

PROVENTION CONSORTIUM
Community Risk Assessment
and Action Planning project

INDIA – Eastern Uttar Pradesh



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Peripheral Heartland: Floods in Eastern Uttar Pradesh

CRA Toolkit
CASE STUDY

This case study is part of a broader ProVention Consortium initiative aimed at collecting and analyzing community risk assessment cases. For more information on this project, see www.proventionconsortium.org.

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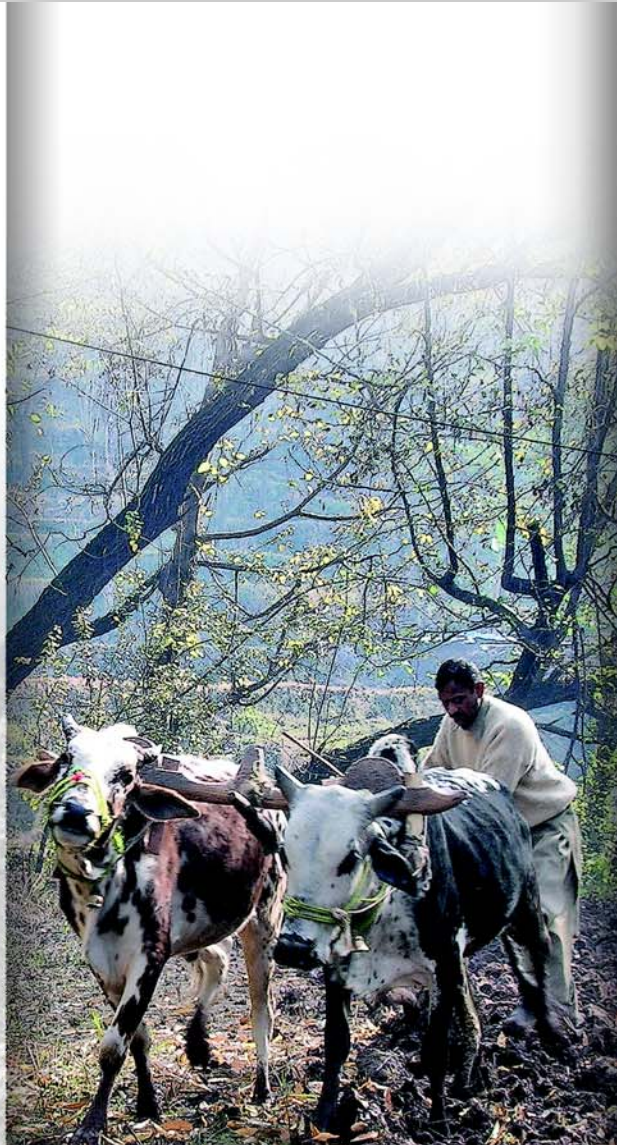
Click-on reference to the **ReliefWeb country file for India:**
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Note:

A Guidance Note has been developed for this case study. It contains an abstract, analyzes the main findings of the study, provides contextual and strategic notes and highlights the main lessons learned from the case. The guidance note has been developed by Dr. Ben Wisner and Stephanie Bouris in close collaboration with the author(s) of the case study and the organization(s) involved.

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C H A P T E R



Peripheral Heartland: Floods in Eastern Uttar Pradesh

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Case Study Guidance Note

Country: India
Location: Uttar Pradesh
Date: May 2007
Sector and Spatial focus: Adaptation and DRR
Title: Peripheral Heartland: Floods in Eastern Uttar Pradesh
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Abstract

The challenge of climate variability and change are increasingly recognised as serious impediments to poverty alleviation. Floods, for example, reverse the development process to a great extent and worsen the situation of disadvantaged and vulnerable groups. The post-disaster context, especially, offers a window of opportunity for political support and for development processes. There is a need to make best use of this opportunity to bring in a change, to design and implement systems in a way that mitigates disaster risk for future risks. The strategy followed is to work outward from the conditions of a household or community and those factors enabling or constraining responses to disasters to identify points of leverage for change. Shared learning dialogues (SLDs) are central to this process because they allow us and the community to build a shared understanding of opportunities and constraints without being held in by predefined notions of what risk reduction consists of.

Eastern UP is a flood prone region of the Indo-Gangetic plain of India. The methodology for the project involves vulnerability and capacity analysis and SLDs. Information from previous studies is being used. The research is finding that a significant number of households are more vulnerable due to factors related to the during-flood and post-flood periods than to physical damage caused by floods. Key factors causing vulnerability in a community are the lack of diversified agriculture systems and income avenues that are less susceptible to the impacts of floods. The most vulnerable group, however, are the landless who are significantly dependent on agriculture labor for their income.

The SLDs were helpful in identifying strategies that included sets of direct risk reduction interventions and interventions for changing underlying systems for adaptation.

Capacity and vulnerability analyses (CVAs) in conjunction with SLDs at different levels can help identify solutions envisaged in DRR. The ongoing research is showing that both CVAs and SLDs generate multi-pronged benefits in terms of data collection, validation and triangulation of the data, stakeholder engagement and policy advocacy. Most importantly, they also help identify potential solutions and mechanisms for development interventions.

Technical Description

- Hazard/risk type: Floods - recurrent and frequent disruption of human and livelihood systems.
- Type of assessment: Research to understand the factors that constrain and enable local communities to reduce risk and adapt to climatic and other sources of vulnerability

Research and Analytical Process

- Methods/tools used: Scoping surveys, SLDs, ranking tools

Key Insights Generated for Vulnerability Reduction and Capacity Enhancement

- Direct support to DRR and Adaptation: Agriculture interventions relating to inundation resistant and early sowing/ harvesting crops, irrigation technologies enhancing access to irrigation, financial risk spreading through crop insurance, innovative models of sanitation and handpumps, housing technology resistant to floods, and early warning systems.
- System Level support: Adaptation incubation systems that support self-management of people's institutions for continual innovations in agriculture and communication, and improvement in education, health and transport systems.

Potential Strategies Identified:

See Table on following page.

Strategic Notes and Lessons Learned – Key Points to Emphasise:

- Capacity and vulnerability analyses act as an initial pointer to the solutions envisaged in disaster risk reduction, complemented by the SLDs at different levels. This study establishes that both these tools/techniques do work and that they generate multi-pronged benefits in terms of data, validation and triangulation of data collected, stakeholder engagement and policy advocacy. Most importantly, they also help to identify potential solutions and mechanisms for development interventions.
- At the field level, SLDs conducted with disaster affected communities not only serve as a platform for sharing experience but also help to identify useful solutions for problems identified by the community.
- SLDs are useful in building capacity in community members and the project team.
- SLDs are a two-way knowledge transfer process. For example, we communicate technical and qualitative details of global warming to local communities. Community members, in return, explain to us the impacts at the field level (both existing and expected) in terms of occupational mobility, migration patterns, livelihood systems etc.
- This two-way transfer of information regarding knowledge of climate change and its impacts (tangible or indirect) needs to be interposed with the community's perspectives. These set the stage for making decisions on key action points.
- Solutions emerging in SLDs need to be documented and shared with stakeholders during further SLDs and/or in meetings with policy makers.
- SLDs need to be have greater participation from women and other marginalized groups.

Village	Description	ADAPTATION SPECIFIC INTERVENTIONS				
		Diversification	Ecosystem	Disaster Risk Reduction	Organization & Incubation	Skill Development
Lakshampur	Population-1,765 (M-726, F-679, C-360), Agricultural land-125 hectares: irrigated-95, non-irrigated-30, Total HH-199, most people (80%) are small farmers	Early maturing and water-standing crops, fodder conservation	Increasing soil fertility through soil testing and treatment, Checking soil erosion through bamboo cultivation on the land between embankment and river, making water logging area cultivable	Provision of irrigation pumps, maintaining and disinfecting hand pumps, construction of drainage pipes but depending upon support of local people (on both sides embankment and road)	Self-managing institutions, formation of farmers groups, village health committee, establishing village resource centres and self-help groups	Awareness programme & training: intensive farming, design and construction of portable raised toilets, personal hygiene
Sonatikar	Population-525 (M-242, F-198, C-85), Agricultural land-78 hectares: irrigated-68, non-irrigated-10, Total HH-100	Early maturing paddy crop, water-standing crop, mixed cropping, increase cropping intensity, vegetable production	Increasing soil fertility through soil testing and treatment, Utilising water bodies for Fisheries	Provision of community tubewells, maintaining hand pumps	Self-managing institutions, formation of farmers groups, establishing village resource centres and self-help groups	Awareness programme on disaster mitigation & training: intensive farming, vegetable production, seed production, water-standing crops, composting, personal hygiene
Manoharchak	Population-467 (M-198, F-186, C-83), Agricultural land-45 hectares: irrigated-29, non-irrigated-16, Total HH-104	Early maturing and water-standing crops, fodder conservation	Increasing soil fertility through soil testing and treatment, Checking soil erosion through bamboo cultivation on the land between embankment and river	Provision of community tubewells, maintaining hand pumps, training in making raised hygienic toilets, immunisation of children and livestock	Self-managing institutions, formation of farmers groups, establishing village resource centres and self-help groups and health committees	Awareness programmes on disaster mitigation, training and exposure visits

M = Males F = Females C = Children HH = Households

- SLDs act as a triangulation and validation tool.
- System and process delivery needs, including those related to policies, should be identified at all levels. The overall SLD process can be viewed as a pyramidal set-up primarily for increasing the number of “solutions” identified and promoted through dialogue across all levels.

Keywords: Floods, SLD, CVA, Climate Change, Adaptation, DRR, Uttar Pradesh

Resource persons: Shashikant Chopde and Shiraz Wajih

		UNDERLYING SYSTEM FOR ADAPTATION					
Financial and Risk Spreading	Communication	Education	Transport	Financial Mechanism	Organisation	Livelihood	
Income generation activities such as mushroom production, goat rearing, fisheries, poultry farming, candle-making	Information centre at village level, early warning systems, communication centres, community radio (FM), mobile phones	Training on seed production, Kishan Credit Cards-KCC- (farmer's credit cards), crop insurance, ensuring availability of Information, Education and Communication (IEC) materials, exposure visits	Boats, bamboo bridge	Linking self-help groups with banks and savings and credit organisations	Community irrigation management, setting up systems for community contributions to repair water pumps	Off-season vegetable & mushroom farming, seed production, kitchen gardening and vermicomposting	
Income generation activities such as mushroom production, goat rearing, fisheries, poultry farming, candle-making	Information centre at village level, early warning systems, communication centres, community radio (FM), mobile phones	Training on seed production, vermi and nadep composting, ensuring availability of IEC materials, exposure visits, KCC and crop insurance	Boats, bamboo bridge	Linking self-help groups with banks and savings and credit organisations	Community irrigation management	Off-season vegetable & mushroom farming, seed production, kitchen gardening and vermicomposting	
Income generation activities such as mushroom production, kitchen gardening, goat rearing, fisheries, poultry farming, candle-making	Information centre at village level, developing and early warning system through mobile phones and community radio (FM) but depending upon external stakeholder's support	Training on KCC, crop insurance, ensuring availability of IEC materials through resource centre, exposure visits	Boats, bamboo bridge	Linking self-help groups with banks and savings and credit organisations	Community irrigation management, voluntarily draining excess water	vegetable and mushroom production, seed production, kitchen gardening, vnrusery raising, vermicomposting, goat rearing, fisheries, incense stick-making, candle-making	

Introduction

Mechanisms can be identified by working with households, communities and other local entities to identify the factors that constrain or enable them to respond to events that could cause disaster.

The impacts of climate variability and change are increasingly being recognised as serious impediments to poverty alleviation in South Asia. In fact, the repeated occurrence of disasters such as floods and droughts and their impacts has added a new layer to the endemic poverty of a large section of the Indian populace. Extreme events worsen the situation of disadvantaged and vulnerable groups and reverse the few benefits which have accrued from the development process. South Asia's seventy per cent of disasters are climate related and as global climatic change increases the frequency and intensity of floods and drought events, the poor and the disadvantaged will become even more vulnerable. Furthermore, much of the world's population lives in vulnerable regions and the number of such people is projected to grow. Unless the cycle of disaster and poverty can be broken, the world stands little chance of ever reaching the millennium development goals (MDGs).

It is worthwhile to note that there is a silver lining under the dark cloud of disasters. This lining is the window of opportunity the disasters create not only for influencing the approaches of development practitioners and policy-makers but also for catalysing political support for change in post-disaster contexts. Disasters create an

opportunity as affected local populations tend to be more willing to make structural and livelihood changes they might otherwise not have been willing to make. Further, the financial constraints faced by poor and vulnerable communities can be overcome more easily in post-disaster contexts, when a flow of funds is made available through government grants, relief aid and other support. Though such opportunities are pulsed, they promote a better understanding of disaster recovery processes and enable the introduction of measures for systemic changes. Often, the impact of extreme climatic events intertwine with the social and economic constraints prevailing within a region - such as a non-diversified livelihood base and poor social and economic infrastructures - and make its population more vulnerable.

During the course of this study, we did not limit our definition of interventions for disaster risk reduction to conventional techniques such as structural protection and provision of relief. We believe that other practical and effective mechanisms can be identified by working with households, communities and other local entities to identify those factors that constrain or enable them to respond to events that could cause disaster. In almost all communities, some groups are relatively unaffected by extreme events while others are devastated. The differences between those who thrive despite the impacts of extreme events and those who are harmed reveal the nature of both enabling and constraining factors and include behavioural as well as other factors. The identification of differences can, in turn, help identify points of leverage (policy, infrastructure or other changes) for removing constraints which limit the ability of vulnerable groups to

undertake the actions to reduce vulnerability that unaffected groups generally take. Once these constraints are known we can identify strategies that should help local people respond better to local conditions.

Our overall strategy is to work outward from the conditions of a household or a community. Shared learning dialogues (SLDs) are central because they allow us researchers, to build a shared understanding of opportunities and constraints without being limited by pre-conceived notions of what risk reduction constitutes. Through dialogue and semi-structured qualitative and quantitative surveys with local communities, government representatives, NGOs and other actors in the area, our goal is to develop both a shared vision of key issues and a semi-quantitative baseline of information.

The impacts of monsoon river floods, which occur more regularly than coastal floods are well documented and understood, the mitigation strategies adopted by state agencies are fairly well reported on. The strategies local communities pursue for coping with and adapting to such impacts, in contrast, are not at all well documented. This paper discusses the strategies adopted by communities within the flood-affected region of the Rohini Basin in India's Eastern Uttar Pradesh, India. The case study field sites were selected because the issues that are most important at the field level – access to communication systems and the location of homes in vulnerable areas such a flood plains – relate well to national policy regarding, knowledge management in the areas of environmental management, vulnerability and communication.

These field locations are also vulnerable to the sudden problems, typically associated with flooding or extreme storm events. As a result, issues related to early warning systems and the role of ecosystems in buffering floods and storms are significant. In addition, the rapid onset of floods and the vulnerable locations of homes and workplaces at the field sites resemble patterns of vulnerability similar to those of other field sites for this project in India, Nepal and Pakistan. In fact, the field-level scenario as well as the national-level policy and knowledge management activities found in the Eastern Uttar Pradesh study are both core parts of a larger programme on adaptation as well as being an integrated study of their own.

Two villages in Maharajganj District, Lakshmipur and Manoharchak, and one village in Gorakhpur District, Sonatkar were selected in Eastern Uttar Pradesh. In all three villages, flood disaster is a process rather than a single event. Each disaster makes the poor more vulnerable to the next disaster and all disasters are a normal condition for those repeatedly affected. This process is aggravated by the fact that these communities suffer from multiple hazards, both natural and man-made.

Peripheral Heartland

Around 29 % of the 33,270 km² of Eastern Uttar Pradesh is a flood-prone region of the Indo-Gangetic plain. The flood-affected areas cover the low lying districts of Gorakhpur and Maharajganj, whose socio-economic and human development indices are lower than those of other Indian states (Figure 1). Floods affect agriculture, the main source of livelihood in this region, disrupt life

The strategies local communities pursue for coping with and adapting to flood impacts are not at all well documented.

and devastate property on a large scale, impede socio-economic progress, including education, and destroy rural infrastructure. The effects of flooding are exacerbated by the characteristics which prevail in the region: poverty, poor health services, malnutrition, illiteracy, lack of food and livelihood security, extensive out-migration and ecological degradation.

Eastern Uttar Pradesh constitutes a riparian land system formed by the Gandak, West Rapti rivers and the Rohini River system. Situated north of the Ganga River, the region is commonly known as the trans-Saryu plain. The Gandak is a snow-fed river that originates in Nepal. The West

Rapti also originates in Nepal, flowing down from the Mahabharat range, and meeting the Gandak near the town of Gorakhpur, Eastern Uttar Pradesh. The Rohini River system, which originates in Nepal, is composed of three rivers, the Rohini, the Tinau and the Banagana and their tributaries. Weirs and barrages have been built on the Gandak and the West Rapti rivers as well as on some of their tributaries. Although the Rohini River system is used extensively and causes large-scale flood damage, it does not appear on the radar screen of the government of either Nepal or India.

The average annual rainfall in the area is between 800 mm and 900 mm. The maximum rainfall generally occurs in July and the minimum, which is negligible, occurs between December and March.

Field sites for this case study were selected within the Rohini Basin because it has faced major floods in the past: In 1904, each year between 1952 and 1957, in 1960, and their again in 1962, 1968, 1970, 1971, 1974, 1980, 1981, 1995, 1996, 1998, 2000 and 2001. The 2001 flood was followed by a drought in 2002. Attempts have been made to control flooding along the Rohini by constructing embankments, a process which began in 1952 and continued intermittently until 1985. Every flood led to the loss of crops, dwellings, food grains, seeds and personal belongings, and each case villagers sought shelter on nearby embankments for many days. The receding floodwaters deposited sand on agricultural land, rendering the land unproductive. With the exception of the 1998 flood, which was the result of a very wet monsoon mostly in the Rohini River system, every flood event here was the result of rivers in the lower parts of the north Ganga plains overflowing.

FIGURE 1 | Gorakhpur/Maharajganj



The Study Villages

A profile of the selected village study sites is provided in Appendix 1 at the end of this chapter.

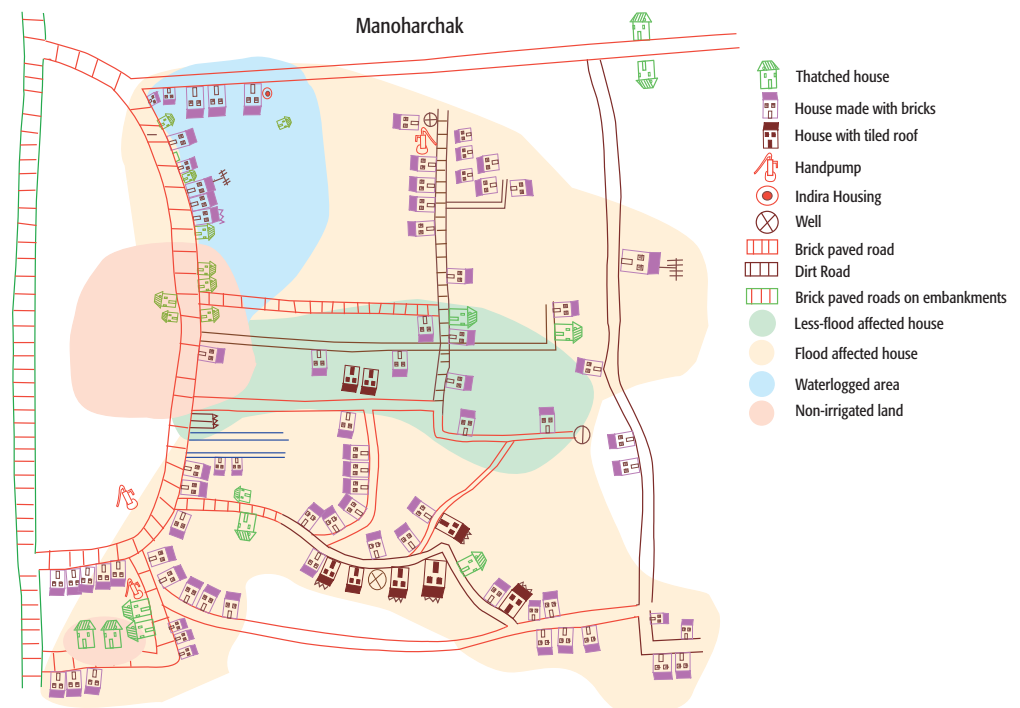
Manoharchak

Manoharchak, a small village of just 104 households, is situated on the banks of the Rohini River, 40 km from Gorakhpur the district headquarters. Agriculture, the main source of income for the residents, is seriously affected by flooding caused by the 35-year-old Rohini River embankment outside the

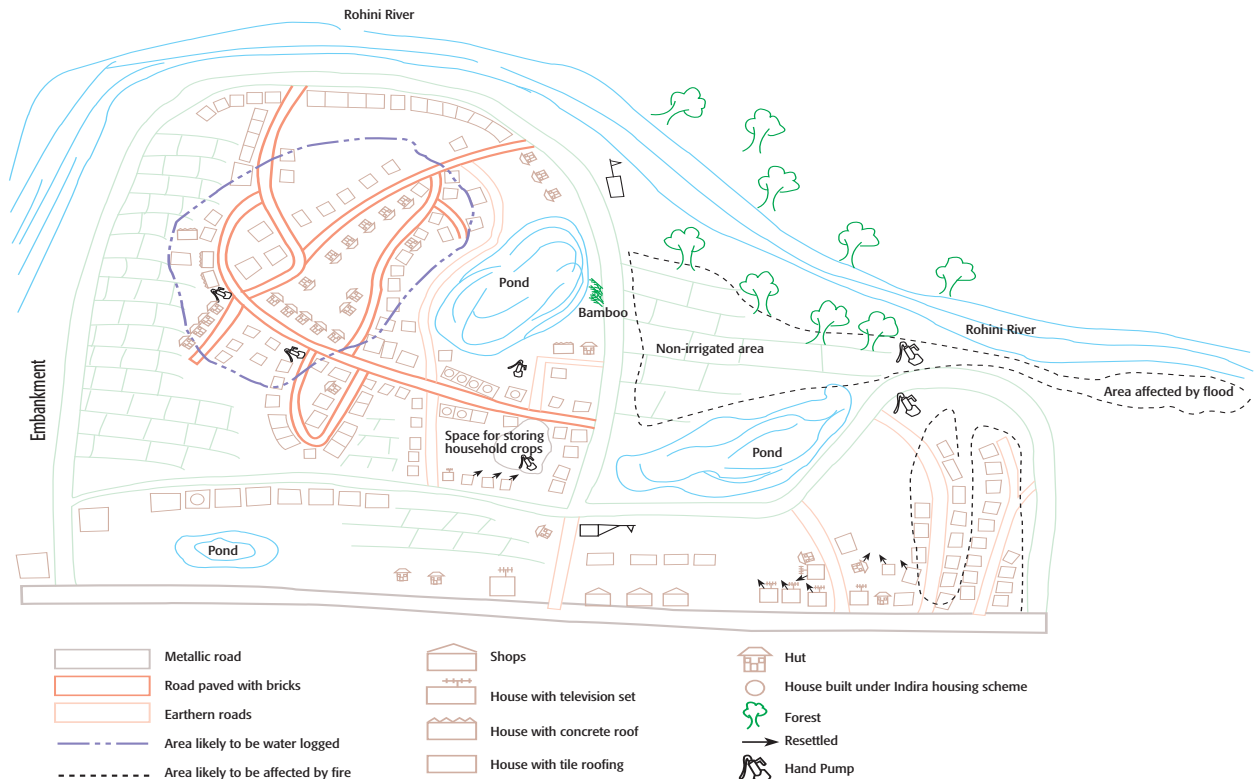
village. Although the embankment does check regular floods, it has also caused increasing waterlogging of agricultural fields. Most farmers own less than one acre of land and the village lacks basic water supply, sanitation and health services. Out-migration is high.

Lakshmipur

Lakshmipur, a village of 199 households, is situated on the banks of the Rohini River, 45 km from the district headquarters, Gorakhpur. It, too, is regularly flooded. Most of the agricultural land in the village is surrounded by embankments, which cause the land to become waterlogged during heavy rains. The irrigation department has an office in the village and regularly maintains the embankments. The village has a primary and a junior high school. Agriculture is the main source of livelihood, but migration has significantly increased as villagers seek an alternative source of livelihood.



Social Map of Manoharchak



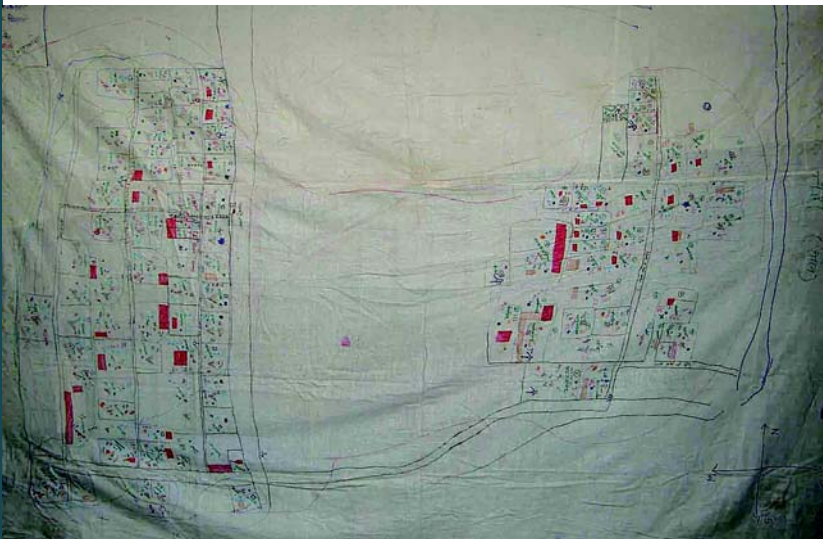
Social Map of Lakshampur

Sonatikar

Located 45 km from the district headquarters, Sonatikar is situated at the edge of the Rohini River and is one

of the most-flood affected villages in the region though a large embankment stands between the village and the river. The embankment prevents the rivers from overflowing into the village of 100 households but it also stops rainwater from draining out of the agricultural fields into the river. During periods of heavy rain, fields become waterlogged for two or three months. Almost half of the villagers have moved to the main road, which they say is safer during floods.

In all three villages, the majority of the farmers own less than one acre of land and fall into the “marginal farmer” category. Landless families depend upon seasonal agricultural labour for income. More details about the three villages and the issues and problems they face due to flooding are outlined in Appendix 2.



Social Map of Sonatikar on a bedsheet.

Methodology and Tools Used

The methodology for our study involved the implementation of vulnerability and capacity analyses through SLDs, while information from previous studies conducted in these villages was used to profile the characteristics of the area. Community groups as well as *panchayat* (local government) members participated in the SLDs held in each village. The problems and issues faced by each village as a whole as well as those faced by villagers individually were discussed.

Scoring and ranking methods were used to identify the most severe problems. Participants were asked to prioritise the problems that affected their village as a whole rather than those faced at an individual or family level. The strategy we adopted assumes working with households, communities and other local entities is an effective mechanism for identifying those factors that prevent or enable responses to events that could cause disaster. Without such consultations the problems faced by a small group of people or households within a community will be overlooked. In-depth discussions on the problems identified followed and social maps were used to analyse the causes and effects of each problem. This process is outlined in Figure 2.

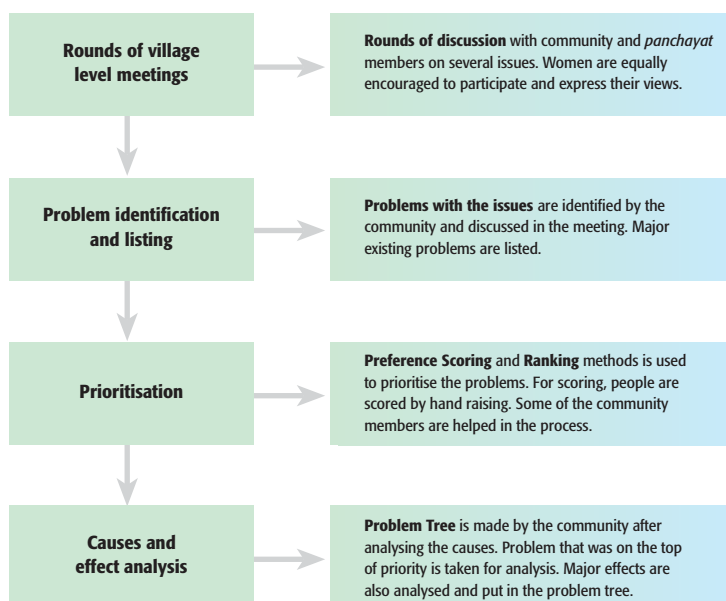
Livelihoods

A social map was used to assess the occupation of each village by household. In addition to farming, residents in Maharajganj and Gorakhpur districts are engaged in daily wage labour, rickshaw-pulling, hair-cutting, and puffing food grains (*bhar*). They are also engaged in fishing, weaving fish nets, tailoring, owning grocery shops, owning tea shops, selling milk, vegetables and fruit carrying goods, doing unskilled labour in brick kilns and performing religious tasks.

Population and Migration

Migration is a popular way of adapting to floods. In the last several years, the search for jobs outside of the three villages has increased significantly. Young men in Lakshimpur, Manoharchak and Sonatikar would

FIGURE 2 | The process



People's greater willingness to travel to distant places in search of livelihoods has increased local occupational mobility.

rather not live in their birthplaces and work as farmers. The number of migrants has increased sharply as has the distances which people migrate. People's greater willingness to travel to distant places in search of livelihoods has increased local occupational mobility. The duration of migration has also increased. People often go away for one to one-and-a-half years, returning to visit their villages for only one or two festivals annually. At the end of this period, they return to the village for about three months and then emigrate again (see Table 1). One result of this rise in extended out-migration has been an increase in the incidence of HIV infection. Another is that with men away for longer periods of time, the impact of flooding is gradually becoming feminised.

Access to Services

Access to key services was mapped in order to understand the social structure within which communities function. The findings are summarised in the sections below.

Education Services

Table 2 presents a picture of the status of education obtained from the SLDs. Two indicators are given: the level of satisfaction and the distance from the village. In general, the higher the level of education an institution confers, the further it is from a village. Though primary schools are found in all three villages, the people are not satisfied with how they are administered, in particular, the lack of teachers, irregularity of classes, poor quality midday meals and poor facilities. The majority of children from poor families do go to primary school or *anganwadis*, but beyond junior high school, their participation decreases dramatically. The average distance to a primary school is about four kilometres and there is a junior high school in Lakshmipur. High school, intermediate and graduate level education, however, is beyond the reach of these villagers. On average students have to travel almost 18 kilometres to get to the nearest college at a cost which is prohibitively expensive. Thus, because of the high cost of

TABLE 1 | Migration Trends

Villages	Number of Households	Households with a migrant	Per cent	Migrated to	
				Local migration	Distant migration
Sonatikar	100	28	28	Brick kilns in Campianganj, Pipiganj and Gorakhpur	Delhi, Gujarat, Mumbai, Punjab and Haryana
Lakshmipur	134	64	48		
Manoharchak	80	37	46		

Source: Field survey, 2006

TABLE 2 | The Status of Education in the Studied Villages

Village	Anganwari		Primary		Jr. High/High		Inter college		Degree College	
	D	S	D	S	D	S	D	S	D	S
Sonatikar	1	0	1	4	4	5	6	5	18	3
Lakshmipur	2	2	0	7	0	5	7	9	19	7
Manoharchak	0.5	9	0.5	4	1.5	5	6	8	17	7

S : Satisfaction in quality of education (on a 0 to 10 point scale)
D : Distance from village (in kilometres)

Source: Field survey, 2006

transportation children of poor families are not educated beyond the primary level (see Table 2).

Health Services

Information on both government and private health services was assessed using diagrams which mapped the services provided against the opportunities to seek those services. As indicated in Table 3, the quality of government health services at the local level is poor. People often consult private doctors or visit a medical college for better treatment. Private practitioners and the staff at nursing homes have much greater credibility than the staff at government institutions. The one community health care centre available at the block level does function comparatively well and people are satisfied with its services. This centre is distant from the villages, however, and hence, in an emergency, no good quality services are available locally.

Agriculture Services

In the villages studied there are no agricultural facilities at the village level. For basic provisions such as seeds, fertilisers and pesticides, people must go to the block headquarters which is about 13 kilometres away. For other materials, such as tube wells and equipment and even some seeds, people must go to the district headquarters about 55 kilometers away. Agricultural co-operatives do exist but they are essentially defunct and people awarded them no marks for the criterion of satisfaction.

Food Deficiency Months, Coping Strategies and Livelihoods

Critical information about the duration of food deficiencies among the rural population, their strategies of coping with deficiencies and their livelihood options are summarised in the Table 4. Clearly, basic infrastructure related to health, education and agriculture is

People often consult private doctors or visit a medical college for better treatment.

TABLE 3 | Status of Health Services

Village	Private Doctors at village level		Primary Health Centre		Community Health Centre		District Hospital		Private Nursing Home		Medical College	
	S	D	S	D	S	D	S	D	S	D	S	D
Sonatkar	3	0	-	-		37	2	1837	56	37		4
Lakshmipur	5	2	4	10	7		-	2056	86	56		4
Manoharchak	5	1	1	4	5	55	3	55	9	55		2

S : Satisfaction of services provided (on a 0 to 10 point scale)
D : Distance from village (in kilometres)

Source: Field survey, 2006

TABLE 4 | Gap in Food Access

Basin	Food Gap (in months)	Strategy	Livelihood
Rohini Basin (Maharajganj and Gorakhpur districts)	i. Bhadra (Aug/Sept) ii. Falgun (March) iii. Magh (Feb/March)	The major coping strategy is to consume less food. Bread eaten with salt is the main food during these months. <i>Bhuja</i> , <i>Chiura</i> , <i>Sattu</i> , potato and a little sugar is also eaten. For some households, fasting is a major strategy for survival. At critical times, people are compelled to obtain credits from moneylenders by mortgaging agricultural lands.	People have no option other than doing labour on minimal wages. The wages earned hardly afford two meals for the family. People consider these periods as exploitative months.

Source: Field survey, 2006

External agencies and voluntary organisations can play a vital role in disaster risk reduction.

lacking and reduces the adaptive capacity of these communities in times of disaster.

An attempt was also made to understand the service delivery roles of two important formal institutions – federal government extension services and *panchayats* in the context of disaster mitigation.

Role of Formal Institutions

Government extension services
External agencies like government functionaries and voluntary organisations play a vital role in disaster risk reduction. The construction of houses on higher grounds is an important step towards disaster risk reduction in flood-prone areas. Indeed, in Sonatkar, people were allotted lands on high ground to build their homes. Very little effort, however, was accorded to rehabilitation and relief services. Only during serious floods are food packets distributed and the maintenance of physical structures has been largely overlooked in all flood prone villages.

Panchayats
The linkages between people and welfare schemes in each village were assessed. Though *panchayats* exist within revenue villages they are practically defunct and people are not satisfied with their work. In fact, the prevailing sentiment is that these local governance units have become agents of politicians and higher authorities and that most are corrupt – particularly in terms of how beneficiaries for welfare

schemes are selected. The stated beneficiaries often receive nothing, while wealthy people with access to power and money enjoy substantial benefits. Only people from Lakshmipur were satisfied with the role of the *panchayat* during floods. They believe *panchayat* committees properly distribute relief materials to villagers.

Natural and Climate Hazards

Eastern Uttar Pradesh is frequently subjected to flooding, due to its topography and heavy rainfall. Most communities know little about the impacts climate change may have on the already difficult local conditions. Since climate change information is still emerging, incorporating insights into risk reduction strategies will require effective strategies for a two-way dialogue. The challenge is to communicate the often abstract and technical insights from global science into a discourse meaningful to local communities. At the same time, the communities have to develop and understand and communicate the potential implications of climate change on their livelihoods. The importance of shared learning is, as a result, central to identifying effective strategies for adapting to climate change. In addition, as enabling and constraining factors at the community level often have roots in high-level systems (financial, policy, and institutional), we need to be able to identify high-level points of entry and work with actors operating at the relevant regional, state, or national levels.

Patterns of Vulnerability

Vulnerability is locally based and must be analysed and understood in context.

Climate change impacts are, and will be, different on all scales. This means that different regions, different social groups and different individuals will face different, diverse and unequal impacts and difficulties in coping with climate change. This makes *vulnerability* to climate change differ too. Hence, vulnerability is locally based and must be analysed and understood in context. Vulnerability can be defined simply as a *set of conditions and processes resulting from physical, social, economic, and environmental factors which increase the susceptibility of a community to the impact of hazards*.

Factors that increase the ability of people and the society they live in to

cope effectively with hazards, that increase their resilience, or that otherwise reduce their susceptibility are considered as their capacity to cope with disaster. Capacity varies depending on factors like poverty, gender, caste (social inclusion), age, physical and mental ability, or what is known as *everyday vulnerabilities*.

Capacity and vulnerability analysis (CVA) was used as a tool to assess the vulnerabilities extant in the three villages studied (see Table 5a, 5b, 5c). Social mapping and community group discussions were also used. The findings about the existing village-level vulnerabilities and capacities, information that is necessary for further intervention are summarised in the tables below.

Changing Nature of Vulnerability

Vulnerability is dynamic and context-dependent. A farming family, for

TABLE 5a | Capacity and Vulnerability Analysis Lakshmipur

	Vulnerability	Capacity
Physical/Material	<ul style="list-style-type: none"> - Over 75% of households own less than one acre of land - Around 50 acres of agricultural land is waterlogged - Around 250 acres of agricultural land is under-irrigated - Health centres do not function; the satisfaction level for these is low - Only 5-6 hours of power supply a day - local food supplies only last six months of the year - Drought is as a problem 	<ul style="list-style-type: none"> - Embankment for refuge during floods - Irrigation Department office exists - Access to road - Market is 7 km away - knowledge of building temporary bridge during flood - 12 individuals have mobile phones and 36 households have television - 3 Public Call Offices - Primary and junior high schools
Social/Organisational	<ul style="list-style-type: none"> - Defunct <i>gram panchayat</i> - Caste divisions during elections - 50% of households have members who migrate out, migration of youths is increasing - No formal group like Mahila Mandal and no self-help group 	<ul style="list-style-type: none"> - Puja committees (Durga, Saraswati) exist - Decentralised roles and responsibilities in group work - Youth sports team - Physical and moral support during floods
Motivation/Attitude	<ul style="list-style-type: none"> - "Flood is our destiny" and "We cannot get external support" are accepted mantras - Depend on government/<i>panchayat</i> to maintain hand pumps, tube wells 	<ul style="list-style-type: none"> - Readiness to work together - Demand for new agriculture techniques - Participation in community meetings - Willingness to obtain new information - Readiness to contribute to resources

TABLE 5b | Capacity and Vulnerability Analysis Manoharchak

	Vulnerability	Capacity
Physical/Material	<ul style="list-style-type: none"> - Over 80% of households own less than one acre of land - Health centre does not function well; visits by medical worker are irregular - Only 5-6 hours of power supply a day - Local food supplies only last six months of the year - Very few natural water reservoirs; deep water table (60-65 feet) - A large number of eligible families have no Below Poverty Line (BPL) ration cards 	<ul style="list-style-type: none"> - Embankment for refuge during floods - Village electrified - Functional ITC: e-chaupal internet connectivity - Connected to road - Market is 8 km away - Knowledge to build temporary bridges and roads during floods - Mobile phone network available - 1 Public Call Office
Social/Organisational	<ul style="list-style-type: none"> - Defunct <i>gram panchayat</i> - Caste divisions during election period - 47% of households have members who migrate; migration of youths is gradually increasing - No formal group like Mahila Mandal and no self-help group 	<ul style="list-style-type: none"> - Puja committees - Decentralised roles and responsibilities - Mutual physical and moral support among people in disaster situations
Motivation/Attitude	<ul style="list-style-type: none"> - Sense of hopelessness in obtaining any government or <i>panchayat</i> support - No faith in <i>panchayat</i> - Depend on <i>panchayat</i> to repair tube well and for health centre 	<ul style="list-style-type: none"> - Some community members are active and encourage others - Demand for new agricultural techniques - Participation in community meetings - Willingness to seek new knowledge - Readiness to contribute to resources

TABLE 5c | Capacity and Vulnerability Analysis Sonatkar

	Vulnerability	Capacity
Physical/Material	<ul style="list-style-type: none"> - Over 80% of households own less than one acre of land - High number of landless families - Health centre and schools do not exist in village - Half of the village is not electrified - Local food supplies only last for six months of the year - A large number of eligible families do not have Below Poverty Line (BPL) ration cards - A large area of agricultural land is waterlogged (around 100 acres) - Land is waterlogged for 2-3 months 	<ul style="list-style-type: none"> - Embankment for refuge during floods - Half of the village is electrified - Connected with road - Urban market is 8 km away - Knowledge of building temporary bridges and walkways during floods - Mobile network is available - 1 Public Call Office
Social/Organisational	<ul style="list-style-type: none"> - Defunct <i>gram panchayat</i> - Caste divisions during election - 28% of households have members who migrate; migration among youths is increasing - No formal group like Mahila Mandal and no self-help groups 	<ul style="list-style-type: none"> - Puja committees - Decentralised roles and responsibilities - Mutual physical and moral support during disasters
Motivation/Attitude	<ul style="list-style-type: none"> - Poor faith in <i>panchayat</i> - Dependent on government/<i>panchayat</i> to maintain hand pumps, tube wells - People are not interested in collective work 	<ul style="list-style-type: none"> - Some community members are active and influence others - Demand for new agricultural techniques - Community members participate in meetings and discussions - Willingness to obtain new knowledge - Readiness to contribute to resources

example, may be more vulnerable to floods, than a landless family is. Spatial and time factors play a crucial role in defining vulnerability too.

In terms of their vulnerability, poor families or communities are broadly classified as improving, coping or declining.

Poor people can move through these three classifications over the course of a month or year. Just as there are cases of people 'coping' with a disaster situation moving to the 'improving' category by virtue of increasing their incomes through out-migration there are also incidences of people who fall from 'improving' all the way down to 'declining'. It is important to document changes in coping status which are influenced by income level as income is the real agent of change.

Gender is clearly an indicator of vulnerability, specifically in relation to health, education, mortality, economic participation, decision-making and safety. As a result of proactive measures taken in the past, gender gaps in literacy appear to be narrowing in those states where the disparity between men and women was once high (according to the 2001 population census).

Although the poor are adversely impacted as a whole, women and girls are the most vulnerable among them because they have little voice in decision-making. In rural areas dominated by men and elites, women often are not well represented politically, are neither consulted nor included in development planning processes, and, as a result, cannot

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Sand bags placed for preventing further degradation of embankment at breached section.

voice their ideas about how services should be designed.

Women and girls find it difficult to participate in consultations for several reasons. Some of these are:

- socio-cultural barriers
- poor timing (timings that conflict with chores women are obliged to carry out) and inappropriate venues for meetings (places where women are not allowed)
- inability to travel freely
- lack of free time.

The 74th Constitutional Amendment (1992) has enshrined a structural basis for women's participation in political decision-making and for bringing them into the mainstream of development. The process of actually empowering women and promoting gender balance, however, is in a nascent stage. Numerous constraints need to be overcome to ensure that women participate effectively.

Numerous constraints need to be overcome to ensure that women participate effectively.

Shared Learning Dialogue

Using the SLD method, this study aimed to understand local concerns and knowledge.

The process of SLD is based on reflexive learning from other positions and perspectives. It is distinguished from the rigid certitude of mono-disciplinary styles, especially those of single-mission outfits which advocate top-down, structural solutions to mitigate the impact of floods and droughts. SLD is built around the idea of introducing the insights of social sciences into vulnerability and risk assessment. While technical experts know much, villagers suffering from floods and droughts know many of the social and environmental contexts in which they cope with the disasters still better. Using the SLD method, this study aimed to understand local concerns and knowledge and to integrate them with proposed pilot interventions.

We undertook various activities to engage with different groups at different levels and scales so that we could gain insights into issues that may have been missed by focusing only on a single perspective. Learning through SLD involves engaging in discussions with representatives from government, market and civic movements on issues relating to adaptation, livelihood and mitigation, reviewing existing mitigation strategies, and establishing communication links among different groups.

Since government bureaucrats, market players and activists define a problem or disaster event differently, they each support different policy measures. As is the case in the SLD paradigm, policy reviews were begun at the lowest level, with the communities affected by disasters. Market players were asked to describe constraints to provide cheaper and more efficient solutions and activists were asked to challenge and examine the issues of fairness affecting those communities. The relevant government departments were provided with recommendations for implementation procedures that could address the concerns of all three sets of actors. These recommendations focused on innovation, fairness and effective regulation. The findings from the SLDs that were conducted are summarised in Table 6.

Key Points from the SLDs for Strategies:

- Varied perceptions on hazards emerged. Although overall, at the village level, droughts and floods are perceived to be a common disaster, the village level definition of a hazard often did not equate with the official definition. For example, villagers define drought as those periods when their crops require water and there is no rainfall. This definition is different from that used by the state government which defines drought based on the deficit in total volume of annual rainfall relative to normal volumes.
- Early flood warning systems need to devolve beyond the region, district or block level to the village level. The villagers of Lakshmipur suggested

TABLE 6 | Summary of Findings from Shared Learning Dialogues

Level	No of SLDs	Stakeholder	Description
Village	5	Community representatives from local government and NGOs	First SLD in five villages discussed the nature of disasters and associated risks. This area is highly flood prone but drought is an emerging hazard as the monsoon is becoming more erratic.
Block	1	Block Development Officer (BDO), Assistant Development Officer (ADO), Media, <i>panchayat</i> officials, block level government officials.*	Main points of earlier SLD shared. Stakeholders' views on flood and rehabilitation explored. District administration (DA) identified as prime authority to implement rehabilitation programme and BDO and ADO perform as instructed by the DA. Compensation assessment not the responsibility of DA. Officials agree damage assessment process is not transparent. Crop insurance can be an effective tool.
State	1	NGOs, Catholic Relief Services (CRS), Oxfam, Church's Auxiliary for Social Action (CASA), Radio and TV, Project thematic partners, District and State disaster management cell	A short discussion on the present scenario of floods and other disasters in Eastern UP including the nature and frequency of flood and ecological change due to disaster. Discussion of communication needs and systems at village, block, district and state level during disaster, and policies on disaster mitigation and rehabilitation.
Panel discussion on crop insurance in during Jan Sansad	1	Attended by about 1,000 farmers and NGOs, chaired by senior administrative officer who shared his views on farmer's rights.	Crop insurance and compensation was one of the major issues discussed. Farmers from flood and drought affected regions suggested that efforts should be made to raise the issue of insurance and compensation. Present mechanisms and policies on crop insurance and damage assessment is complicated and beyond the reach of the community.

*Dialogue is planned for Paniyara Block.

that if they could receive information on water levels, then preventive measures could be taken to save their assets, including crops. Currently people get some information on the probability of a flood event through newspapers and the radio. Such information is not considered specific enough, however, for people to determine if their village is likely to be affected or not. Currently, villagers monitor river water levels next to their village on their own. They use river level assessments to make judgments on whether or not a flood event is likely.

- Farmers were interested in knowing about suitable alternative crops that they could cultivate to minimise crop damage due to floods or poor rainfall. These could include early-sowing short duration crops that can be harvested before the onset of the

flood season (July-August) and crops that can survive waterlogged conditions.

- Seasonal migration helps local communities that are regularly affected by floods to cope with the losses incurred.
- Interventions and actions are needed at different levels—household, community groups and village levels.
- At levels higher than the field level, questions of who should undertake what activities leads into the questions of what needs to be done for adaptation and disaster risk reduction.
- During the SLD process, several issues were raised regarding high frequency disasters with low impacts versus low frequency disasters with high impacts. Three important questions emerged which stakeholders felt are important to

Preventive measures could be taken to save their assets, including crops.

SLDs help gather people's perceptions of the costs and benefits of disaster risk reduction.

consider while designing disaster risk reduction strategies:

- a. How do we sustain proposed adaptive strategies for DRR (insurance, communication mechanisms, early warning systems) for low frequency/high impact disasters?
- b. In developing adaptive strategies, should the focus be on high frequency and low impact disasters, while nonetheless keeping high impact events in mind?
- c. How do we integrate adaptive strategies overall development?

It was also pointed out that market and larger political dynamics can exacerbate the vulnerability of local communities.

- The various representatives of government departments we interacted with through SLDs were defensive at first but tended to provide achievable, incremental "options for the way ahead" for disaster interventions;
- As a tool, SLDs allow for continuous engagement with stakeholders, which is much more meaningful than simply getting feedback from them as it allows the project team to share experiences and findings. SLDs are inclusive and integrative because stakeholders at all levels understand that these discussions are not a one-off exercise but rather a forum for continuous discussion;
- SLDs help gather people's perceptions of the costs and benefits of disaster risk reduction strategies: embankments as a preventive measure against floods can be both a boon as well as a bane. The embankment in Lakshmipur is a case in point. The ring bund embankment

was constructed 35 years ago. In 2001, the embankment protected the village from floods, but later it breached, washing away part of the village and forming a large pond on arable land. The ring bund also prevents flood water from draining properly, resulting in waterlogging. Though the soil is fertile, agricultural productivity has been adversely affected. The Irrigation Department has neglected its responsibility for maintaining the bund. As a result, the threat of its breaching and inundating the village is constant.

- In addition to discussing field based issues, the state level SLD, also broached policy requirements. This forum allowed for a discussion and recognition of community needs and possible policy changes called for. This SLD also helped explore how best to translate policy into action.

Who is Vulnerable?

From the foregoing, it becomes clear that SLDs have helped identify patterns of vulnerability in project villages, and, more specifically, those factors which promote or prevent household adaptation to floods. Villagers used several specific indicators to identify vulnerable households, including susceptibility of physical assets such as houses and agricultural land to damage inability to cope with or recover from a disruption in the supply of primary services such as water supply, sanitation and health; and the inability to maintain household income, especially during the post flood periods, due to excessive or sole dependence on livelihood systems affected by floods.

TABLE 7 | Vulnerable Groups

Vulnerability Attributes	Manoharchak (% households)	Lakshmipur (% households)	Sonatikar (% households)	Remarks
I) Susceptible to physical damage (houses)				
a) houses	31	22		<i>Kachcha</i> dwellings prone to damage
b) inundation of agricultural fields	25	-		Loss in crop production
II) Access to safe drinking water, especially during floods	75	75		Contamination of handpumps due to flood waters
III) Access to sanitation facilities, especially during floods	100	100		Toilets and open areas for defecation remain inundated
IV) Inability to recover from loss of livelihood incomes				
a) Inability to take at least one extra crop	80	75-80	100	Waterlogged lands due to floods constraining them to take only one crop after flood water recedes
b) Lack of irrigation facilities post floods	70	85	70	Lack of access to irrigation technologies resulting in loss in production
c) Low income groups (landless)	28	10	40*	No alternative income source to agricultural labour
V) Lack of access to information and early warnings	100	100	100	People are unaware of alternative income generation activities and do not have access to effective warning system

* includes marginal farmers who are dependent on big farmers

A cursory look at Table 7 reveals that a significant proportion of households are more at risk because of vulnerability factors related to during-flood and post-flood periods than because of physical damage due to floods. A key factor making a community vulnerable is the lack of a diversified agricultural system and of income avenues not affected by flood impacts. The most vulnerable group is the landless, who are heavily dependent on agriculture labour for generating household income.

Who Should One Work With?

SLDs at different levels not only point out possible development interventions

but also reveal the mechanisms (or roadmap) for achieving them. Different stakeholders can take on distinct roles in their aim to achieve the common goal of disaster risk reduction. Government officials agreed, for example, that damage assessment in post-disaster scenarios is not transparent and that existing relief and rehabilitation systems are deficient, but felt that crop insurance could emerge as an effective tool to minimise the losses of disaster.

It is important to recall that the government has been mandated with the task of governance and that there should be no duplication of service delivery. Instead, the existing government system needs to be complemented. Treating the

The landless are heavily dependent on agricultural labour for generating household income.

We also need to generate space for market actors.

government as a monolithic institution does not improve local level situations either. It is the existing disaster management cell which has been mandated to undertake activities for disaster risk reduction that needs to play a key role in the delivery of services.

Communities impacted by disasters are the target groups for developing pilot intervention activities. While there is a tendency of doing too many things at one go, especially in the context of disasters, it is more important to exercise restraint and design interventions that are incremental and achievable. The involvement of communities through SLDs can lead to effective diagnosis and throw open options. SLDs at different levels can target achievability in the delivery of services.

SLDs serve as a key tool for civil society institutions and the media to engage with each other. They also help donor

communities adopt a consensual approach rather than, as is typical in disaster risk reduction interventions, being donor-led. Pilots and briefs (supported by donors) can go a long way in moving towards achieving bottom-up initiatives.

Banks and traders can also contribute towards improving conditions in rural communities. The focus should be on business rather than on philanthropy through social responsibility initiatives. Presently, the private sector, banks, traders and insurance communities hide behind the sophistry of 'systems for and policies on crop insurance and damage assessment are too complicated for rural communities' rather than using these mechanisms for risk reduction. To widen the reach of disaster risk reduction solutions we also need to generate space for market actors. First, though, the existing data gap needs to be filled and key insights into how that aim could be achieved needs to be generated.

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Embankments are sites of refuge during floods.

TABLE 8 | Pilot Adaptive Measures for the Three Study Villages

	Lakshmipur	Sonatikar	Manoharchak
Description of Village	Population-1765 (M-726, F-679, C-360), agriculture land- 125 ha, irrigated-95 ha, non irrigated-30 ha, Total HH-199, majority of small farmers (80%)	Population-525 (M-242, F-198, C-85), agriculture land- 78 ha, irrigated-68 ha, non irrigated-10 ha, Total HH-100	Population-467 (M-198, F-186, C-83), agriculture land- 45 ha, irrigated-29 ha, non irrigated-16 ha, Total HH-104
ADAPTATION SPECIFIC INTERVENTIONS			
Diversification			Early maturing and water standing crops, fodder conservation
Ecosystem			
Disaster Risk Reduction	Provision of irrigation pumps, maintaining and disinfection hand pumps, drainage pipes construction but depending upon support of local people (on both sides embankment and road)	Provision of community tube wells, maintaining hand pumps	Provision of community tube wells, maintaining hand pumps, training on hygiene toilets making and raising, immunisation of children and livestock
Organisation and Incubation	Self managing institutions, formation of farmers groups, village health committee, establishing village resource centres, SHG formation	Self managing institutions, formation of farmers groups, establishing village resource centres, SHG formation	Self managing institutions, formation of farmers groups, establishing village resource centres, SHG formation, health committee
Skill Development	Awareness programme and training (intensive farming, design and construction of portable raised toilets, personal hygiene	Awareness programme on disaster mitigation and training (intensive farming, vegetable production, seed production, water standing crops, composting etc., personal hygiene)	Awareness on disaster mitigation, trainings, exposure visits
Financial and Risk Spreading	Income generation activities such as- mushroom production, goat rearing, fishery, poultry, candle making etc.	Income generation activities, such as mushroom production, goat rearing, fishery, poultry, candle making etc.	Income generation activities, such as mushroom production, kitchen gardening, goat rearing, fishery, poultry, candle making etc.
Communication	Information centre at village level, early warning, communication centres, community radio (FM), mobile phones	Information centre at village level, early warning, communication centres, community radio (FM), mobile phones	Information centre at village level, developing early warning system through mobile, phones, community radio (FM) but depending upon external stakeholder's support
UNDERLYING SYSTEM FOR ADAPTATION			
Education	Training on seed production, Kissan Credit Card, crop insurance, ensuring availability of IEC materials, exposure visits	Training on seed production,vermi and nadep composting, ensuring viability of IEC materials, exposure visits, Kissan Credit Card and crop insurance	Training on KCC, crop insurance, ensuring availability of IEC materials through resource centre, exposure visits
Transport	Boats, bamboo bridge	Boats, bamboo bridge	Boats, bamboo bridge
Financial Mechanism	Linking banks with the self help groups/savings and credit organisations	Linking SHG with bank, inter loaning	Linking SHG with bank, inter loaning
Organisation	Community irrigation management, setting up systems for community contribution to repair water pumps	Community irrigation management	Community irrigation management, <i>shram daan</i> by people to drain excess water
Livelihood	Off season vegetable and mushroom farming, seed production, kitchen gardening and vermicomposting	Off season vegetable and mushroom farming, seed production, kitchen gardening and vermicomposting	Vegetable and mushroom production, seed production, kitchen gardening, nursery raising, vermicomposting, goat rearing, fishery, incense stick making, candle making etc.

Pilot Activities

Disaster risk reduction also needs technological innovations.

The disaster risk in the project villages can be mitigated by targeting the following activities:

a) Direct risk reduction interventions: These include agricultural interventions relating to inundation-resistant and early sowing and/or harvesting crops, irrigation technologies enhancing access to irrigation, spreading financial risk through crop insurance, innovative models of sanitation and handpumps, housing technology resistant to floods, and early warning systems.

b) Interventions for changing underlying systems for adaptation: These include adaptation incubation systems that support self-managing people’s institutions for continual innovations in agriculture and communication and improvement in education, health and transport systems.

While the above-identified activities emerged from SLDs, the activities that are actually piloted will need to be carefully selected after validation by the community in the next round of SLDs.

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Flood damaged cash crops and paddy: 2007 monsoon, Eastern Uttar-Pradesh

Summary of Key Insights and Conclusions

SLD is a two-way process of knowledge transfer.

- Capacity and vulnerability analyses and SLDs at different levels help point out disaster risk reduction strategies. This study establishes that both these tools do work and that they generate multi-faceted benefits in terms of generating, validating and triangulating data, engaging stakeholders, and supporting policy advocacy. Most importantly, they also help identify potential ideas and mechanisms for development interventions.
- At the field level, SLDs conducted with disaster-affected communities not only serves as a platform for sharing experiences but also helps identify useful solutions to problems identified by the community;
- SLD is useful in building the capacity of both community members and the project team;
- SLD is a two-way process of knowledge transfer. For example, we communicate technical details of global warming to local communities while they explain to us the existing and expected impacts at the field level in terms of occupational mobility, migration patterns, livelihood systems, etc.;
- This two-way flow of information regarding knowledge about climate change impacts and their (tangible and indirect) impacts needs to be interposed with the understanding

the community possesses. These set the stage for making decision on key points of action;

- Solutions emerging in SLDs need to be documented and shared with stakeholders during further SLDs and/or in meetings with policy-makers;
- SLDs need to be more participatory, in particular women and other marginalised groups need to be more involved;
- SLDs can function as a tool for triangulation and validation;
- System and process delivery needs, including those related to policies, should be identified at all levels. The SLD process can be viewed as a horizontal process: more and more SLDs and more 'solutions' have to be identified and promoted through dialogue as one moves across scales.

Weaknesses of the Methods and Concepts

1. One of the weaknesses that emerged is that the process of SLDs requires intensive inputs in terms of both money and time.
2. So that too many ideas do not float around in a SLD and discussions do not veer away from the agenda, there is a need for effective moderation. Who should assume the role of moderator is problematic. If project personnel adopt the role, their guiding the discussions can be seen as a form of bias.
3. Contentious issues such as land rights sometimes take the centre stage in these platforms.
4. Some priority areas such as gender-sensitive approaches get low priority if not handled carefully.

Appendix 1

Profile of Project Villages

Village : Sonatikar
Block : Campierganj
District : Gorakhpur

1. Population:

Men	Women	Children	Total
242	198	85	525

2. Types of Houses:

Kaccha	Pakka	Phoos	Total
32	52	16	100

3. Castewise Population

Caste	No. of Household	Population	
		Male	Female
General	7	17	14
Backward Class	68	202	165
Other Backward Class	5	11	09
Schedule Caste	20	58	49

4. Number of Households with Toilet : 4

5. Total Agriculture Land Area : 78 ha
 Irrigated : 68 ha
 Non irrigated : 10 ha

6. Literacy

Male	Female
60%	40%

7. Number of Handpumps

Private	India Mark
38	12

8. Area open/Under forest : 2 ha

Village : Manoharchak

Block : Paniyara

District : Maharajganj

1. Population:

Men	Women	Children	Total
198	186	83	467

2. Types of Houses:

Kaccha	Pakka	Phoos	Total
12	72	20	104

3. Castewise Population

Caste	No. of Household	Population	
		Male	Female
General	7	23	18
Backward Class	70	134	121
Schedule Caste	27	88	83

4. Number of Households with Toilet : 2

5. Total Agriculture Land Area : 45 ha

Irrigated : 29 ha

Non irrigated : 16 ha

6. Literacy

Male	Female
70%	30%

7. Number of Handpumps

Private	India Mark
26	07

8. Area open/under forest : 0 ha

Village : Lakshmipur

Block : Paniyara

District: Maharajganj

1. Population:

Men	Women	Children	Total
726	679	360	1765

2. Types of Houses:

Kaccha	Pakka	Phoos	Total
13	156	30	199

3. Castewise Population

Caste	No. of Household	Population	
		Male	Female
General	19	59	51
Backward Class	116	656	631
Other Backward Class	29	68	53
Schedule Caste	35	128	119

4. Number of Households with Toilet : 7

5. Total Agriculture Land Area : 225 ha
 Irrigated : 125 ha
 Non irrigated : 100 ha
 Irrigated Land : 95 ha
 Non Irrigated Land : 30 ha

6. Literacy

Male	Female
60%	40%

7. Number of Handpumps

Private	India Mark
45	7

8. Area open/under forest : 100 ha

Appendix 2

Issues and Problem Identification in Flood Affected Villages

Manoharchak

Main Problems

Identified problems related to flood are as follows:

- Unavailability of fertilisers and seeds on time
- Lack of electricity
- Lack of irrigation water
- Lack of safe drinking water and sanitation for villagers
- Inaccessibility to govt. welfare schemes (BPL cards, Antyodaya cards etc.)
- Lack of labour work at village level

Followings are the problems according to the priority:

1. Lack of Irrigation facilities
2. Lack of safe drinking water and sanitation
3. Inaccessibility to govt. welfare schemes (BPL cards, Antyodaya cards etc.)
4. Unavailability of fertilisers and seeds on time

Lack of Irrigation Water

Causes

There are several causes that are contributing to lack of irrigation water.

- (i) There is a community tubewell in the village but it is not working in the absence of proper maintenance. The *panchayat* which is accountable for its maintenance is not looking after it properly.
- (ii) Most of the farmers have very small land holding and they do not have resources to buy pumping sets or other irrigation equipment. Hence they often hire the pumps from big farmers.
- (iii) Lack of electricity is one of the causes. Only 5 to 6 hours of power supply is available. Power cuts often create problems for farmers to assess the full benefit. Irrigation tubewells which require regular supply of power cannot be operated. Maintenance of electric equipment such as a transformer is the prime responsibility of the *gram panchayat*. But this institution does not even undertake simple repairs.

- (iv) Low water level increases the cost of deep boring and pumping. According to farmers, where the water table is deep, farmers are not able to invest in pumps or individual tube wells. Generally tube wells are set at 65-70 feet.
- (v) Irrigation canals are not properly managed and hence interrupt the irrigation process.
- (vi) The villages have limited surface water resources. There is no pond close to agriculture land. Carrying water from the river is an arduous job for farmers because there is an embankment between the village and the river. Long irrigation pipes fed by a powerful pumping set would be necessary, which would increase the cost.

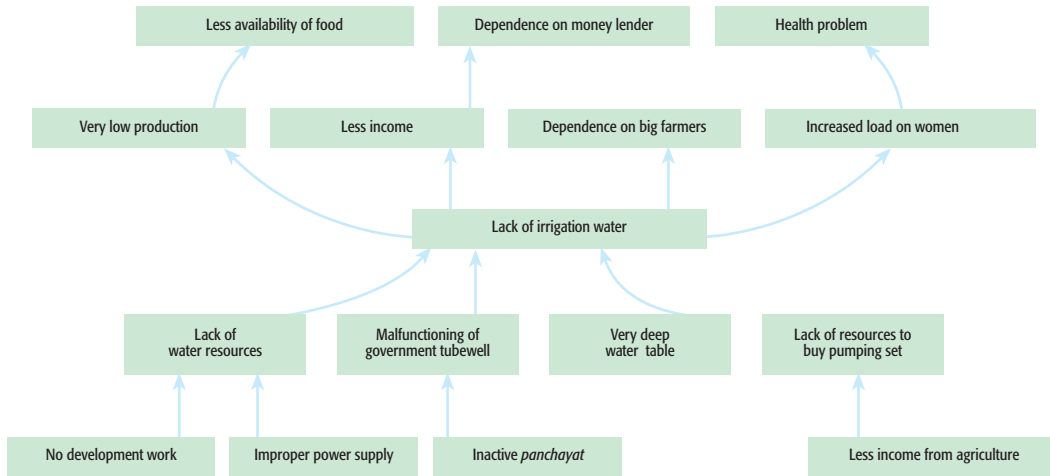
Effects

- (i) Lack of water for irrigation decreases crop production. In the last few years the area has been affected by drought. This is affecting the main *kharif* crop (paddy).
- (ii) As a result farmers are forced to hire the pumping sets and irrigation pipes. Both add to direct cost.
- (iii) Repeated flood and new drought has detached farmers from agriculture as the work cost of farming is increasing. Migration has significantly increased.
- (iv) The load on women has increased significantly. Apart from other household chores, they are also involved in irrigating lands using hand pumps. Overall their health status is affected.

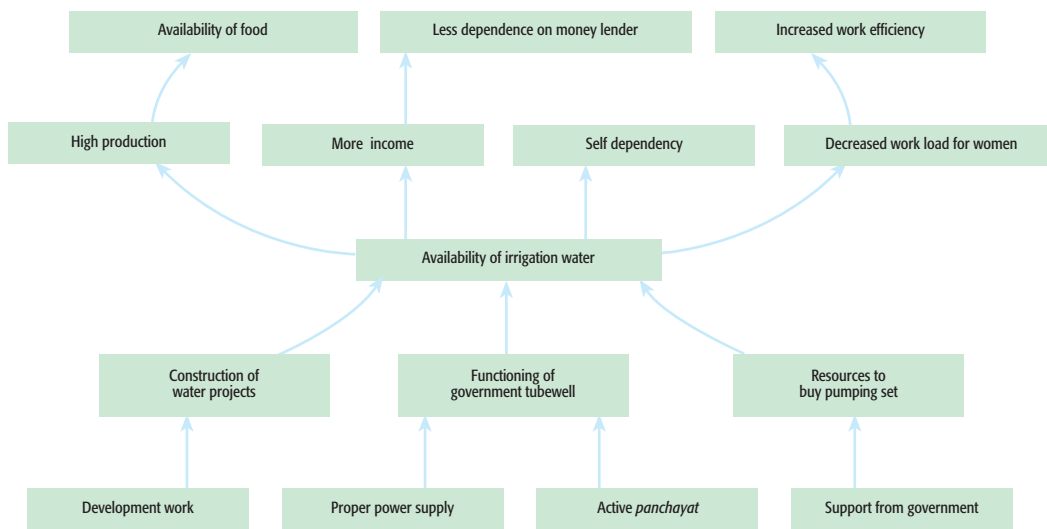
Community's Perspective of Pilots

- The government should help install tubewell of high capacity
- Uninterrupted power supply especially during *kharif* season
- Ensure availability of irrigation pipes for small farmers
- Irrigation canals should be lined.

Problem Tree - Manoharchak



Solution Tree - Manoharchak



Sonatikar

Identified Problems

- Lack of irrigation facilities
- Lack of adequate safe drinking water and sanitation
- Single crop in a year
- Villagers lacking BPL card, ration card.
- No health facilities

Problems on Priority Basis

1. Single crop in a year
2. Lack of irrigation facilities
3. Waterlogging in agricultural fields
4. Inaccessibility of BPL cards to the eligible families
5. Lack of adequate safe drinking water and sanitation.

Single Crop

Sonatikar is highly affected by flood. This is primarily a farming community that gets one cropping season (*rabi*) in a year.

- (i) Waterlogging of agricultural fields during periods of heavy rain is common. *Kharif* crops are inundated for 2-3 months. The village situated on elevated land (main road) is less affected by heavy rain. Embankment does not allow rain water to drain.
- (ii) Standing water remains for 2 to 3 months and affects sowing of *rabi* crops.
- (iii) Crop productivity has been lowered due to waterlogging. Land fertility has also declined.
- (iv) Farmers avoid sowing paddy crop in *kharif* season because they think that sudden of flood event could cause damages.
- (v) There is a lack of knowledge about deep groundwater as well as about early varieties. Farmers do not take any crop in *kharif* season because they do not have knowledge about the early and deep water varieties which can be grown in flood prone regions.
- (vi) Lack of proper irrigation causes low production of *rabi* crops. Most farmers have small land holding and their income is low. Irrigation facilities are unavailable. Farmers have no option except to hire wells from larger farmers or from the market.

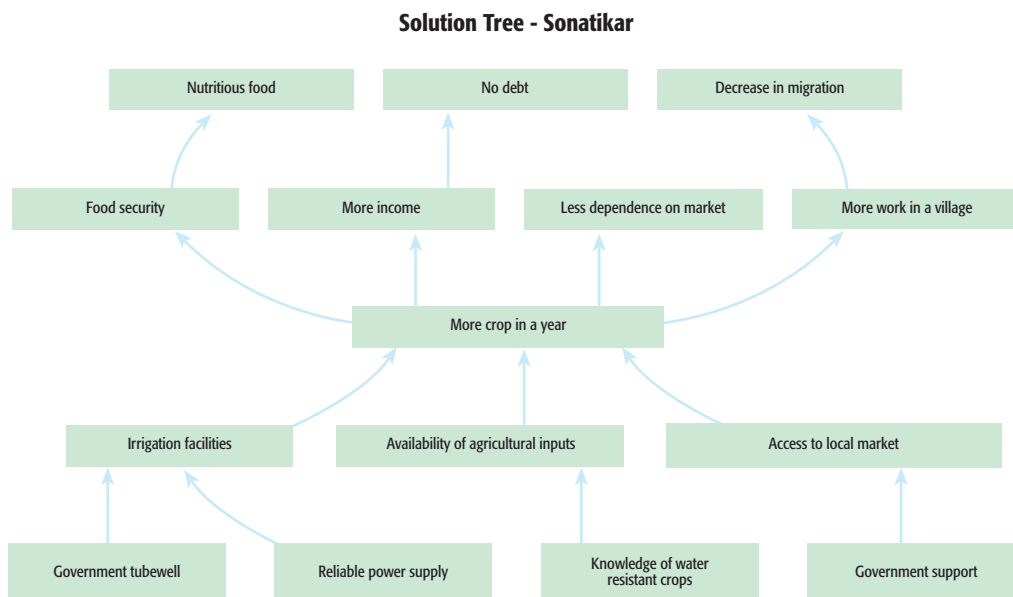
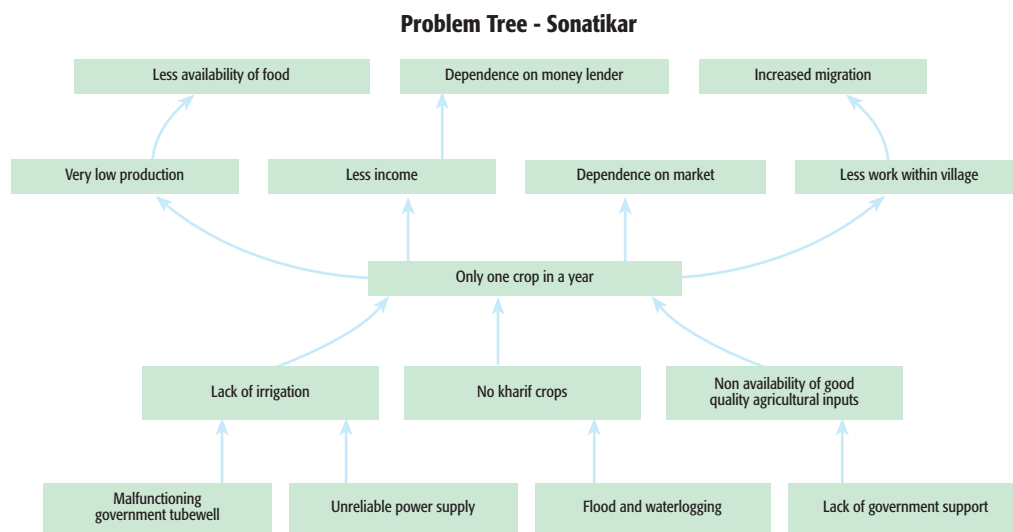
Effects

- (i) Agricultural produce fetches poor prices.
- (ii) Food is available for only six months
- (iii) Compelled to take credit from money lenders

- (iv) Farmers are detached from agriculture
- (v) Increase in out migration

Community Perception on Further Action

- Dissemination and knowledge about water resistant varieties
- Availability of tubewells
- Training on modern farming technologies to minimise the cost of production
- Subsidy on agricultural inputs should be increased to minimise the cost of production



Lakshmipur

Identified Problems

- Lack of safe drinking water and sanitation
- Lack of irrigation water
- Waterlogging of fields
- Farmers get only one crop in a year
- Migration of youths in search of livelihood

Problems on Priority Basis

1. Lack irrigation facilities (around 250 acres are under irrigated)
2. Single crop a year
3. Waterlogging of agriculture field (around 50 acre of land is water logged)
4. Migration of youths
5. Lack of adequate safe drinking water and sanitation.

Lack of Irrigation Facilities

Causes

- Most of the agricultural lands are under irrigated. About 250 acres of land are quite affected by lack of water. Water cannot stay in these agricultural lands because of the high land.
- Malfunctioning of community tubewell is a major problem. It is does not work due to absence of timely maintenance and repairing.
- Lack of electricity increases dependency on fossil fuel. Farmers buy diesels but incur high cost.
- Most of the farmers are small holders and do not possess resources to buy pumping sets. They are compelled to hire the sets from big farmers.
- Lack of water resources also affects irrigation.

Effects

Increase in cost of production due to dependence on groundwater irrigation.
Decrease in *kharif* crops.

Some farmers cultivate *kharif* crops because their lands are not close to embankment.

Migration in search of livelihood is increasing. There are few incentives for the younger generation to stay in agriculture based livelihoods.