

# VOICE FOR CHANGE

**Agrarian Communities' Action Plan On Climate Change**

**UTTAR PRADESH**

**June 1, 2015**

## Introduction

The severe impacts of climate change have begun to appear in several parts of the world with intensity. India is exceptionally vulnerable, with 70 per cent inhabitants depending on climate-sensitive sectors such as agriculture, fishing and forests. The impacts are already visible, especially in agriculture, and will become more severe in the decades to come.

### What makes Uttar Pradesh vulnerable to the effects of climate change?

- Tropical monsoon climate with variations due to differences in altitude
- Floods are a common annual occurrence and the Tarai region is the most affected
- Bundelkhand region has been witnessing more intense and constricting cycles of drought.
- The economy of Uttar Pradesh is dominated by the agricultural sector with a heavy dependence on the monsoon. It employs about two thirds of the work force contributing a third of the state's income.
- Sugarcane, wheat and rice are key agricultural products. Barley, potatoes and mustard are grown in Rabi (winter). Sugarcane is grown in areas where irrigation through surface water or ground water is possible. Pulses and oil seeds are also grown. 80 % of total sown area is irrigated and the rest is rain fed
- A high percentage of marginal and small land holdings with high population pressure
- Ground water resources account for 78% of irrigated area and surface water resources for 22%. It is estimated that for domestic, industrial and irrigation needs of the growing population, the level of ground water exploitation will increase three times by 2025 which will increase the requirement of ground water by double from the present level
- Uttar Pradesh houses the largest number of energy poor (those with lack of access to modern energy sources) in India and climate change would increase the distress these communities face
- Health for all, housing for all, education for all, potable water for all, and meeting other developmental goals including those at the international level, and targets at the national and state level would require more energy to be consumed and thus produced
- The electricity - peak period gap is over 25 per cent of availability
- Out of the 752-forested grids in Uttar Pradesh, 53 (7.04%) will be impacted by climate change. Similarly a higher percentage (35.64%) of the forested grid, is projected to be impacted by 2080.

## Research Methodology

It is in this context that Praxis set into motion a series of processes in 13 habitations located in 6 districts across Uttar Pradesh, Uttarakhand and Bihar that enabled these communities to engage more substantively with climate change through community-led mapping and analysis of local realities, experiences, perspectives and strategies they employ to cope with the effects of climate change. Four of these habitations were in Uttar Pradesh. The study was facilitated in the Muzaffarnagar District located in the Western Plains and Hamirpur District located in the Bundelkhand region of the state.

In Muzaffarnagar District the study team visited one habitation (Bhoojhaheeri) while it visited two habitations in Hamirpur (Haretha and Shankarpur).

In the next phase, 13 community participants from these three states (4 of them from Uttar Pradesh) were part of a Ground Level Panel<sup>1</sup> in New Delhi to collectively analyse all the information and then

<sup>1</sup> In July 2013, a Ground-Level Panel of 14 people living in poverty and marginalisation was facilitated by Praxis in collaboration with Participate in four countries, including India. The Panel responded to the UN High Level Panel's recommendations on what should replace the MDGs. This alternate development agenda evolved by the Ground-Level Panel was shared with officials, media and civil society in India and at international forums (<http://ow.ly/MF1t7>). The experience of the Ground-Level Panel process opened up possibilities for marginalised communities to inform global development debates from the vantage point of their lived experiences. Its



respond to the State Action Plans on Climate Change and the United Nation’s proposed Sustainable Development Goals.

### Community-led research

The team interacted with members from agrarian communities in the three villages as mentioned above. Taking the case of Haretha village in Hamirpur district of Uttarakhand, the community-led analysis of climate change and its impact on agrarian communities is presented below. The community members documented the vulnerabilities of the households in their village using the social map. They mapped vulnerabilities such as caste, disability of a member of the household, employment status, level of access to irrigation facilities and relationship to land. They also mapped the wellbeing of the communities based upon criteria they evolved.

**Diagram 1. Reproduction of a social map of Haretha village created by community members**





objective is to ensure that the process of setting a framework includes actual dialogue with the perspectives of people who live in extreme poverty and who are most marginalised in any context.



There were almost 70 households in Haretha and villagers largely migrated for labour to Gurgaon, Ghaziabad, Etawah, Delhi and Surat as they could do only subsistence agriculture. They engaged in construction work, sand mining work and levelling of roads when they migrated. The social map points towards certain deprivations - out of 64 families mapped, only eight families had irrigation facilities of their own and two families had received government support in the form of pumps, pipes and sprinklers. Landed families were also vulnerable due to continuous economic stress. Four families were reported to have received notices for loan recovery and of them; one had mortgaged their land for repayment while the other two sold off their land. Though participants acknowledged the ill effects of sand mining, they reiterated that they were compelled to indulge in the same because of a lack of choice in terms of livelihood engagements. Ten families were engaged in sand mining. Out of 64, 34 families reported migrating to other places for supplementing the family's income. Two households also reported livestock deaths due to illness during the course of the last year. Only 11 families reported having job cards, which further pushed them into searching for alternate livelihood options. Out of the landless families, six landless families did not have ration cards.

**Table 1. Households categorised by Haretha community members according to perceived well being**









Category	Households	People's Criteria
 <b>Happy</b>	39, 40, 4, 19, 16, 29, 33	Families with tractor; less number of children, families engaged in agriculture; those accessing employment in Army, Anganwadi centre; educated children who are working outside
<b>Satisfied</b>	56, 46, 47, 45, 26, 38, 41, 28, 1, 2, 20, 6, 9, 31, 43, 44, 54, 35, 48, 15, 18, 12, 32, 5	Families mostly practice agriculture; some family members have migrated and are engaged in private labour; less number of children; have land
<b>Less satisfied</b>	36, 42, 25, 37, 17, 34, 11, 10, 62, 53	Families with members who have migrated to cities for private labour; more number of children; some land access; no savings and equal expenditure as the income
<b>Least satisfied</b>	3, 58, 14, 30, 22, 23, 24, 27, 51, 8, 55, 52, 21, 7, 50, 49, 63, 13	Families with disabilities, households facing problems of alcoholism and domestic violence, families that have 1.5-2 bigha of land, family members migrated to cities for private labour, BPL families and families with job card but inadequate MNREGA work
 <b>Unhappy</b>	57, 59, 61, 60	Families belong to SC community, mostly dependent on agricultural labour and remain unemployed due to erratic monsoons and low crop yield, very few are engaged in local private labour in village itself with unstable income
<b>Note:</b> Figures in red are the households with highest vulnerability		

To understand the community's experience of climate change, a participatory trend analysis was facilitated wherein, the respondents shared and collectively analysed changes over the past two decades in agricultural practices and associated factors.





The participants analysed the trends in different aspects of agriculture, climate and lifestyle. These are presented in the three tables below:













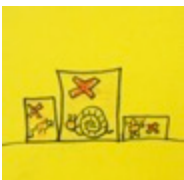



**Table 2: Trends in climate change according to the community members in Haretha**

Parameter	1990s-2015	Description
<b>Monsoon rainfall (July – Sep)</b> 		<p>Since the 1990s, there has been a considerable drop in the rainfall during the monsoon. This has directly contributed to a change in the cropping pattern.</p>
<b>Erratic Rainfall (Feb-March)</b> 		<p>There has been an increase in erratic rainfall since the 1990s, leading to more frequent crop damage. Earlier, it rained in the monsoons from July to September. Now it starts raining in February itself. This change is more recent.</p>
<b>Drought</b> 		<p>The chances of drought have gone up. Earlier, it did not have as large an impact as it does now, because the yield was good enough to substantiate damaged crop. In recent times, the possibility of drought has increased</p>
<b>Frost and Hailstorms</b> 		<p>The temperatures in the 1990s would not drop as low as they do in recent times resulting in the formation of dense fog, which subsequently leads to crop damage</p>



**Table 3: Parameters for agriculture and produce according to the community members in Haretha**

Parameter	1990s-2015	Description
<b>Seed</b> 		<p>Several seeds have been replaced over time. Traditional seeds like Andi have disappeared. Seeds used for production currently, consume less water and germinate faster. Production of Bajara and urad has declined.</p>
<b>Yield</b> 		<p>Per hectare produce was high in the 1990s as cases of erratic rainfall were very less. Now, the per hectare produce has declined mainly due to reduction of water content in the soil, lack of irrigation facilities and erratic rainfall.</p> <p>One of the respondents said “<i>Das quintal acre bhi nai nikal raha hai</i>” (we don't even get 10 quintals per acre)</p>


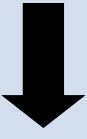










Parameter	1990s-2015	Description
<b>Livestock</b> 		<p>Major livestock included cows, oxen, goats and pig till a few decades ago and the fodder was also available in plenty. However, scarcity of land, decline in grazing spaces and lack of veterinary facilities has caused a decrease in the numbers of livestock</p>
<b>Use of Chemical fertilisers</b> 		<p>The livestock itself used to provide natural manure and hence the use of chemical fertilisers was negligible.</p> <p>Now, natural manure is almost absent, leading to an increase in use of chemical fertilisers. People think that more the use of fertilisers increases yield.</p>
<b>Fodder</b> 		<p>Earlier, there was no problem related to the quantity of fodder, as the number of livestock was also high. In recent times, the amount of fodder available to the livestock is declining due to the use of harvesters and also due to people taking away the fodder to the brick kilns.</p>
<b>Soil Fertility</b> 		<p>Soil fertility was maintained well due to the use of green manure but now the fertility of soil has reduced</p>
<b>Livestock diseases</b> 		<p>Number of livestock diseases has gone up. This has increased the demand for veterinary facilities. The diseases related to livestock include "Ghurpatta (Swelling on foot)", "Galagot (breathing problem)", Sarra (breathing problem).</p>
<b>Use of pesticides</b> 		<p>The intensive use of pesticides has started over the past three to four years. Termites have become common, affecting crops, especially chana (green gram)</p>
<b>Irrigation facilities</b> 		<p>Earlier, the water table was high. But now, despite irrigation facilities like bore wells, tube wells and hand pumps, given the decline in the level of the water table, none of these facilities are useful or effective</p>



Parameter	1990s-2015	Description
<b>Technology</b> 		<p>The lack of livestock has led to the use of tractors for ploughing the field as well as the use of harvesters has led to decline in the amount of fodder.</p>

**Table 4: Parameters for forests and wild animals as mapped by members in Haretha**

Parameter:	1990s-2015	Description
<b>Forest cover</b> 		<p>The forest cover is declining due to the cutting of trees as well as due to the introduction of foreign species of certain crops like babool. In the 1990s there was a huge forest cover but most of it has now been converted into agricultural fields. The present forest cover is 2-3 km away from the village area as opposed to 50-100 metres away before.</p>
<b>Crop damage by wild animals</b> 		<p>Earlier, the dense forest cover confined the wildlife within the forests but due to cutting down of trees, animals venture into the fields and are seen damaging the crops. The respondents said that the wild animals could be seen very easily in villages in recent times as opposed to earlier.</p>
<b>Exotic species</b> 		<p>The variety of exotic species was larger in number earlier. These days, there is a change in species of trees. New foreign species are grown and as a result they hinder the growth of the old exotic species.</p>
<b>Flow of river</b> 		<p>In the 1990s the rivers had water perennially, but now, the flow of the rivers Betwa and Yamuna is restricted to 2-3 months of the year. The main reason cited by the respondents was sand mining.</p>
<b>Amount of fish</b> 		<p>The quantity of fish in the 1990s was much higher than it currently is. This was directly related to the high volume of water in the river. Large scale sand mining and reduction in the levels of water in the river are major reasons there has been a drop in the fish population.</p>



### **Similar exercises were facilitated in all three villages of Uttar Pradesh**

*“Earlier, on one acre of land we used to get one and half quintals of produce. This has now reduced to 5-6 kilograms. We do not get rain in the months when we sow seeds and it should rain, but instead we get rains when the crops are getting ready for harvest which damages them.”*

*Recently, the villagers were trapped in a flood (2013). The place where we are sitting, it was all covered with water. We lost all our crops and our homes were badly affected. Between 2009 and 2011, we experienced a long drought and they again had to tussle with the environmental issues. When we are affected by hailstones (it has happened in the month of February), it kills all our crops and affects our livestock as well.”*

*Pichln 4-5 salon se zyada badlaav ho raha hai, zyada kharab ho rahan hai, pehle bhi hota tha par bahut kam. Ab ek dum bahut zyaada ho raha hai”* (In the last 4-5 years there have been severe changes, severe deterioration has taken place. Earlier climate change used to take place but the changes were very slow in progress, now it has suddenly increased)

### **Communities are Experiencing Unpredictable and Difficult Changes in Climate**

In the recent years the community has experienced irregular and erratic rains along with sudden episodes of hail storms. These sudden changes in patterns of rains and hail have led to crop failure and injury to cattle. Communities in Shankarpur (Hamirpur, Uttar Pradesh) had never experienced hailstorms before. And prior to 1990s, communities could not recall changes in seasons and calamities to the proportion that they are facing for the last twenty years.

### **Access to Services and Opportunities has increased but not proportionate to mitigate the effect of Climate Change**

Dalit households, women headed households, households with persons with disability and those with landless persons are more vulnerable to changes in climate due to their lack of capacity and resources in coping with such changes as opposed to other households. This results in a low level of well-being and sudden changes in livelihood patterns which further makes them to be vulnerable than the rest of the population.

*“We produce wheat most of the time. A part of it is retained for our consumption and the rest is sold; but that is 5 kilograms of wheat. The money we get out of it should be used for multiple things from oil to salt; education to health care...and it is definitely not sufficient for us”. Dalit communities in Haretha, UP*

*“Most of the land in our village belongs to the baniya community living in Muzaffarnagar... however it is up to us to produce something as best we can out of the land and support our families. We need to take all the risk while they just collect the money.” Community in Muzaffarnagar, UP*





**Table 5: Climate change and its impacts as experienced by agrarian communities in Uttar Pradesh**

Thematic areas	Habitations in UP where processes were conducted		
	Bhoojhaheeri	Haretha	Shankarpur
<b>Climatic Changes</b>			
Drought	Y	Y	Y
Increased DrY spells	Y	Y	Y
Floods	Y		
Cloud burst			
Erratic rainfall	Y	Y	Y
Unseasonal rainfall	Y	Y	Y
Reduction in snow fall			
Frost / hailstones	Y	Y	Y
Rise in temperature	Y	Y	Y
<b>Changes in farming</b>			
Low productivity	Y	Y	Y
Increase in pest attacks	Y	Y	Y
Loss of cattle	Y	Y	Y
Increase in cattle diseases	Y	Y	Y
Increased use of fertiliser and pesticides	Y	Y	Y
Loss of food diversity	Y	Y	Y
<b>Changes in lifestyle</b>			
Migration	Y	Y	Y
Increase in diseases	Y	Y	Y
Drudgery of women	y	Y	Y
Loans from moneylender	Y	Y	Y
<b>Other vulnerabilities</b>			
Landlessness	Y	Y	Y
Sand Mining		Y	Y
Hydroelectric Dam			
Child Labour	Y	Y	Y
Lack of irrigation facilities		Y	Y
Ineffective implementation of social security and livelihood programmes	Y	Y	Y
Share cropping	Y	Y	Y
Cattle sharing		Y	Y
Selling of land	Y	Y	Y
Non-receipt of compensation	Y	Y	Y
Cutting of forest/trees-Reduced tree cover	Y	Y	Y
Y indicates that a particular factor has been experienced in that village. Source: Field interactions			

### Ground Level Panel (GLP)

Subsequent to the field visits in Hamirpur and Muzaffarnagar districts of Uttar Pradesh, four members from the habitations visited Delhi to be part of the Ground Level Panel on Climate Change and



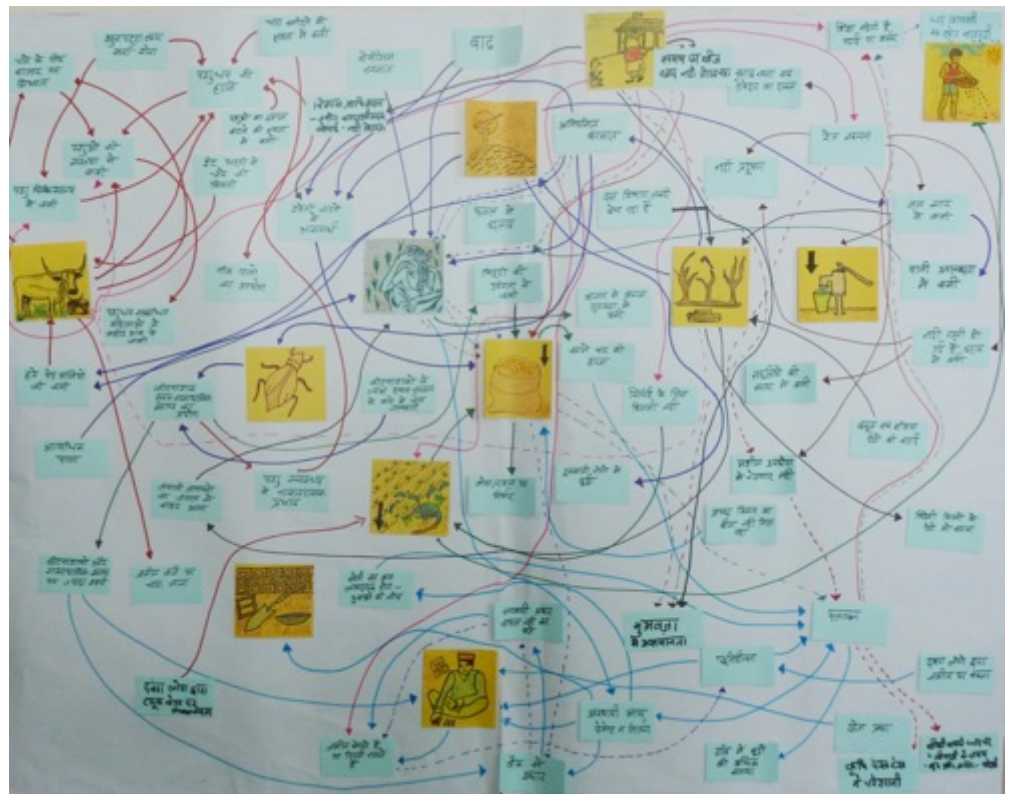
Agriculture. Along with nine other panellists from Bihar and Uttarakhand, these panellists drew their expertise from their lived experience, and not from any previous role in policy-making, research or academics. The panellists collectively analysed their experience of climate change as part of their agrarian life and livelihoods. They also examined the State Action Plan on Climate Change for their respective states and contributed their inputs to the policy while collectively evolving an action plan on climate change from the perspective of agricultural communities along with the panellists from other states. The Ground Level Panellists are:

- |  |                 |
|--|-----------------|
| Urmila Devi<br>Pyaari Devi<br>Gulab Singh<br>Prakash Chand                   | } Uttarakhand   |
| Ram Lachan Manjhi<br>Sumitra Devi<br>Shabnam<br>Shail Devi<br>Upendra Paswan | } Bihar         |
| Gajodar<br>Uma Devi<br>Mohammad Iqbal<br>Ombiri                              | } Uttar Pradesh |

The panellists engaged in a collective analysis of the linkages involved in climate change and agriculture. The following diagram presents these linkages.

**Diagram 2: Causal loop of linkages between climate change, agricultural practices and lifestyles**

Contributing to climate-related factors like drought, leading to a reduced water table, there were other factors like lack of electricity for irrigation, inability to procure seeds and fertilisers at the correct time, leading to distress. Similarly, unseasonal rains caused by factors such as increased cutting of firewood, led to several issues such as increase in pests, which in turn led to the increase in use of chemicals like pesticides. These various linkages established by the group of causes and consequences of climate change can be seen in Diagram 2.



## GLP's Analysis of Uttar Pradesh State Action Plan for Climate Change (SAPCC)

The Uttar Pradesh State Action Plan for Climate Change does not seem to have any specific objective and this presumes support towards the plan and action envisaged in the National Action Plan for Climate Change (NAPCC). The plan talks about an integrated approach but does not elaborate on the same. The plan does not seem to point towards any broad outcomes, but has a focus more on sector wise outputs. It does not describe any public consultation or the undertaking of any vulnerability study. It has identified the Directorate of Environment as the nodal agency that will carry forward the strategies and actions proposed in the plan. The plan acknowledges the status of UP being the highest emitter of green house gases (emits 14% of national greenhouse gases) with all its data based on the Ministry of Environment and Forest Inventory of 2007.

**Table 6: Facts about the Uttar Pradesh State Action Plan on Climate Change**

SNAPSHOT OF FACTS ABOUT UTTAR PRADESH SAPCC	
Response strategy	Accelerating inclusive economic growth, promoting sustainable development, securing and diversifying livelihoods and safeguarding ecosystem services
Community participation	Not mentioned
Nodal agency	Directorate of Environment
Vulnerability study	Not conducted
Mean temperature	Maximum temperature is predicted to increase by 2.1°C during pre-monsoon followed by monsoon (1.8°C) towards the 2050's
GHG emission	Contributes nearly 14% of national greenhouse gases (GHG). CO <sub>2</sub> emissions have increased at 5.6% CAGR (Compound Annual Growth Rate) since 1990, as compared to 1.5% and 3.0% CAGR of CH <sub>4</sub> and N <sub>2</sub> O emissions respectively.
Tree cover change	From 7545 sq.km in 2001 to 7382 sq.km in 2009
Forest cover change	From 10751 sq.km in 1997 to 14338 sq.km in 2011
Annual Rainfall	Annual rainfall between 1971 and 2005 is 946 mm Annual rainfall predicted to increase by 15% to 20% in the 2050's
Net sown area	69% of total area of the state with cropping intensity of 154.2%
Fertilizer consumption	Mean fertiliser use intensity for 2009-10 - 160.8 kg/Ha, growth in fertiliser use intensity (between 1999 and 2010) - 34.3%
Gross State Domestic Product (GSDP) growth	From Rs. 600164 Cr (2010-11) to 886410 Cr (2013-14) UP's GSDP (Gross State Domestic Product) has dipped from 29.7% as of 2004-05 to 21.9% as of 2012-13.
Plan Outlay Gender Dimensions	No mention of women or gender within plan outlay

Agriculture is the largest occupation of the state with 36 million people engaged in agriculture. Net sown area is 69 % of the total area of the state, 80 % of total sown area is irrigated and the rest is rain fed. Uttar Pradesh is the largest producer of wheat in India, contributing 32.7% to the country's total production. It is also the largest producer of food grains and sugarcane, with a share of 18.2% and 35.8%, respectively, in the country's total production. Agriculture and animal husbandry constitutes major part (25%) of the state GSDP.

The agriculture sector contributes about 77% and 88% of CH<sub>4</sub> (enteric fermentation, rice and biomass burning) and N<sub>2</sub>O emissions of the state. Majority of N<sub>2</sub>O emissions occur from application of synthetic nitrogenous fertilizer (56%) followed by decaying of crop residues left on field as in the case of paddy cultivation (13%) and indirect emissions from soil (13%). Nitrogen based fertilizer consumption has grown at a rate of 2.5% per annum against only 1.2% and 0.9% growth rate of food grain and rice production respectively.



The following table presents the Ground Level panel's recommendation to the SAPCC strategies for the state of Uttar Pradesh.

**Table 7: GLP's response to SAPCC strategies**

S.NO	THEMATIC AREA	SAPCC STRATEGIES AND ACTIONS	GLP'S RECOMMENDATIONS
1.	Agriculture	<ul style="list-style-type: none"> <li>▪ Extension of direct sowing systems and a discouragement of sowing of rice through transplantation.</li> <li>▪ "Climate Change and suitable agro based systems" to be priority topics through agro-science centres.</li> <li>▪ Planned programs designed for agro forestry and horticulture.</li> <li>▪ Effective regulator to be arranged for scientifically monitoring the CC Strategy.</li> <li>▪ Consultants to be appointed to take advantage of clean development mechanism (CDM).</li> <li>▪ Thrust on organic fertilizers, pesticides, farming and production</li> <li>▪ Soil and water conservation programmes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Farmers need to get timely and appropriate information from whatever channels are easily accessible to them</li> <li>▪ While it might be more effective to do direct sowing, it is not so profitable and as a result small farmers will be further marginalised</li> <li>▪ Suitable agro based systems might result in more corruption so this needs to be checked</li> <li>▪ Cattle farming and animal rearing should be encouraged and made easy for us</li> <li>▪ Big companies that produce chemical fertilisers should not be encouraged and in fact existing ones should be curbed</li> <li>▪ Ultimate reason that are encouraging organic is because they know they will get a good price in foreign markets.</li> <li>▪ For many years we have been compelled to use subsidised chemical fertilisers made by foreign companies. This has a double disadvantage for us because more fertilisers mean more water, which costs more. Only fertiliser companies benefit</li> <li>▪ The emphasis needs to be on ending mining of all kinds as this affects the water table</li> <li>▪ Consolidation of land to be organised. Land acquisition to be facilitated and landless farmers be given plots of land</li> <li>▪ Excessive use of machines had put pressure on small farmers and rendered them unemployed so this should be regulated</li> <li>▪ Small farmers to be given support to facilitate agriculture</li> <li>▪ There should be no system of commissions/ corruption</li> <li>▪ Farmers to be given access to high yielding varieties of seeds which have proven to cause no damage</li> <li>▪ Government to link up with private channels and show TV programmes related to farming in these, with timings well-advertised</li> </ul>



S.NO	THEMATIC AREA	SAPCC STRATEGIES AND ACTIONS	GLP'S RECOMMENDATIONS
2.	Water and Irrigation	<ul style="list-style-type: none"> <li>▪ Regulate ground water extraction</li> <li>▪ Early warning system to monitor water flow and weather parameters</li> <li>▪ Water efficient crops</li> <li>▪ Drip and sprinklers</li> <li>▪ PVC pipes</li> <li>▪ Save water loses during transmission and distribution</li> <li>▪ Legal frame on water extraction, recharge and monitoring.</li> <li>▪ Reduce subsidies in water prices</li> <li>▪ Ponds to store the rain/flood waters in river basins to maintain minimum water flow in rivers.</li> <li>▪ Ground Water Control and Management bill</li> <li>▪ Early warning system to monitor water flow and weather parameters</li> <li>▪ Aquifer mapping -Aquifer Management Authority</li> <li>▪ Irrigation and Geology Departments - reorganised and strengthened</li> <li>▪ State Geology Department to be re-organised</li> </ul>	<ul style="list-style-type: none"> <li>▪ More information needs to be shared with us and made available at the block level.</li> <li>▪ The older ponds and lakes that the Government has allowed private people to take over (especially mining companies) and destroy or fill should not be allowed. They need to protect our ponds and lakes.</li> <li>▪ Cutting subsidies should not be considered at all. Subsidies are meant for the poorest and most marginalised but the benefits never go to them. It is usually the Government and other big companies that get the subsidy and are negligent with water use.</li> <li>▪ Small farmers should be provided subsidised pump sets and sprinklers</li> <li>▪ If the Government implements this subsidy cut they need to make an alternate arrangement for this so that we get access to water.</li> <li>▪ The poor farmers are unable to access ground water and they should be prioritised to get water</li> <li>▪ This department and information centre is urgent for us to have but there is no point if it is at the capital city - it needs to be accessible to us</li> <li>▪ Canal system to be developed for us</li> </ul>



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