay) in search of non-agricultural jobs such as diamond cutting and polishing. In the case of Satlasana where there are 7 diamond-polishing units, many people have found jobs. On an average 80-100 people are working in these units. Most of the labourers are from the nearby villages and they commute for work.
- ***Migration for sharecropping:*** Migrating to nearby districts (Sabarkantha and Banaskantha) where water is still available, for sharecropping. In the case of sharecropping, the landlord would get ? of the crop yield and ? will be available for the sharecropper. In such cases, the head of the household or the adult members of the family stays in those areas and carry out the cultivation. It has been observed that the people who have resorted to sharecropping have relatives in those areas to support them. This has taken care of the food and fodder security of many families in the region.
- ***Wage labour in nearby areas:*** Working as wage labourers on construction sites and taking up other menial jobs have increased in recent years. Working as wage labourer was considered to be lower in social status especially by the Darbar community. However in the recent consecutive droughts most of the Darbars (including women in that community) have resorted to wage labour as a survival strategy.

4.5 Consumption Expenditure

- ***Reduction in consumption expenditure:*** Many people have reduced the number of items of food consumption and in some cases quantity of essential cereals and pulses have been reduced. Expenditure on rituals and festivals reduced drastically. Expenditure on clothing has reduced.

4.6 Dependence on Common Pool Resources

- ***Dependence on forests:*** There has been excess dependence on nearby forests to collect fuel wood and fodder, as farm wastes are not enough due to crop failures.
- ***Dependence on Gauchars:*** The common grazing lands (*gauchars*) are used for open grazing even though not enough grass was available.
- ***Over-extraction of Groundwater:*** Even monsoon crops were irrigated by using groundwater due to failure of rainfall in the initial years of the last consecutive droughts. Wells were deepened in many times to chase groundwater in order to retain agricultural production.

4.7 Social Effects

- ***Cultural change:*** Many women in Darbar community (perceived to be higher up in social hierarchy) began to work as wage labourers outside their own farms. In normal times this would have been considered as socially unacceptable.
- ***Effects on Children:*** There is an increase in school dropout rates. Children (both boys and girls) have been put to work in construction sites. This would have been a taboo in normal times.
- ***Effect on girls:*** In normal days girls were married when they were around 18 years old. Due to drought, for those who have more than on girl child, the marriage age has been reduced to 13-15 years to have sufficient period to gather money for marrying other children. The other reason for reducing the marriage age of girls is to avoid paying huge amounts as dowry if the girl is married at a later age. However, on the other hand, there are many instances of increase in marriage age of girls. The parents of the girls are expected to pay dowry to the bridegroom. This amount varies from 5,000 to 50,000 rupees. According to the normal practice, the total expenses per marriage vary between 47,000 and 175,000 rupees approximately. This means that at least a sum of 47,000 rupees is required for meeting the minimum social, ritual and other essential requirements of a girl's marriage. Many parents find it difficult to mobilise this kind of money and this in turn has resulted in postponement of girl's marriage. There are cases where women are not married even at the age of 27 years due to financial difficulties.
- ***Reducing social visits*** (for marriages, community functions, relatives), as there is no money left at hand. In such social occasions, the visitors are expected to contribute either in cash or in kind. To cite a recent example, in a temple consecration ceremony in Bhanavas, only less than 40% of the expected number of people attended the function primarily because of the above reason. A lot of foodstuffs were wasted due to the non-attendance of people.
- ***Neglect of the aged:*** Some have left the aged people back in the village while they migrated with their families, as there are no facilities to accommodate them in the cities. In a few cases observed, the elderly people were left to fend for themselves through begging (the cases in Harijan settlement, Vansada village).

Progress report from IDS-Jaipur

Adaptive Strategies to Drought in Rajasthan

During the last four months i.e. July 1st to October 28th following activities were undertaken: (1) Primary data was collected from 18 districts, 18 villages for 446 households. For the fieldwork Rajasthan was divided into four broad agro-economic and cultural zones namely, Desert Region, Northern Region – Shekhawati Region, Eastern Region, Southern Region – Tribal Region. The detail of sample households from each zone is reported in Table 1. Village level primary and secondary information and Tehsil level secondary data were also obtained to know the macro environment. (2) Collected data was checked at two stages; firstly, each day during the data collection process and second, at Jaipur office. Gaps were identified and corrected. Cleaning of data was done for electronic processing. (3) Data was codified and data entry was started. So far almost 50 per cent of collected household data is entered. It is expected that by November 15th data entry work will be over and processing of data will be started.

Report writing works is also in process. Review of literature and secondary information is being analysed.

Region-wise, District-wise Number of Selected Households

Regions	**Districts**	**Number of Sample Village**	**Number of Sample Households @ 20 per village**
Desert Region	Barmer Jaisalmer Bikaner **Jodhpur** Nagaur	5	129
Northern Region Shekhawati Region	Churu **Jhunjhunu** Sikar	3	80
Eastern Region	Jaipur Ajmer Sawai Madhopur Tonk Dausa	5	119
Southern Region Tribal Region	Bhilwara Chittor Rajsamand Udaipur Dungarpur	5	118

Sample Households by Region and District

Regions	Districts	Name of Tehsil	Name of Panchayat Samiti	Name of Sample Village	Number of Sample Households
Desert Region	Barmer	Barmer	Barmer	Ramderia	23
	Jaisalmer	Jaisalmer	Sum	Kanoi	30
	Bikaner	Nokha	Nokha	Ninyadeshar	25
	Jodhpur	Osiya	Osiya	Bara Khurd	30
	Nagaur	Jayal	Jayal	Khanwar	21
Northern Region Shekhawati Region	Churu	Sardarshahar	Sardarshahar	Mitasar	20
	Jhunjhunu	Nawalgarh	Nawalgarh	Niwai	30
	Sikar	Fatehpur	Fatehpur	Nayabas	30
Eastern Region	Jaipur	Dudu	Dudu	Khudeyala	20
	Ajmer	Kekri		Sarsunda	20
	Sawai Madhopur	Bauli	Bauli	Bapui	30
	Tonk	Malpura	Malpura	Sans	27
	Dausa	Lalsot	Lalsot	Dungarpur	22
Southern Region Tribal Region	Bhilwara	Banera	Banera	Banskalya	20
	Chittor	Bhadesar	Bhadesar	Parleya	30
	Rajsamand	Rajsamand	Rajsamand	Phiyaudi	21
	Udaipur	Jhadol	Jhadol	Chechlaya	19
	Dungarpur	Sagwara	Sagwara	Gudhaveganiya	28

Progress report from ISET-Nepal

July 1st – September 30
Fieldwork to conduct the survey that began in the last week of June continued through July and first week of September in the Bagmati and Rohini basins.

In the Rohini Basin Krishna Bahadur Gurung took the lead. Krishna Prashad Adhikari led the study in the Bagmati basin. In UP and Bihar, the Gorakhpur Environmental Action group (GEAG) conducted the study, largely coordinated by Tariq Rehman.

Bagmati basin
The field crew began its survey in Brahmapuri VDC of Rautahat district. Primary data were collected in two ways: household survey and PRA. In each of the three wards selected for survey in a VDC the crew carried out PRA using various tool. However, only one ward was covered in each of the resettled area. Information was collected using various methods. Social and resource mapping was prepared for each area. Ethno history of flood was drawn. Seasonal diagram for flood events and Venn diagram to located institutions was also made. The crew carried transect walk through the villages (see list of activities). The crew made personal observations of the flood situation and how people really adapt and cope with it at the time of flood. Since the survey was being carried out during the monsoon. The crew also had opportunity to observe events as they took place. For example when flood in Bagmati and Bakaiya Rivers started to reach villages and farms along the riverbanks, farmers were cutting newly planted paddy and sugarcane. The idea was to harvest any green fodder possible from paddy and sugarcane before the rising river would wash them. The crew took pictures and video of the events.

List of activities carried out during the study

Primary information

- Social and Resource Mapping
- Ethno-history of Flood
- Focus Group Discussion
- Key Informant Survey
- Seasonal Diagram (for flood events, migration etc)
- Transect Walk
- Venn Diagram
- Case Study (study of 3 generations within a family– oldest survivor, middle aged member and youth)
- Observation
- Household Survey

The crew conducted focus group meetings of mixed groups as well as women groups (See table 1). There were three to twelve such groups in each ward. At least one women group was interviewed in each ward. Similarly, case studies were also prepared from men and women of the wards studied. A total of 14 wards were covered in Bagmati area.

Table1:

	Nawalparasi	Rauthat	Total
Case studies	43	37	80
Women focus group discussion	14	13	27
Mixed focus group discussion	14	11	27
Focus group discussion	N/A	12	12
No. of Wards	14	15	35

Regarding the areas covered by the survey some changes were made. VDCs and number of Households interviewed is given in the following Table 2. Table 2 also gives location (head, middle or tail) of the area in relation to flood.

Table 2: Details of area, sample size and their characteristics

River Basin	District	Strata	VDC	Total # Households	# households sampled	Remarks
Bagmati	Rautahat	Head	Kanakpur	1348	110	Dominated by Mushhar
		Middle	Bhasedwa	814	70	Mostly Tarai
			Samanpur	1106	90	" "
		Tarai	Barhmpuri	966	80	" "
			Santapur		100	
			Paurahi		200	
Rohini	Rupandehi	Head	Devdaha	4355	368	Mostly hull origin
			Kerwani		190	
	Nawalparasi	Middle	Devgaun	644	53	Mostly Tharu
			Koluwa		25	
		Tail	Rampur Khadauna	620	50	Mostly Tarai
			Makar		133	

Four VDCs of Kanakpur, Bhasedwa, Samanpur and Brahmpuri were covered in Rautahat. Likewise, two villages of Santapur and Paurahi were selected for resettled areas. These VDCs were selected on the basis of their location in flood prone areas as well as ethnicity of the people living in the villages. For example, Mushar community dominates Kanakpur VDC whereas; people of Tarai origin dominate Bhasedwa,

Samanpur, and Brahmapuri. Mixed groups that consist mostly of hill origin dominate Santapur and Paurahi resettled areas.

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Some 37 case studies of individuals were prepared. Many of them are women respondents. Similarly 36 focus group discussions were conducted, of which, 13 were exclusively of women and the rest were of mixed groups. A total of 650 households were interviewed in Bagmati basin (See table 3).

Rohini basin

The same activities as shown in the list above were carried out in Nawalparasi and Rupandehi districts of Rohini basin. There were 15 wards of five VDCs and one resettled area covered in this basin. Two VDCs of Devdaha and Kerwani were in Upper area, two VDCs of Devgaun and Koluwa were in middle and two VDCs of Ranpur Khadauna and Maakar were in the lower areas of the flood areas. The head area lies in Rupandehi district whereas the middle and the lower areas lie in the Nawalparasi district.

Rohini basin had more VDCs and households to be covered. As planned earlier, 764 households were interviewed. But there were also 80 households of Kerwani VDC added to the list in the later part of the study. It was because resettlers of this village had to be compared as they were close to Devdaha in the same district. This would make comparison of old village and resettled people easier.

Some 43 case studies of individuals were prepared. Many of them are women respondents. Similarly 28 focus group discussions were conducted, of which, 14 were exclusively of women and the rest were of mixed groups.

In both places the survey was completed in mid September, as scheduled. However, we had started to enter data for processing in August. The first batch questionnaires arrived in Katmandu on Aug 19.

In the meantime analyzing PRA information was initiated. Secondary data have been collected after we started receiving field information. The reason we did not collect secondary information before was because it was decided to wait until field information give picture of what would be important to look at. We believed that deciding this would after some field experience.

There were some problems in the forms because some answers written in the field were less clear to staff to enter into the computer. This was relayed to the coordinators in both basins. Two staff from each basin came to NWCF in Katmandu to look into this missing information.

Data entry

Data processing began on 21st of August. Because there were about 1500 forms with multiple questions, we decided to hire some additional staff to enter data in the computer. Data is being analyzed using SPSS program.

Review meeting (Sept. 23-25, 2003)
To review the progress of the entire of Adaptive Strategies for Flood and Drought Mitigation a review meeting was organized in Kathmandu, September 23 - 25, 2003. ISET-Nepal coordinated the meeting. Srinivas Mudrakantha of VIKSAT of Gujrat and Manohar Rathore of IDS-Jaipur, Rajastan, presented progress of their drought studies; gender specialist Sara Ahmed participated in the meeting; Tariq Rehman presented progress on the study areas in UP and Bihar, India.

Table 3: Households Surveyed

River Basin	Household Type		
	Flood Affected VDC Dwellers	Resettlers	Total Households
Bagmati	350	300	650
Rohini	610	154	764+80 from Kerwant
Total	960	454	1414

Progress report from Sara Ahmed – adapted from a PowerPoint presentation

Understanding gender and equity in the context of adaptive strategies

Work done so far

Methodology workshops

Pilot testing of household survey with GEAG
Short field visits with VIKSAT
Literature review and networking
Constraints:
Gender as an 'add-on'
Communication and logistics

Gender and vulnerability

Worldwide, it is now acknowledged that women and children are more vulnerable in the face of disasters, natural or otherwise, *even amongst the poorest of the poor or in marginalised communities.*

Failure to recognise that vulnerability is structured by relations of gender and power at intersecting institutional levels means that our responses to 'disasters' such as drought or floods may reinforce inequalities.

Limitations of quantitative surveys

Understanding gender as a marker of different kinds of unequal relations is generally obscured by quantitative analyses of *difference* between sexes.

Gender becomes an 'independent variable' that is used to account quantitatively for variation in a dependent variable.

Little understanding of complexities – 'why' or 'how' i.e., processes of power and negotiation

Gender, culture and water

Understanding water use in the context of global climate change – interdisciplinary focus looking at cultural shifts in water use.

How do we experience 'water', both in terms of scarcity and abundance?
How do history and traditions of the past inform the present? (embedded values/gender)
"Every waterhole has a story" (Nyungar, WA)

- Step-wells and other water sources have been important meeting places but also sites of 'conflict' – small girls were/are often sent down wells with a rope and bucket attached to them to collect water during periods of scarcity.

- Wells continue to be used for committing suicide by young women driven by domestic violence and poverty. (Saurashtra)

Representing drought

Komal Kothari, oral history of Rajasthan:
Drought is represented indirectly through songs dealing with rain and with the desire for rain, also rhymed couplets (*dohas*).
Stories which tend to inverse the social order for e.g. between upper/lower castes and between *adivasis* (Bhils) and moneylenders (*banias, sahukars*) on whom they remain indebted: 'please do not capture the clouds'. Physical and symbolic context of drought and power

"They Get Water from the Soak". A poem by Mervyn Street, Ngalingkadji

"This soak water is down at Binbornoo, from there, from the soak, they'd take water up that way, the old, old women, up to Gananyi.
They went down that way to water with yokes
Up that way, all the time, they'd take the water, up with yokes for their work, for vegetables, for tea, for food…..
They'd get it long, long ago for everything."

Capturing the different meanings of water embedded in cultural landscapes

In the desert country of the Walmajarri, there are four different types of waterholes:
Jilla: a permanent waterhole in the desert
Jumu: a temporary water source, e.g. soak
Jiwari: shallow rock cavity that has water
Wirrkuja: a deep rock cavity that collects rainwater
Similarly in the desert region of Rajasthan, there are different water sources……

Inversion of gender roles

Rain ceremony in an adivasi community in south India where men dress up as women, inverse the construction of gender identities.

Disasters and vulnerability

Economic:
- changes in the gender division of labour and nature of work, time-consuming, unpaid or poorly paid – 'expanded caring', unskilled work on drought relief sites
- changes in access to resources and 'control' (decision-making / ownership) e.g. Nepal, female-headed households, but in U.P. after floods women lose control over their immediate household domain
- impact of male out-migration (nuanced)

Social:
- position of women in given cultural context (data on sex ratios: adult/child 1991-2001 and other indicators on the changing position of women and social practices such as *purdah*)
- changes in access to education: girls/boys, school enrolment and retention rates
- impact on women's health, hygiene and nutrition (short and long-term)

changes in age of marriage, dowry, other customs
increasing trauma, violence, sexual abuse

Voicing vulnerability

"We would make holes in the river bank at the right places to chase underground water – cleaner water came out of these holes, but it took far longer. If there was a marriage or death in the family, water was drawn out endlessly for the guests. I never played with the guests, but my brother did," Sangita (SEWA member) remembering drought during her childhood days at home, married at the age of 14 to face the same problems.

Dalit women in Patan district, North Gujarat record greater dependence on moneylenders, landlords and contractors during periods of drought for water and other livelihood needs in return for 'sexual favours'. In Taranagar village, there are three taps supplying potable water, but the dalits are forced to take brackish water from another one. "The Rabari-Desais will allow us to fill a few pitchers only if a young woman goes begging to them," says Paniben, age 65.

Parabs provide drinking water during times of scarcity to passersby, a traditional legacy not to deny anyone drinking water, even during drought, regardless of caste affiliation

'Coping' or adaptive strategies? Households and communities

Changing livelihood strategies , e.g. sex work amongst *adivasis*, dating to the 1980s drought, increasing land alienation
Borrowing / pawning jewelry / bonded labour
SHGs – loans, micro-enterprises (NGOs)
Informal networks of cooperation (little info)
Social 'movements' – Stri/Mukti Sangharsh, SEWA Water Campaign, PRAVAH network
NGO water initiatives and sector reforms

Adaptive strategies: state and market

State: gender-blindness of water, drought, flood policies and programs, everyone subsumed under: stakeholder participation
Notion of 'unitary' communities rather than inter/intra-household dynamics, social excl.
Markets: present opportunities for some women, but these need to be negotiated at multiple levels – capacity building, life-skills, access to information, technology and organization are all important factors

Progress Report from Panjab University

Dr. Sanjay Chaturvedi & Ms. Eva Saroch
Centre for the Study of Geopolitics

JULY-SEPTEMBER 2003

In continuation with our comprehensive study on government of India's flood policy from a critical perspective' based upon various official reports/documents published by Ministry of Water Resources, Government of India, in the past three months, some key question/queries and issues have evolved during our ongoing analysis. Some of these questions were also raised at the Adaptive Strategy Meeting 22-26, September, 2003, Kathmandu, for instance, its being observed that government of India's policy to provide protection to 40 million hectare of flood area in the India, as estimated by Rashtriya Bargh Ayog (RBA), has been both structural as well as non-structural measures. As stated in Ministry of Water Resources, Government of India report on 'Achievement in Flood Management' (2000) structural measures constructed so far are: number of embankments constructed are 33630 km; drainage channels are 37904 km; towns/village protection work: 2337 nos.; Villages raised: 4713nos. As a result total number of area benefited is 15.8 million. But does such 'achievement in flood management' addresses to peoples' vulnerability to flood hazardous? Is there a sensitivity to scale of vulnerability and marginalisations? More so, where are the people in such scheme of flood protection? Such an approach de-links nature from development.

It was also pointed out during the presentation that there has being a shift from structural to non- structural measures, as stated in ministry of water resources, government of India, in its report on the 'Performance of Budget 2001-2002' that "complete protection from all floods by structural methods is not economically feasible. Moreover, these methods are costly, take a long time and have their own limitations. The thrust now onwards is on "flood proofing measures" which are considered to be more cost effective". Such a shift in the language and discourse of the government from structural to non-structural policy's, needs to be ascertained, as to whether the shift is in reality or not. We are very shortly meeting Gorakhpur Environmental Group, engaged in fieldwork in Eastern Bihar and Western UP, to see as to how effective are the government flood policies, and also to enquire as to whether such a shift is visible at the cites of disaster?

It was also argued that it is only important to forecast floods but the real challenge is the timely dissemination of the information to the most and the last affected community. Given the fact the countries of South Asia are locked in the politics of data generation and sharing, where as such programmes, needs transparency and active participation at all levels including the community who is affected the most. Another challenge is to look for various means and ways to ensure data sharing at the international level for effective flood forecasting?

Since the case studies for the Adaptive Strategies Project are mainly drawn from the flood prone areas of Western Bihar and Eastern Uttar Pradesh, we are in the process of critically analyzing Bihar governments flood policy, which mainly deals with long term and short-term solution to floods in Bihar. According to government of Bihar the long term solution to flood problem lies in construction of dams and reservoirs in Nepal as most of the rivers originate in Nepal and flow for a considerable length before entering Bihar, also all suitable dam sites fall in Nepal. Where as the short term solutions lie in the construction of embankments. It is being argued by NGO's like Barh Mukti Abhiyan that such an approach of setting up of dams in Nepal, an area noted for seismic activity which would be linked with embankments in the state is faulty, as there is going to be no change in the flood situation whether dams are constructed or not. Also technically, embankments are not the solution as proved by decades of flood control measures in the state. Instead of depending on proposed dams, is it not wise to deal with floods locally and delink the flood problem from proposed dams as such dams have never controlled the floods in the past, nor can they do it now. Also embankments have not only given rise to the politics of embankments but also to the politics of disaster relief!! There is a wide spread feeling among affected communities and the NGO's that structural measures provide a false sense of security and should be planned and implemented (if the need be) with great care. In this context it is also important to analyze as how do communities perceive floods? Who does (or does not) adapt, when, where , how and why? Also NGO-NGO, or Government-NGO cooperation at various levels of adaptation strategy needs to be analyzed. More insights will be offered in this regard in our forthcoming discussion with GEAG group (Tariq and Paras Nath).

While commenting upon the institutional landscape of India's flood policy, it was argued that at the lowest level of local-self government, at the village level, Panchyats have not much say in the decision making process. There is limited role of Panchyats at the distribution of relief measures, where as Tehsils play a key role. It is important to mention that sustainable management strategies are those that are determined through community evolvement, ie. devolution of decision making to the lowest level, and are appropriate to local conditions. Since decisions are made and implemented by institutions and all institutions necessarily have geographical and functional boundaries, not least to promote accountability, also the scope for redefining institutional boundaries are guided and limited for historical, cultural or other reasons, it is important to establish ways and means of co-ordinating across boundaries and formulation of institutional design that is critical to the success of a flood hazard management policy.

As mentioned in our previous report, a comparative analysis of adaptive strategies pursued by a number of basin states has also been the focus of our inquiry. The case studies which we are currently analyzing are the Mediterranean river basin (Adaptation Strategies for Improved Flood Management in the Mediterranean), the Mekong river basin (Flood Management and Mitigation Strategy), and the Chao-Phyraya river basin, Thailand (the Master Plan for Flood Mitigation). An overview to the policies adopted by the three basins suggests that the emphasis is on flood management and mitigation strategies, which is an integrated and coordinated mix of structural and non-structural measures that broadly reflects the flooding, flood risk and flood hazardous characteristic

of the particular floodplain along with the specific social and economic needs of the 'flood-prone communities' as well as environmental and resource management policies for the floodplain. Secondly, a long-term perspective of flood management must consider also the variability of flood hazard in terms of magnitude and return periods induced by climate change. Although the role of the human activities in the climate change is still an open debate, but there is no doubt that the effects of climate change in altering the precipitation patterns in terms of distribution, intensity and duration of extreme rainfall events and a higher frequency of strong precipitations. Some of these insights were also discussed in our presentation in Kathmandu, on Government and Regional Flood Relief policy'.

In the coming weeks our focus will be to look for more case studies, especially, in the Indian Ocean Region that deals with adaptive strategies to flood mitigation and management and what are the commonalities/differences with regard to flood management strategies adapted by various basin-states within Indian Ocean Region and the lessons for South Asia?

We are in the process of finalizing bibliography which is related to various aspects of the Adaptability Strategy Project after a careful scrutiny of the relevant data collected from various internet sites, official documents, books, articles, newspaper.