

PARTICIPATORY VULNERABILITY & CAPACITY ASSESSMENT

Facilitators' Manual

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Gorakhpur Environmental Action Group (GEAG) is a voluntary organization working in the field of environment and sustainable development since 1975. Ever since its inception, GEAG has been actively engaged in implementing several development projects addressing livelihood issues of small and marginal farmers, particularly women based on ecological principles and gender sensitive participatory approach. Besides, GEAG has accomplished several appraisals, studies, researches at the micro & macro levels as well as successfully conducted a number of capacity building programmes for various stakeholders including women farmers, civil societies groups and government officials etc.

Today, GEAG has established its identity in North India as a leading resource institution on sustainable Agriculture, Participatory approaches, methodologies and Gender. Acknowledging its achievements, efforts and expertise United Nation's Economic and Social Council (ECOSOC) accorded GEAG special consultative status in the year 2000. GEAG has also been recognized recently as North India hub for interSard, South Asia a network to facilitate information sharing on issues of concern.



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FOREWORD

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ACRONYMS

ANM	Auxiliary Nurses Midwife
ASHA	Accredited Social Health Activist
BDO	Block Development Officer
BDRC	Building Disaster Resilient Communities
CBA	Cost Benefit Analysis
CBO	Community Based Organisation
CCA	Climate Change Adaptation
CLD	Causal Loop Diagram
CO ₂	Carbon Dioxide
DFID	Department for International Development
DRR	Disaster Risk Reduction
FGD	Focused Group Discussion
GEAG	Gorakhpur Environmental Action Group
GHG	Green House Gas
HFA	Hyogo Framework for Action
HH	Household
IAY	Indira Awas Yojana
ICDS	Integrated Child Development Scheme
IMD	India Metereological Department
KVK	Krishi Vigyan Kendra
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NFSM	National Food Security Mission
NGO	Non Government Organisation
NIDM	National Institute of Disaster Management
PCBA	Participatory Cost Benefit Analysis
PDS	Public Distribution System
PHC	Primary Health Centre
PM & E	Participatory Monitoring & Evaluation
PRA	Participatory Rural Appraisal
PVCA	Participatory Vulnerability and Capacity Assessment
RCC	Reinforced Cement Concrete
SLA	Sustainable Livelihood Approach
SLD	Shared Learning Dialogue
SWOT	Strength, Weakness, Opportunity and Threat
UNFCCC	United Nations Framework Convention on Climate Change
VO	Voluntary Organisation
WatSan	Water and Sanitation

Developing countries like India are especially vulnerable to climate change because of their geographic exposure, low incomes and greater dependence on sectors that are sensitive to climate change impacts, particularly agriculture. People exposed to the most severe climate-related hazards are often those who are the marginalised sections of the society and they become increasingly vulnerable because of their limited capacities to cope with the associated impacts.

In order to plan effective adaptation actions, scientific climate change analysis is vital for broad context. However, at the local level, the most relevant information and knowledge often already exists or can be generated through local stakeholders' own analysis. Local knowledge also has a credible authority for informing and influencing policy.

Therefore, this Facilitators' Manual presents a unique methodology for Participatory Vulnerability and Capacity Assessment (PVCA) which empowers poor people to analyse their problems and suggest their own solutions. This manual is based on the premise that communities are not homogeneous and special

attention should be paid to those marginalised people who are more at risk and has no or less capacities to deal with it. It is all about facilitating people to help them to do their vulnerability analysis and an assessment of their existing or needed capacities to cope with the climate change impacts. In this process, it applies various participatory tools, processes and methods which enable local people to articulate and enhance their own understanding of these impacts and to come up with an action plan accordingly.

This manual, written in a lucid language, aims to serve as a practical guide for facilitators in carrying out PVCA. It stresses on the importance of people's empowerment and of careful facilitation. It is being envisaged that the use of this important manual will help those communities whose lives and livelihoods are threatened by climate change to build effective resilience towards the climate change impacts and related challenges.

Dr. Shiraz A. Wajih
President
GEAG

ACKNOWLEDGEMENT

Climate change is proving to be one of the greatest threats to sustainable development. The poorest and marginalised are most vulnerable to climate change impacts as their livelihoods and assets are largely dependent on biodiversity and ecosystems. Gorakhpur Environmental Action Group (GEAG) has been working on climate change adaptation and livelihood resilience, primarily in the flood affected areas of eastern Uttar Pradesh and drought affected Bundelkhand. The learnings gained through working with small- marginal- landless- women farmers re-affirmed GEAG's sustainable livelihoods approach focusing on local ecology, integration of science and traditional wisdom, due priorities to communities needs and capacities as the core issues towards resilience in stressed situation, especially in dealing with emerging challenges of climate change impacts.

We felt strong need to develop a simple and easy-to-use manual for the facilitators which can help them in understanding vulnerabilities of local communities and planning for community based adaptation through bottom up participatory approach.

We are thankful to Christian Aid, particularly Mr. Anand Kumar, Mr. Subrata De, Mr. Ram Kishan and Mr. Deepankar Patnayak for their support and encouragement is bringing out this important manual on Participatory Vulnerability and Capacity Assessment. We are also grateful to Dr. Shiraz Wajih for his insightful ideas in bringing out this manual.

We are thankful to the local communities who shared their experiences and helped in this documentation.

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CHAPTER : 1 INTRODUCTION

India is the sixth largest country in the world in area and second largest in population after China. India's more than 90% of land mass are prone to natural disasters. More than 12% of land is susceptible to floods whereas 57% of land comes under earthquake prone zone. According to National Institute of Disaster Management (NIDM), there is no safe place in the country which can be considered under disaster free area. Apart from this situation, there are various areas prone to multiple natural hazards. For instance, Eastern Uttar Pradesh which is considered to be the most densely populated region in the country is highly prone to floods as well as earthquake. Not only these two hazards but recently it has been observed that dry spells in summers and winters have created drought like situation in the region because of its direct impact on agricultural production and allied services. Changing climate condition has had significant impact on disaster in past few years. There are growing evidences that climate change has significantly increased the intensity and frequency of disasters in rural as well as urban areas.

1.1 Climate Change, Disasters and Development

Natural hazards by themselves do not cause disasters. It is the combination of an exposed, vulnerable and ill-prepared population or community with a hazard event that results in a disaster. Climate change therefore, affects disaster risks in two ways, firstly through the likely increase in weather and climate hazards, and secondly through increase in the vulnerability of communities which are impacted by these natural hazards, particularly through ecosystem degradation, reduction in water and food availability, and changes in livelihood pattern. Climate change adds yet another stress to those of

environmental degradation and rapid unplanned urban growth, further reducing communities' abilities to cope with even the existing levels of weather hazards. It is impossible to be absolutely certain about all the disaster-related effects of climate change, owing to the intrinsic uncertainty in the climate projections, the diverse and rapidly changing nature of community vulnerability, and the random nature of individual extreme events. However, there is plenty of information on the serious impacts of events that have occurred in past decades, and on this basis alone there is much to be concerned about.

Climate Change Adaptation and Disaster Risk Reduction

Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) are closely linked. Experiences have shown that adaptation and risk reduction are almost having the same purpose. More extreme weather events in future are likely to increase the number and scale of disasters, while at the same time, the existing methods and tools of DRR provide powerful capacities for adaptation to climate change. The expressions 'disaster risk reduction' and 'climate change adaptation' represent policy goals, one concerned with an ongoing problem (disasters) and the other with an emerging issue (climate change). While these concerns have different origins, they overlap a great deal through the common factor of weather and climate and the similar tools used to monitor, analyse and address adverse consequences. It makes sense, therefore, to consider them and implement them in a systematic and integrated manner.

“Disaster Risk Reduction” can be defined as “*action taken to reduce the risk of disasters and the adverse impacts of natural hazards, through systematic efforts to analyse and manage the causes of*

disasters, including through avoidance of hazards, reduced social and economic vulnerability to hazards, and improved preparedness for adverse events”.

“Climate Change Adaptation”, as per UNFCCC, can be defined as “*actions taken to help communities and ecosystems cope with changing climate conditions.*”

CCA and DRR share another common feature- they are not sectors in themselves but must be implemented through the policies of other sectors, in particular, those of agriculture, water resources, health, land use, environment, finance and planning. There are also linkages with other policies, most notably poverty eradication and planning for sustainable development, education and science.

Historical Context of Integration of DRR and CCA

The Hyogo Framework for Action (HFA 2005-15) provides the foundation for the implementation of disaster risk reduction. Agreed at the World Conference on Disaster Reduction in January 2005, in Kobe, Japan, with the support of 168 Governments, its intended outcome for the decade is “the substantial reduction of losses, in lives and in the social, economic and environmental assets of communities and countries”. It specifically identifies the need to “promote the integration of risk reduction associated with existing climate variability and future climate change into strategies for the reduction of disaster risk and adaptation to climate change”.

DRR and CCA approaches were integrated at national level under India’s commitment to HFA 2005-15 which made it mandatory to mainstream climate change component in every developmental themes, plans and departmental policies. Since DRR plan needs collaboration and coordination of all departments in preparedness, timely response and effective post disaster activities, Central and State Government have started mainstreaming DRR in all concerned departments. But integration of climate change is still not being considered due to lack of knowledge, awareness and capacity of government officials on climate change. It has been widely accepted that the traditional backward looking approach of DRR where plan is developed on the basis of historical information and trends, should also consider the future climate projections and anticipated change for better preparedness to cope up with hazard impact.

Impacts of Climate Change

Climate change presents additional obstacles to ending poverty and achieving social justice. Rising

temperatures, increasingly erratic rainfall, and more frequent and severe floods, cyclones and droughts all have significant consequences for the livelihood security of poor people.

Climate change has already impacted on innumerable communities, exposing them to increasing hazards and making them more vulnerable; and it is expected that this will become even more significant, and for some communities catastrophic, in the coming years. In order to plan effective adaptation and resilience actions, scientific climate change analysis is vital for broad context. However, at the local level, the most relevant information and knowledge often already exists or can be generated through local stakeholders' own analysis. Local knowledge also has a credible authority for informing and influencing policy. In order to ensure that development programmes reduce people's vulnerability to climate change, we must understand who is vulnerable to its effects and why. Then, we must apply this information to the design, implementation, monitoring and evaluation of activities.

Irrespective of what an individual city's contribution may be to climate change, most rural and urban areas, particularly those in developing countries, are impacted by a changing climate. The impacts felt directly or indirectly relate to variations in climatic conditions such as temperature change, precipitation change, frequency and intensity of severe storm events, and sea level rise.

Sectoral Impacts

The impacts of climate change do not follow the boundaries. Its adverse impacts are equally visible in India across sectors. For example, **agriculture** in India is already fragile- being dependent on the mercurial nature of monsoon. An aberration in the rate and amount of precipitation and alteration of minimum and maximum temperature scenario (as felt by people) in recent past have confirmed the ominous potent of nature's fury. The available research (Stapleton, 2010) explicitly concluded that climate change have posed direct impact on the aberration of temperature and rainfall patterns. The analysis of different climate projection models developed on downscaled data (best fitted with past observed data) clearly deduced that due to climate change, particularly in middle Ganga plain, the rainfall amount (July-Sept) in kharif crop season is going to increase which might be a positive impact for kharif crops.

But a rise of one- degree temperature for kharif crops would have negative impact for its productivity.

However, the rise of temperature will have negative impact on the productivity of rabi season crop, particularly the wheat, which is a critical food-grain crop. Increased climatic extremes like droughts and floods are likely to alter production variability. Productivity of most of the cereals would decrease due to increase in temperature and decrease in water availability, especially in middle Gangetic plains. The loss in crop production is projected at 10-40% by 2100, depending upon the modelling techniques applied. Extreme weather conditions resulting in disasters will have their own socio-economic impacts, especially on the poor and the marginalised. Further changes in crop productivity will have implications on farmers' incomes leading to push migration, forced labour and indifference from agriculture activities. This will neither result in an increase in the number of poor people who would be hit the hardest as they have resources nor have any capacity to respond to these negative impacts.

Likewise in WatSan sector, changes in precipitation patterns and water cycle will increase the already existing problems of **water supply** and quality in urban and peri-urban areas. Water logging and floods resulting because of erratic rainfalls will add to **sanitation** problems, especially those of the women and old age. Lack of sanitation and potable water will increase contaminated water and food-borne diseases like cholera, typhoid, diarrhoea, hepatitis, and gastroenteritis.

Climate change will also increase **environment-related diseases**. Warmer and/or wetter period of breeding due to global warming will provide ideal conditions for expansion of mosquito-borne diseases as puddles, in which malaria carrying mosquitoes breed, are created either by excessive rainfall or by droughts in rivers.

Poor people suffer more as they have lesser possibilities to adapt. Poor areas that lack **health** and other services, combined with crowded living conditions, poor water supply and inadequate sanitation, are ideal for spreading respiratory and intestinal conditions, and for breeding mosquitoes and other vectors of tropical diseases such as malaria, dengue, and typhoid. Changes in temperature and precipitation can spread disease in previously unaffected areas and encourage it in areas already affected.

Climate change related drought and floods foster rural to urban **migration**, increase overpopulation of cities and the proportion of poor and vulnerable people living in urban areas. The migrants are the most vulnerable groups in any city. With no access to

the city's livelihood network and a lack of skill sets to help them survive, these groups live in the slums which are illegal and that have no access to basic amenities. These groups are thus highly vulnerable to a variety of risks living on hazardous sites, environmental health risks via poor sanitation, water supply, little or no drainage and solid waste services, air and water pollution and the recurrent threat of being evicted.

DRR, CCA & Development Connect

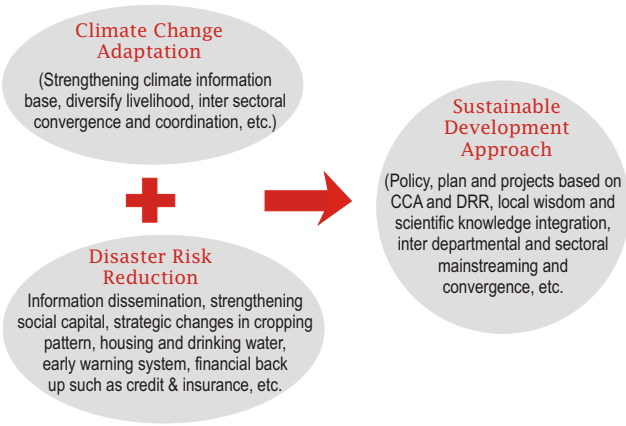
As discussed before, climate change and DRR are closely interlinked. Scientific evidence indicates that the current changes in climate will not only increase the number of extreme events but that these will become more frequent and intense. The anticipated catastrophic impact of climate change may occur in the form of repeated climate disasters of growing intensities that result in higher risks and vulnerability of the poor. Repeated exposure to weather related disasters leaves a long lasting impact on the lives and livelihoods of the poor and marginalised and is often one of the most common causes of poverty. With the frequent climate changes being felt

DRR and CCA initiatives should include efforts to reduce hazards (land use zonation, structural measures), reduce the vulnerability (better housing, diversified livelihoods systems) and/or enhance the capacity to deal with them (savings, access to credit, insurance, etc.). Non-structural measures, such as community based risk assessment, awareness building, early warning systems, livelihood diversification and strengthening are important elements of DRR. These interventions should follow an approach of working with the community based organisations and should emphasise on community level capacity building.

increasingly, large population of people are getting exposed to the risks of multiple and recurrent natural disasters that reverse decades of development work. This results in slowing down the pace of progress towards poverty reduction. Poverty and vulnerability to disasters are closely linked: low income groups and the poor and disadvantaged groups are typically more vulnerable to and disproportionately affected by disasters. Climate change, sustainable development and DRR are closely interlinked. Disasters occur as a result of a change in the climate and even if natural hazards cannot be fully avoided, disasters to a large extent can be avoided by reducing the exposure of communities to the hazard, increasing their capacities to withstand it and/or by reducing their vulnerability. Climate induced disasters undermine the societal and economic growth to a great extent. Developmental plan and policies are now meant to

be developed by considering climate change and disaster of the region.

| Fig 1 | CCA, DRR and Development Connect



1.2 Emerging Vulnerabilities due to Climate Change, Disaster and Unplanned Development

The concept of vulnerability has been one of the most insightful and influential additions to hazards and climate change research during the last three decades. Vulnerability is defined as “*the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC 2007 b).*”

It is known that the vulnerability is caused mainly by the exposure of the hazard and the socio-economic conditions of the affected community. It is important that the vulnerability of the area and the most vulnerable groups are understood before starting the DRR interventions. The limitation of resources also demands that the most vulnerable communities are addressed on a priority basis. In virtually all situations, different groups face different levels of risk in relation to specific hazards. A tangible example is the tendency of poor populations to cluster in high-risk areas such as urban and rural flood plains. As a result, they have a far higher level of vulnerability to flooding than groups living in less hazard prone areas. Interventions to mitigate flooding can be designed that meet the needs of such groups. However, in many cases interventions that might “benefit” the larger society as a whole actually

increase the risk some groups face. The fact that interventions often have differential effects or may not reach specific groups is common across most hazards and contexts. In many situations the factors causing vulnerability are not as direct or immediately evident as in the flooding example given above. Instead, vulnerability may be related to culturally based gender differences (women can be more vulnerable to floods due to cultural inhibitions on swimming or clothing styles), differential access to basic services (you cannot call for help as effectively if you do not own a phone), and a host of other factors. As a result, clear understanding of patterns of vulnerability is essential to identifying effective risk reduction strategies.

This understanding needs to move beyond the immediately evident exposure to specific hazards and address deeper systemic factors that shape risk for different groups. Furthermore, we believe it is important for approaches to vulnerability analysis to be based on common metrics- indices, maps and disaggregated data in order to provide an effective basis for planning and decision-making. At present most approaches to vulnerability analysis are narrative based. Because of this they are difficult to map in ways that illustrate the concentration or diffusion of vulnerable groups. They are also difficult to aggregate and disaggregate in ways that assist in identifying common factors contributing to vulnerability across large areas or multiple groups. However, various efforts have also been made to assess the vulnerable groups and vulnerability through community based assessment methodologies and integrating scientific data in the local level information to have broader picture.

Types of Vulnerability

Material vulnerabilities

A *diverse livelihood strategy*, rather than the quantum of income, is one of the key elements of resilience against environmental hazards (Moench and Dixit, 2004). Therefore, the diversity and stability of livelihoods is listed as a key component contributing to capacity and its converse to vulnerability in this case. Formal education, as a driver of vulnerability is considered, as this may be a factor for gaining access to livelihood opportunities and facilities both in rural and urban areas, although the degree of importance may differ.

Liquidity of assets can be important in terms of helping recovery. For example, maintenance and selling of farm animals to recover from flood damage is often an important component of recovery. It may also include sale of valuable items, e.g., jewelry,

scooters, land etc. However, sale of these assets in some cases can seriously undermine the resource picture and mobility of the household.

Exposure to specific hazards is a component of material vulnerability, but only a component and not the whole picture. Attention has to be on the social component in addition to the physical component.

Institutional vulnerability

Social networks and social capital have been deemed to be important contributors to building resilience and helping recovery from hazards particularly since they can be conduits for information, preparedness, relief and recovery.

Extra-local kinship ties, although important, are difficult to assess in terms of their quality. However, there is also evidence that sometimes, extra-local family members are either unable or unwilling to extend significant help to disaster victims, possibly because of their own precarious livelihood situations, and can at times become a burden in terms of social obligations rather than an asset.

The proportion of dependents in the household is similarly considered to be an institutional vulnerability because the effects of it are institutionally mediated. Having a large family by itself is not a bad thing, because of the extra labor that comes with large families in rural settings. But dependents, particularly young children and the elderly, in the absence of social systems for taking care of them, can be a drain on family resources.

The infrastructural measures are similarly listed as institutional vulnerability, because they are a function of the quality of governance in a society. Warning systems are a special case where just the existence of a warning system is not sufficient, but rather its credibility and awareness is just as important.

The last category of belonging to an ethnic minority and/or a lower caste can be an important factor in determining vulnerability. Similarly, for ethnic or religious minorities, sometimes specialised networks can facilitate access to resources for relief and recovery in addition to employment and education opportunities.

Attitudinal vulnerability

Among the attitudinal vulnerabilities, *sense of empowerment* is considered to be the key category. Proximity to local and regional power structures in addition to a personal sense of efficacy- all self perceived- is evidence of a sense of empowerment in the face of adversity. Proximity to power structures can be very effective in terms of channeling relief

and recovery in the aftermath of disasters and even gaining access to government services in addition to critical productive resources which otherwise may not be possible for disadvantaged poor, minority or low caste groups. Furthermore, people's knowledge and attitude towards potential hazards can also be critical in determining behavior and vulnerability to hazards.

Financial vulnerability

Poor residents typically lack the resources to respond effectively in a crisis creating greater dependency on the poorly funded public and non-profit sectors. In a heterogeneous society, the ability and affordability of residents to respond to climate change impacts are quite different. On the one hand, where the financially well-offs are able to deal with the crisis in a better way, the poor often suffer because of lack of knowledge as well as resources to overcome the crisis.

Factors Affecting Vulnerability

The root causes of vulnerability are related to human-induced changes in hydrologic systems, greater economic activity in vulnerable regions and patterns of development that are poorly adapted to the inherent variability of natural systems. All three factors increase the level of risk for livelihood systems. Studies have shown that vulnerability and social impacts associated with floods, droughts and climatic variability are heavily influenced by the following eight factors:

- ◆ The nature of livelihood systems within a region, in particular the extent to which individuals and households are able to diversify income strategies and incorporate non-farm components, many of which are less vulnerable to disruption from natural disasters than agriculture is.
- ◆ The ability of people to migrate or commute in order to obtain access to non-farm or agricultural sources of income outside of drought and flood-affected areas.
- ◆ The ability of information, goods and services to flow into and out of affected areas
- ◆ The differential social capital and institutional checks and balances that households have access to, including education, community institutions such as self-help groups, formal institutions such as government departments and banks, NGOs, the media and social networks
- ◆ Existing patterns of differential vulnerability created by gender, income and social position
- ◆ The nature of physical infrastructure (roads, houses, water supply systems, etc.) in particular:
- ◆ The degree to which such infrastructure is vulnerable to being disrupted by floods and droughts; and
- ◆ The extent to which such infrastructure allows the

- maintenance of livelihoods during drought and flood periods by serving as a point of refuge, helping to protect assets and facilitating the movement of goods, services and people.
- ◆ The ability of households to obtain secure sources of water for domestic uses
 - ◆ Natural resource conditions, particularly the degree to which ground and surface water are disrupted.

1.3: Understanding Resilience/ Coping Capacity

Resilience of any system is the capacity of the system to respond to a change or disturbance by negating or reducing the harmful impacts and recovering to its original state in a short time span. Resilience to climate change implies that the human and natural systems are able (or enabled) to with stand (or recover from) the negative impacts of uncertainties in temperature and precipitation in the foreseeable future. In context of disaster, coping capacity or resiliency of a system, household or any individual largely defines their ability to regain the previous status. As previously stated, climate change and disasters have direct association with each other which increases the risk manifolds. In this scenario, system or individual can only be resilient only if there is awareness on vulnerable areas, existing local capacities and resilience planning based on Participatory Vulnerability and Capacity Assessment (PVCA). This approach allows local people to participate in risk identification, vulnerability and capacity analysis process followed by a feasible resilience planning and implementation.

1.4 Resilience Planning Process

Resilience planning of a specific area is based on the existing vulnerability and capacity of the systems and community. For any area, without having a prior experience on climate change resilience planning, it is a prerequisite to have a lead organisation or person having adequate knowledge of climatic aberration and long experience of DRR issues to develop synergy of engagement with local people and their inherent adaptive indigenous knowledge. One of the key elements to a successful climate change resilience planning is the 'participation' from a diverse set of stakeholders. Participation is the key to any development process but for resilience building process, it becomes even more essential. In real terms participation means the articulation of local contextual wisdom, expertise with external

knowledge and examples of best practices. Participation thus ensures that the autonomous adaptive capacities of the people built over a period of time get incorporated into the resilience planning. It has been our experience that people in rural areas are much more cooperative and participative in nature than their urban counterparts.

The important step to resilience planning is formation of a group of such key stakeholders in the village who will participate and lead the resilience building process with support of the facilitating person or organisation.

The research and knowledge is available mostly at global and sometimes at the regional level. There is a huge gap between what the communities experience and what global knowledge is available. Because of this, the communities are learning to survive with the changing climatic conditions by themselves but at a very slow pace. Though the community learning process is slow but it is something which is actually tried and tested. Hence, for the replication at the broader level it is required to integrate the local knowledge with the scientific methodology.

Given this, it becomes important how to purposefully engage the communities in the resilience building process. For this, it is required to develop the capacities of the community to think in a direction where they can realise the changing climatic conditions and can understand how they are adapting to these changes. This process of adaptation is so spontaneous that the communities are not able to differentiate it with their other experiences.

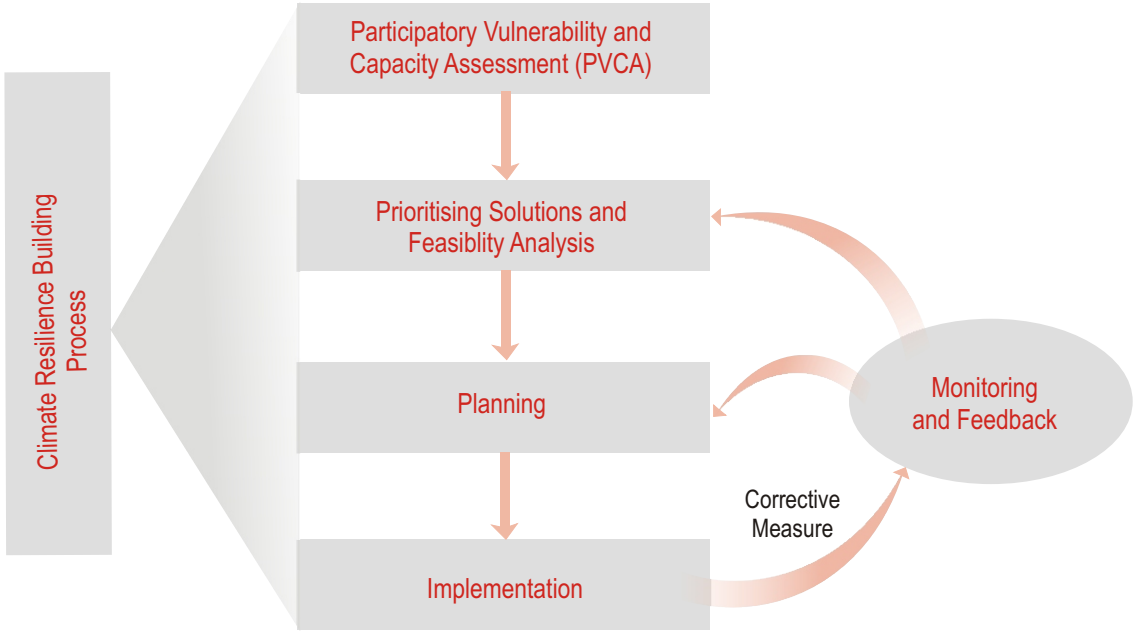
At this point, the role of facilitator becomes crucial to catalyse this situation. First of all he/she has to develop his/her own understanding with the globally available information and need to translate it at the community level where communities can explain their experiences. The next step is to help the communities to correlate their experiences with the wider available knowledge and get engaged in the resilience building process.

The resilience planning should be based at the local context. Many a times, it is not possible to replicate the experiences gained in other areas as it is without considering the local capacities and social, economic and political context. Hence, the role of the facilitator is to facilitate the resilience building process by stimulating the local wisdom instead of developing it with his/her own experiences. For better community involvement in thinking, discussions and resilience building process, many

methodologies and participatory visual tools are available which could be used by the facilitators. The broader goal is to enhance the thought process of communities related to climate change and resilience building processes based on their own knowledge and experience and integrate that with the knowledge available at the global level. Participation is also important in the replication of the resilient actions in rural areas where the

availability of mass media and other communication media are limited. The figure- 2 below outlines the process of building resilience which starts from participatory assessment of local level vulnerability and existing capacity of local community. PVCA is followed by resilience planning, implementation and monitoring after feasibility analysis of identified solutions.

| Fig 2 | Flow Chart of Resilience Building Process



CHAPTER : 2

PARTICIPATORY VULNERABILITY AND CAPACITY ASSESSMENT

Participatory Vulnerability and Capacity Assessment (PVCA) is a framework which can be used by development practitioners and institutions to conduct assessments of vulnerability and capacities in relation to climate change in a participatory way. The broad objective of PVCA is to gain a better understanding of how communities are affected by climate variability and change, how they perceive these changes, and how they cope with or adapt to these changes. The knowledge gathered through PVCAs can be used to help in enhancing the resilience and supporting the adaptation of communities vulnerable to environmental and socio-economic change.

2.1 Definition and General Understanding

PVCA is “an approach to excerpt community perspective towards existing issues and situations in local context”. Climate change induced disasters have larger risks on human lives and livelihoods. It becomes important at this juncture to include local community in assessing the situation, translating into local context and evolving locally appropriate solutions to reduce such risks based on their wisdom.

PVCA can be also described as “an approach of participation and empowerment of local communities in analysing their vulnerabilities and capacities to get appropriate solution in view of observed problems”. In other words, PVCA allows people to get involved in the process of defining the problems in their own ways, underlying vulnerabilities, and existing resources and further be the lead in implementation, feedback mechanisms and undertaking corrective measures. PVCA helps stakeholders to facilitate the process of information gathering, articulation in local context and planning to build resilience. PVCA can

also be counted as a process of understanding local situations.

2.2 Need for PVCA

Local wisdom has been always considered the pathway of understanding the problem and building resilience into people's lives. In India, shift changes in disaster response at all levels and efforts of mainstreaming climate change in DRR have expressed the need of change in the developmental approach by giving value to the local knowledge and experiences. Robust changes in the lives of people can only be brought if they are involved in local level planning and implementation. For example, Christian Aid has experienced implementing PVCA tool in its DFID funded BDRC (Building Disaster Resilient Communities) project in various countries and found it very effective in reducing community vulnerability to future shocks and crisis. Likewise, GEAG has widely used PVCA in building community resilience in urban and rural areas through using various participatory tools (Annexure-1). Amalgamating both the experiences, this PVCA manual will tend to produce a comprehensive guideline for participatory practitioners in developing resilience planning in the context of climate change and disaster.

2.3 Benefits of PVCA

PVCA benefits participatory practitioners as well as community in several ways. It does not only allow people to share the information but also bring them to implement and monitor the actions. Following are some benefits of PVCA:

I. Helps in getting local perception on existing situation: PVCA process is based on the principles of participation. Community owns the process and articulates the gathered information in their own

ways. Those information and identified solutions are translated into actions through local people. PVCA helps us getting viewpoints of local people on observed situation.

II. Complementing baseline information for measuring impact: We want to see that our work is having a positive impact on poor communities. To show this, we need to demonstrate progress made from the start of a project to the end. This requires sufficient baseline information at the beginning of a project and a final evaluation. PVCA can provide accurate baseline information to identify where communities are and what changes they want to see.

III. Empower community: PVCA is more than just an exercise to collect background information or make a project known among beneficiaries. Rather it is an empowering tool that gives people a chance to organise themselves and take the future into their own hands. This reflects one of the goals of Christian Aid's Turning Hope into Action to enable poor and marginalised communities to work together to manage livelihoods, risks and resources. PVCA is a way to mobilise communities to work towards common goals that they have identified and want to achieve.

IV. Bring partners and volunteers into closer contact with communities: It provides space for all community members to voice their opinions. These include marginal groups which can often be excluded from community planning. The findings of the vulnerability analysis are used to develop a community action plan, where local authorities, community members and organisations such as Christian Aid partners commit to working together towards common goals. A PVCA exercise can be invaluable for increasing local involvement, building commitment and reducing the risk of misunderstandings and pitfalls later on in a project.

V. Make participatory practitioners more accountable to beneficiaries: PVCA process includes involvement of local communities at every stage and thus make involved people accountable towards the beneficiaries.

VI. Facilitate integration of CCA in DRR and other developmental issues: The PVCA process identifies ways that CCA and DRR can be better integrated with other development projects so that they support each other. Applying this would allow us to make durable changes to people's lives while pursuing disaster-preparedness activities with the community. A PVCA takes an integrated approach to the idea of vulnerability, tapping into community

Capacity building and lobbying of government staff at local and district levels should focus on promoting PVCA as a first step for community-development planning. Experience shows that to scale up PVCA for a greater impact beyond the immediate community, work should be complemented by:

- Partner capacity assessments
- Mapping of existing initiatives and networks and
- Area/country baseline studies regarding disaster risk and climate trends

knowledge of local needs and risk in order to build resilience into any project design. For example, when a community identifies shelter as a local need, the potential risks, such as flooding, are taken into account so that buildings are not damaged every year.

This integrated approach to assessing community's vulnerability can also help to identify gaps in a partner's capacity and in on-going programmes, and can prompt us to link with others whose activities can complement ours. It can also highlight areas for advocacy, as the need to build community resilience often cannot be met without addressing wider social and political issues. This can range from lobbying local government departments to provide support for community-based risk-reduction activities, to larger longer-term advocacy for policy change.

2.4 When and When not to do a PVCA

When a PVCA can be used
PVCAs support community members to develop action plans with project staff by analysing together what resources and strategies are available in order to address the risks and vulnerabilities identified. Therefore, a PVCA can be used for:

- ♦ **Project design:** PVCA can be part of the identification/needs assessment phase of a project and the findings can then be used to design, write and justify a project proposal.
- ♦ **Community mobilisation and commitment building:** PVCA can be used at the start of community-based actions, sometimes as the very first activity to build commitment to common goals. In this case, although its use in assessing vulnerabilities and needs remains, the main purpose is not an initial needs-assessment report or a set of baseline data, but a community action plan, developed by the relevant local stakeholders with the support and facilitation of NGO partners

- and owned and supported by community members.
- ♦ **The documentation process:** A PVCA allows communities themselves to explore and document in a structured but contextualised way their vulnerabilities, capacities and processes, as well as their shared vision. The information gathered during the process can be shared and disseminated across the community and with local representatives and other stakeholders.

When a PVCA should not be used

A PVCA should not be used:

- ♦ **As a large-scale investigation:** The PVCA is a methodology conceived for community level work; it is a labour-intensive exercise and as such it is difficult to employ it to target many communities at the same time. PVCA should be applied at an appropriate scale only.

There are several ways of achieving results that have a wider impact than on the community targeted with a PVCA:

- Documenting the project as an evidence - based example to address issues at a regional level
 - Reinforcing regional networks to exchange experience and
 - Showing other communities the results to encourage replication
- ♦ **For reinforcing pre-conceived assumptions-connecting local concerns with disaster risks:** When conducting a PVCA we need to be flexible and open minded. When the community action plan is defined by the community's own perception of its vulnerability there is a likelihood that it may differ from what we expected. This also challenges the use of a PVCA as an opportunity to seek funding, as donors' priorities do not always fit with the actual vulnerabilities, needs and actions as identified in the action plan. Community problems are very often linked to everyday life risks such as undrinkable water and illness rather than large-scale disasters. When conducting a PVCA the facilitators need to give due attention to people's own assessments of risks but at the same time ensure that any support offered to the community fits the project objective and reduces community vulnerability to future shocks and crises.
 - ♦ **As a research method:** PVCA should be treated as a prelude to programme activities, not just an extractive research exercise. This implies that we should plan for follow-up activities in each community that conducts PVCA.

- ♦ **In conflict and post-conflict situation:** PVCA has not been explored as an approach for conflict resolution or to be used in conflict prone areas or in social exclusion situation. PVCA has only been experienced in disaster prone areas.

2.5 Process for Resilience Strategy Planning Using PVCA

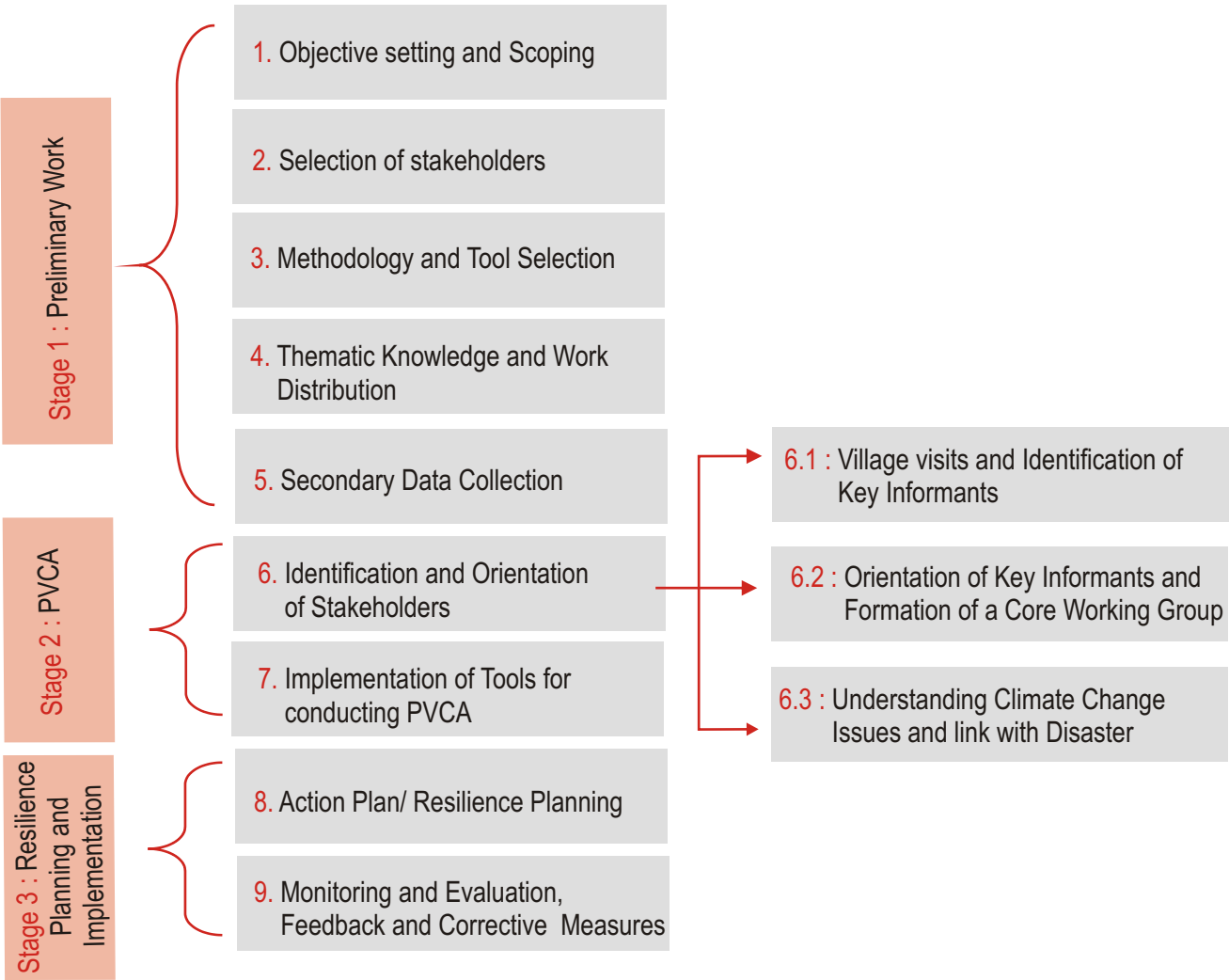
Climate change induced disasters impact local people in several ways. Community adapts the changes in their own ways based on their local wisdom but in the last few years, scenario of disaster has changed immensely due to climatic variability which is affecting adaptive capacity of local people adversely. In this view, analysing the local scenario, local perceptions and probable solutions and thereafter developing resilience strategy in view of climate change impacts and disaster risks has been inevitable. Resilience strategy for a particular place is a process undertaken and owned by the local stakeholders. This section is intended to provide the context, evidence and analysis to justify adaptation actions and set priorities for actions to build resilience based on vulnerability and capacity.

The key idea here is to provide a guideline to prepare the strategy that it is aligned with the current or existing planning and implementation processes so that it can be readily assimilated and used by the local agencies, private sector and general public. It has been an underlying fact that the concepts of climate change, vulnerability and adaptation (as understood largely by the external experts) is relatively new to the village areas and rural people and hence, there is a need to build this understanding in such a way that this external knowledge is in sync with the local knowledge and practices.

2.6 Stages for PVCA and Resilience Strategy Planning

The development of a resilience strategy for any area follows the steps given below in a chronological manner. Preparations at team level and community level are required to understand and follow in prescribed manner. Information required for PVCA is often obtained from both primary and secondary sources.

Fig 3 | Flow Chart of PVCA and Resilience Strategy Planning



Stage 1: Preliminary work to be done at organisational level

Before undertaking PVCA in the field, internal preparation is required at organisational level for effective results. The preliminary work can be divided in simple steps starting from setting objectives of the exercise to developing common understanding on issues and work distribution.

Step 1 : Objective setting and scoping : As the first step, common understanding regarding the exercise should be developed among all the involved team members. Purpose and scope of the exercise largely depends on the requirement of the project or to the organisation or could be both. Selection of community and scoping should often be aligned with the resources of the organisation.

Scoping should offer best way to produce expected result in time with reasonable use of resources.

Step 2 : Selection of stakeholders : Selection of stakeholders should start taking place once the scoping is final. Various criteria such as extent of climate and disaster impact and level of external intervention can be used to select the communities. Such criteria could be:

- Communities' exposure to risk
- ♦ Access to communities
 - ♦ Relationship with partners and communities
 - ♦ Level of social capital/community organisation and
 - ♦ Presence of other agencies and NGOs in areas

The above mentioned criteria could be referred to identify and select the communities for PVCA

exercise and further involvement. However it's mainly the local community who should be part of defining associated risk and exposed communities.

Step 3 : Methodology and tool selection: Selection of appropriate methodology and tools at this stage would be an important step. Criteria of selection of

For example, if we need precipitation record of last 50 years for a particular region, it can be collected from secondary source such as meteorological department, irrigation department or even from flood control department in certain cases. Such information can be furthered triangulated with primary data, i.e. from community. On the other hand if we want to get the number of houses exposed to water logging, it can easily be obtained from community using PRA techniques.

tools must be based on objective of exercise, level and type of information, use of the information, local partner capacity (if selecting local NGO partner) and time availability. Effective tools for the exercise are always prescribed to be selected on the basis of required information, source of information and available time.

Table-1 below explains the key factors, required information and prescribed tool to assess that information. This could be useful for participatory practitioner in setting criteria and selecting tools accordingly.

In view of climate change and disaster, there are mainly eight factors that largely influence vulnerability and capacity of community. The table below also describes the factors that directly or indirectly influence the vulnerability and the appropriate tools required to assess the information.

Table 1 | Factors influencing vulnerability and tools required for assessment

S.No.	Factors influencing vulnerability	Information required	Tools
1.	Nature of Livelihood Systems	Existing livelihood practices, number of HHs involved, fragility to get disrupted, income distribution in case of it being diversified	Social Map, Scoring and Ranking Method
2.	Ability to commute for non-farm livelihood options	Access to non-farm livelihood sources outside	Social Map
3.	Inward and outward flow of information, goods and services	Types and level of information, availability of goods and services and access	Social Map, Shared Learning Dialogue
4.	Social capital and institutional checks and balances	Types of social capital, their roles, institution and their role in checks and balances/ influence	Shared Learning Dialogue
5.	Gender practice, income and social position- socio- cultural	Vulnerability pattern, access to livelihood sources and income	Shared Learning Dialogue, Focussed Group Discussion, Casual Loop Diagram
6.	Physical infrastructure	Details of roads, houses, water supply, power supply, schools, health infrastructure. The degree to which such infrastructure is vulnerable and the extent to which such infrastructure support in sustaining livelihood and saving lives	Resource Mapping, historical and trend analysis Focussed Group Discussion
7.	Water availability	Availability and source of drinking water, irrigation water	Resource Map, Social Map, Focussed Group Discussion
8.	Natural resource and geographic conditions	Existing natural resource location of area	Resource Map, Focussed Group Discussion, Transect

Step 4 : Thematic knowledge and work

distribution: It is essential for partners/ team members to have minimum common understanding on climate change, disaster risk reduction and their relation with livelihood systems. Not only the basic knowledge but ability to demonstrate the concept to the community and further facilitate them to share the information in local scenario during participatory tool implementation is a prerequisite. Further, terminologies to be used and the way of conversation with the community is very critical part of the exercise which should be pre-decided. Hence, it would be advantageous if team decides role of every individual before going to the field. Very importantly, team must be ready to explain to the community about the objective, process and follow up of the exercise in local context. They must be able to explain how the exercise will benefit the communities. Following areas are to be covered for common understanding before initiating PVCA in the field:

- ♦ Common understanding on climate change, disaster and its linkage
- ♦ Understanding on its impact on livelihood and the Sustainable Livelihood Approach and
- ♦ Understanding on climate resilient planning

I. Developing common understanding on climate change

It is important to have basic information about the issue on which the exercise is based upon. Organisation should organise a technical session on the issue for the team members who will conduct PVCA in the field. Here is an example of technical session on climate change. This could be the basis of organising trainings on other issues as well.

Understanding Climate Change : Rural life and livelihoods are closely linked with the natural systems that are more climate sensitive. Planning for climate change resilience would indeed require knowledge of the climate that an area would face in the future. However, the projections of climate information are riddled with uncertainties and availability of future climatic data and its downscaling to the village level is almost impossible at this time. Despite these uncertainties local communities have been taking decisions based on their own wisdom to cope with the climate variability. Hence, it becomes important to develop a common understanding of the changing climate in the local context and define the parameters how communities are observing the climatic aberration. This section discusses to explore the changing climatic trends at the planning unit, develop the indicators for community observations in rural areas and explain how planners could use this information for planning resilience.

Important points to cover

- ♦ What does climate change mean?
- ♦ What are the indicators?
- ♦ What are the reasons?
- ♦ Global warming and types of Green House Gases
- ♦ Impact of climate change in rural and urban areas
- ♦ Linkage between CCA and DRR

Understanding to be gained from this section is :

- ♦ Demystifying climate change concepts and explaining the phenomenon in a simple way
- ♦ Understanding the trends of change in climate in rural areas observed and experienced by the communities
- ♦ Finding out the indicators through which communities observe the change in climate.

What is Climate Change and how it occurs : The climate of a place is the average of weather conditions prevailing at that location over a period of time. Rainfall, temperature, air pressure, humidity and wind speed are the important components that determine the climate. While the weather conditions at any place can change suddenly, the changes in climate are slow and are much less noticeable in short time periods.

The climate change happening earlier occurred due to natural causes were very slow and that enabled life forms to adapt to those changes. However, the pace at which climate is changing has increased in the last century. It has now been conclusively proven that this increased pace of climate change is much due to the human factor rather than natural factors. Large scale use of fossil fuels like coal and petroleum for industries, energy generation and generation of huge amounts of gases from vehicles which are known as Green-house Gases or GHGs. Secondly, large scale clearing of natural sinks (for CO₂) like forests for the massive population increase (housing and agricultural requirements) also added to the accumulation of GHGs in the atmosphere. It is estimated that the energy sector alone is responsible for about 3/4th of the carbon-dioxide which is the most important GHG in the atmosphere.

The atmosphere surrounding the earth is made up of gases that include GHGs. (Annexure- 2).GHGs help to maintain the earth's temperature to what it is today. In the absence of these gases, the earth would be much cooler. We can say that these GHGs are nature's way of climate control. These gases have been in the earth's atmosphere since the beginning. They were kept in balance because their

creation and consumption was controlled by natural ecosystems. However, in the last century, human activities have started to produce and release more GHGs into the atmosphere, that create an imbalance and the envelope/blanket of GHGs is becoming thicker and thicker. This leads to more heat getting trapped and the earth is getting warmer and warmer. This is called global warming.

Understanding climate in rural and urban areas and its impact on disasters : Change in climate is being observed in rural as well as in urban areas. It is impacting ecosystem directly for climate change. Agriculture is the primary occupation for people in the rural parts of India and it is largely dependent on the conditions of climate. Uncertainty in rainfall, rising temperature, dry spells during winters, hot waves during summers, rising humid days are some of the indicators putting adverse impact on farming. Climate change has strongly been observed in urban areas in various forms such as erratic rainfall which is causing flooding or occasional water logging and water contamination, impact on peri-urban agriculture, increasing incidences of various pandemics in the region.

The changes in climate in the last three to four decades have been more prominent and both urban and rural communities have begun to experience the impacts of climate change in their daily lives and livelihoods. While in urban areas people are much more acquainted with the changes in climate as the access to weather related information is easily available and frequent discussions in media on the issue of climate change go on, the rural communities better observe the changes in climate because the rural systems are closer to the natural ecosystems which is highly sensitive to climate change. Needless to mention that climate change puts direct impact on nature of disaster. Especially, impact on hydrological hazards such as flooding due to climate change is becoming more prominent for several reasons. For example, very high intensity of rainfall causes flash floods and even untimely flood situation. Government of India has mandated to integrate climate change component in departmental planning. However, it has been observed that there is very limited awareness and capacity of government departments to prepare plan in view of climate change. Mainstreaming of climate change issue is still a challenge at state and local level.

- ♦For resilience planning, it becomes important to know the perception of local people about the observed changes in the climate. To make the team aware on the importance of people's perception on the issue, 'Box game' (Annexure-3) can be used in the exercise.

There are four major climate variables which are important to understand for resilience planning- precipitation or rainfall, temperature, humidity and extreme climatic events.

Temperature: There are various trends of temperature which may affect the resilience of local system. For example, variation in temperature or temperature regime may affect the growth of crops, flowering time, soil quality, and irrigation demands. The changes in temperature may also cause negative impacts on human health. Based on the available climatic scenarios and local experience, for example, the temperature trend may be observed as:

- ♦ Prolonged summer season
- ♦ Increase in day time temperature and cooler nights
- ♦ Shift in summer season
- ♦ Heat waves in winters and short intense periods of winter

Precipitation: Precipitation or rainfall is responsible for crop productivity, soil fertility, economic pressures on rural communities, livestock, etc. For instance the trends of precipitation may be observed as under:

- ♦ High intensity of rainfall in short span of time
- ♦ Overall decrease in rainfall
- ♦ Dry spells or fluctuating and irregular rainfall patterns
- ♦ Having flood and drought like situation in same season
- ♦ Shift in monsoon season

Humidity: Humidity has direct impact on crop quality and human and livestock health. Trend of humidity may be observed as

- ♦ Increased humid days in summer
- ♦ Late onset of winters
- ♦ Prolonged hot hours in summer days

Extreme climatic events: Apart from the fluctuation in temperature and precipitation there are some extreme climate events which could cause severe impact on rural livelihood, health, education, infrastructure, and disturb the routine life. For instance, it could be observed in the form of

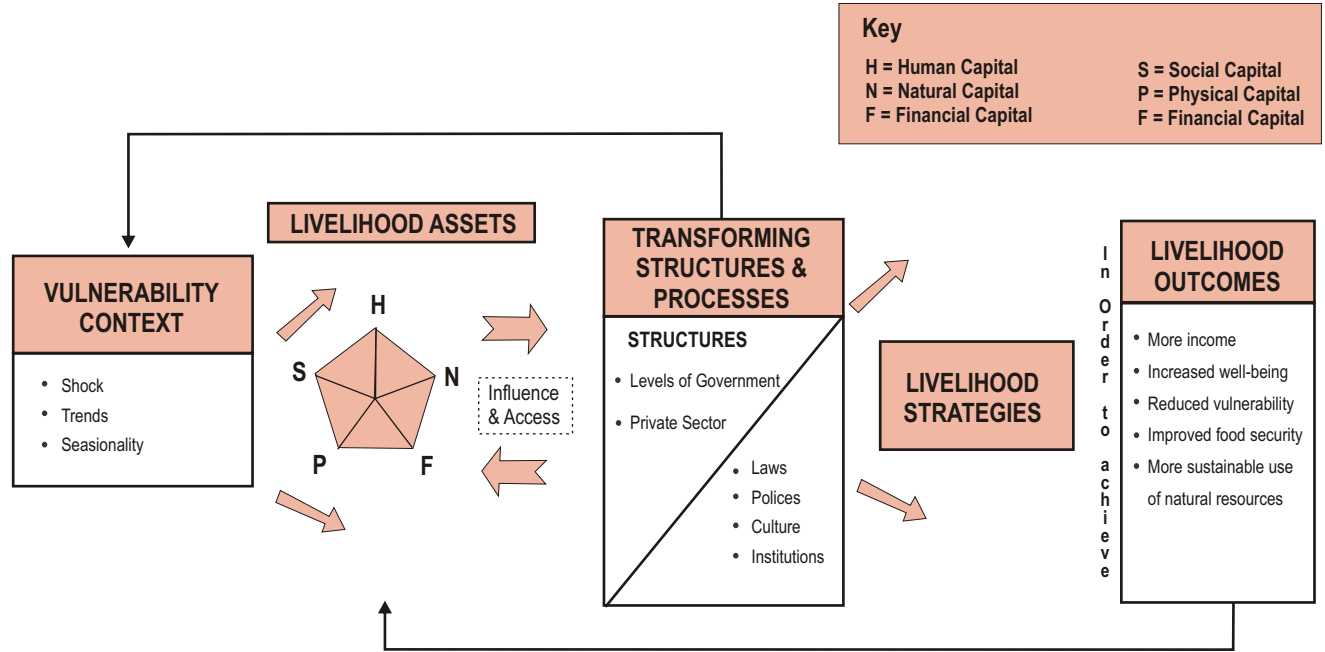
- ♦ Floods
- ♦ Drought
- ♦ Waterlogging
- ♦ Hail storm
- ♦ Wind storm
- ♦ Heat Waves
- ♦ Frost

II. Understanding Sustainable Livelihood Approach, influencing factors and adaptive capacity

Climate induced disasters have direct impact on people's livelihood. It is understood that diverse livelihood options and practice defines the adaptive capacity of people. In order to understand the adaptive capacity of people, the Sustainable Livelihoods Approach (SLA) is a tool which is used

to improve understanding of livelihoods, especially of the poor. "A livelihood comprises the capabilities, assets (including both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base." (DFID 1999, p 1)

| Fig 4 | Sustainable Livelihoods Framework



The above diagram of SLA presents the main factors that affect people's livelihoods and the different assets people have. It distinguishes five types of assets:

Human capital : Includes health, nutrition, education, knowledge, and skill.s

Social capital: Comprises networks and connections, relationships of trust and mutual support, formal and informal groups, common rules and sanctions, collective representation, mechanisms for participation in decision making, and leadership.

Natural capital: Encompasses access to land and produce, wild foods and fibers, water and aquatic resources, biodiversity, trees and forest products, environmental services, and wildlife.

Physical capital: Consists of infrastructure, tools, and technologies.

Financial capital: Covers savings, credit, remittances, pensions, and wages. Further, the SLA helps to analyse a community's vulnerability and adaptive capacity, as livelihood assets are important determinants of a community's capacity to adapt to climate and socio- economic change.

III. Develop Understanding on Resilience Planning

In the previous section, we assessed probable climate change impacts and the sectors, households that would be impacted based upon their vulnerability and the sustainable livelihood approach. The next step in the resilience planning process is the identification of adaptation options for the vulnerable sectors/households identified so that they become resilient to climate change impacts.

This section on resilience planning will help participatory practitioner to:

- ◆ Understand/ develop future climate scenarios and their impact on rural people
- ◆ Identify adaptation options that would help systems and people to become resilient to climate change impacts
- ◆ Analyse of proposed adaptation measures according to the parameters and identify the strengths and gaps in the range of proposed village resilience actions

Understanding Climate Resilience : Resilience in simple terms and in the context of climate change implies the ability of a system to withstand and maintain their core functions through the stresses and climate shocks and recover quickly. As we develop our understanding on resilience for systems, it is to be noted that the resilience of any system also stems from and is connected to the resilience of other systems. For example, a resilient irrigation system may lead to a resilient agriculture system that impacts the resilience of households in rural areas. Other characteristics of resilient systems are that these should be dynamic, adjusting over time in response to new information and external pressures, including climate factors. In conclusion, a system would be considered resilient to climate change if it does not fail when faced with climate stresses and shocks that may affect each system directly, or through its linkages to other systems.

So if we were to define a resilient system, some of the characteristics that the systems should exhibit are listed below. In any resilient system, not all of these characteristics may be present but all resilient systems in any rural/urban setting or as part of natural ecosystem exhibit most of these characteristics.

Redundancy : Redundancy is basically multiple ways to achieve that essential task required from a system. Thus, a resilient system can function and achieve results through alternate pathways when

Examples of Redundancy

- ◆ Multiple livelihood options like agriculture combined with dairy or sheep. Even if the agriculture fails for some reason, the other will help sustain the household economy.
- ◆ Multiple facilities for irrigation like canal irrigation supported by tube wells, etc.

one fails. In contrast, a 'single best solution' is not resilient because if this single option fails, the system is not able to deliver the required services. Back-up systems, or decentralised arrangements for service delivery in a linked network, are always preferable and are resilient.

Flexibility/Robustness : A resilient system is able to function under different conditions than for which it was primarily designed and deliver the required services. The systems which are designed only to handle unique and specific situation or conditions are not resilient and fail if there are any changes in the optimal functioning conditions. However, since almost any system will fail once it surpasses a certain threshold; another quality of resilient system is its capability to fail under stress in a safe and predictable way, rather than suddenly and catastrophically. Further, a resilient system would also recover to its prior condition quickly without having undergone any irreversible changes.

Examples of Robustness

- ◆ Flood resilient agricultural practices (such as *machan* farming, early varieties of seeds, etc)
- ◆ Livestock which could either provide milk and/or meat.
- ◆ Existence of community owned centres such as farmer field school, village resource centre, farmer's clubs, etc.

Reorganisation/ Responsiveness : Resilient systems are flexible in the way that they can respond to unexpected shocks or changes. This requires that a system uses variety of resources like information, skills, experience, etc. to mould itself according to the changed working conditions and continue delivering services as per the changed requirements.

Examples of Responsiveness

- ◆ Community institution may work in multiple modes. Women of Self-help group usually provides small credit support, but they can be quickly used for new skill building groups to support households in case of droughts or floods when agriculture systems fail.
- ◆ In flood prone areas, increasing RCC roof, raising plinth of houses and raised hand pumps
- ◆ Developing drainage in the village by using MGNREGA funds can reduce the risk of water logging in the area to a great extent (for case study-see below)

Capacity for Learning : Resilient systems learn from and build on experience, so that mistakes are not repeated and lessons from similar activities undertaken in other rural areas are integrated into current planning and implementation. Communication and sharing amongst various organisations and networks is the key to develop this characteristic of resilient system.

Examples of Capacity for learning

- ◆ Dissemination of flood adaptation practices, through a network of NGOs and government departments
- ◆ Dissemination of knowledge regarding failed variety of paddy in floods
- ◆ Sharing of successful interventions of MGNREGA to government, policy makers and rural planners

Step 5 : Secondary Data Collection : It is suggested before the field work begins that it is imperative to get all the basic information regarding the village or the area where this exercise needs to be conducted and record in a specific format. Possible secondary information sources are the census records, block office, village land records, and the meteorological department for weather data. Suggested format, as an example, for secondary data collection is given below. This format has been designed to collect village information from the revenue office (Tehsil), block office, meteorological office and other sources. Information on this format which include the demographic details, crop details, irrigated and non-irrigated lands, month wise weather especially rainfall information and natural resources. Collected information is further shared and triangulated with community in local level dialogue.

Table 2 | Format of Secondary Data Collection

Village		Block								District			
Total population													
Number of households													
Total geographical area of the village (in ha) :													
Barren and uncultivable land													
Forest area													
Water bodies in and around the village													
Cultivable waste, pastures and groves													
Fallow Land													
Net Sown Area													
Gross Cropped Area													
Net Irrigated Area													
Area under major crops (in ha) :													
		Crop 1 _____											
		Crop 2 _____											
		Crop 3 _____											
		Crop 4 _____											
Number of electrified houses													
Small scale industries in the village													
Number of units of Industry 1													
Number of units of Industry 2													
Number of units of Industry 3													
Climate details		Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	Minimum												
	Maximum												
Average number of rainy days/month													
Average rainfall amount (mm)													
Name of person collecting information								Date					
Name of NGO													

Case Study : MGNREGA Helps in Adapting to Climate Change in Budheli Village

Budheli is a small village in the Jungle Kaudia block of Gorakhpur. The village is located 250 metres away from the bank of a river named Rohin. The village habitation is situated on the uplands but most of the farming activities are done on the lowlands. Owing to its geography, the lowland area remained waterlogged during the rainy seasons. During the rainy season about 200 acres of its agricultural land used to remain inundated for more than 50 days. Earlier rain water usually drained out in the river Rohin through canal and a regulator constructed on embankment. But the ignorance, improper maintenance of canal and its desiltation became the major hurdle in draining out the rain water out into the river. As most of these lands belong to the small and marginal farmers of scheduled caste community, the water inundation for such a long span of time aggravated their vulnerability and affected their livelihood. To cope with the situation, villagers finally decided to rejuvenate the old drainage system on their own. Village Pradhan and people prepared a detailed work plan by keeping in view the financial resources provisioned in MGNREGA. Villagers repaired and cleaned the drains which completed before monsoon for safe passage of storm water and avoid flow of water in agriculture land. For this, 109 (including 30 women) MGNREGA job card holders worked together for 2750 human days and cleaned 1200 meters of drain lines. As a result of this effort, now 70 % of the water logged area has been reclaimed and 100 HHs have already sown their kharif crop in their lands.

Stage 2 : Participatory Assessment of Vulnerability and Capacity

The second stage is to assess vulnerability and capacity of community at field level which starts after collecting the required secondary data.

Step 6 : Identification and Orientation of Stakeholders: Implementing PVCA in the field will need support of local leaders, stakeholders and volunteers. Most importantly, identifying most exposed groups can only be obtained through consultation. Hence, work should start with identification of key informants followed by community level meeting. Sub steps of this section are:

- 6.1** *Visit to the Village and Identification of Key Informants* : The initial visits to the village are intended to familiarise the team with the village, building rapport with the community members, identify key informants and have one-to-one discussion with each one of them. The idea behind these initial visits is to take advice regarding the village dynamics, main stakeholder groups and identification of the core working group members. The key informants can also be good resource for cross-checking the secondary information collected. For example-some of the key informants in a village are the village head, or the ex-head, Panchayat members (local elected body), school teachers, Anganwadi workers and ASHA workers (local health frontline workers).
- 6.2** *Orientation of Key Informants and Formation of Core Working Group:* After identification of key informants and important stakeholders, organise a meeting to explain the objective and programmatic arrangements of the exercise. Anticipated benefits of the projects should also be explained and discussed. This platform can be used to decide who should invite and should be invited to participate, what the place of exercise is, what tools are to be used and who can be part of the facilitation. Selection of respondents must consider aspects of gender, caste and age classification to ensure maximum participation. This exercise is very important to decide how information will be shared with the community and how it will be used further in action planning. It is suggested to arrange basic logistical arrangements needed for the community exercise (transport, stationery, lights, etc.). The decision on the duration and timing for the activity will depend on the context and community members' availability. If possible, it would be useful if a community level core group is formed during the meeting who could take the responsibility to undertake and monitor the exercise in the village. This core group will further take up the exercise to action level and own the entire process. However, local dynamics and community receptiveness will play important role in this process.
- 6.3** *Understanding Climate Change issues and link with Disaster through Trend Analysis (Identifying climate trends and impact on sectors)* : After having meeting with community, primary work is to get the understanding on local scenario of climate change and its impact on specific sectors. This information can effectively be obtained from the community through conducting following participatory exercises :

Lead question and process: Selection of lead questions play very important role and often helps in deciding the discussion course. It is important to be clear on what information needs to be extracted out of the community and how can that be done. Lead question here could be- ***what are the changes in weather you have observed in last one or two decades?***

Preparation: After identification of community, gather 8 to 10 community members to discuss on the issue of climate and its impact. Involvement of elderly members of the community in the discussion will be helpful. Select an appropriate place for the meeting which could be school building, orchard, community hall or any other common place. It is also recommended that at least two people are required to lead the process and act as a facilitator and an observer.

How to identify trend of above climate variables and events in the area : As discussed earlier, there are

four climate variables which are important to understand in local context. For identifying the climate change trends there is a need to understand the changes in climate as observed by the local communities. It is possible that the communities may not be able to explain or tell about the changes in temperature from last year to the current year but they would definitely be able to explain the overall shift and/or trends in weather conditions or if they are observing any trends in changing climatic conditions. It will help to get the area specific information and the response capacity of the local communities and further the information could be used to develop the resilience plan.

Discuss and note what the observed changes in the weather/climate are over a longer period of time in the three climate variables. Start with rainfall and consequently cover rest of the three. Listen carefully to the people, note down the points one by one. We can put more questions to verify the information. Observer should write down the important points and compile the information in the following format. Information related to climate variables and change observed can be compiled down in format below :

Table 3 | Format of capturing Climate Variables and Observed Changes

Climate Variables/ Events	Earlier	At Present	Changes Observed
Rainfall - Months (number) - Months (name) - Intensity (days) - Timing - Dry Spells			
Temperature - Hot days - Hot waves - Months (number) - Months (name) - Hot winters - Cold days - Cold waves			
Humidity - Humid days - Timing - Duration			
Extreme Climatic Event - Intensity - Frequency - Magnitude Also ask extreme climatic events history of last 40-50 years (flood, drought, etc.)			

current risks or problems that are being faced by various sectors. This would give us an idea of the areas that we definitely need to consider for climate impacts and whether these get aggravated. For this we need to carry out small group exercise and come to a consensus by ranking exercise.

Process: Identify volunteers and form small groups of 5-6 persons and ask them to identify current problems that the people face. These could be as diverse as water for irrigation to lack of health facilities in the village. List down all the existing problems identified by community and try to arrange after scoring. On the one side in the paper from top-down, write down sectors vertically and identified hazards horizontally as depicted in given example in table. Ask people to put numbers in accordance to sector's vulnerability to particular climatic hazard. More number will depict more vulnerability or risk. Give them to score on a 10-point scale.

After scoring, add all the scores vertically and horizontally which will show which sectors are vulnerable towards which hazards and which hazard is more prominent. This table would provide a clear picture of the current problems and the next step would be to see what areas or issues are likely to be impacted by changes in climate.

Since in rural areas, almost all walks of life and livelihood are connected (either directly or indirectly) with natural ecosystems, it is likely that almost all areas would classify as being impacted by changing climate. It may vary in urban areas where livelihood sources are mainly non-farm and comparatively diversified.

Table 5 | Format for Scoring and Ranking Exercises

Problem Area/Issue (For Example)	Area fully or partly affected	Score	Ranking
Irrigation			
Drinking water			
Health facility			
.....			
.....			
.....			

Important Dos and Don'ts for facilitator during exercise

- Explain people carefully and make them understand what you want
- This exercise needs more facilitation
- Always be patient, don't be in hurry
- Listen to people and let them decide how to start and how to conclude
- Interfere only if the process is not going in the right direction
- Articulate all information and share with larger group
- Discuss with team-anchoring and writing
- Do this exercise twice or thrice with different smaller groups (This exercise does not take as much time as social map takes)
- Triangulate the information and prepare a final one

Tool 3 : Vulnerability Assessment Exercise through Focussed Group Discussion (FGD)

After assessing community specific problems through implementing above tools, next step is to assess the vulnerability of households, community and systems. Initially the team developed its understanding on climate change, disaster and associated impact on sectors. Further, local level problems have also been identified by the community. Now after getting aware of this crucial information, identification of households that are most vulnerable and also the 'systems' in the village that are vulnerable should be done. This would form the part where we understand 'what or who' in the village is vulnerable and 'from what'. In this process we would also try and understand what makes these component vulnerable or why these components are vulnerable.

Photo 3 | Focus Group Discussion



Vulnerabilities of the area could be divided into two levels:

- (i) Community level vulnerability: This can also be identified as 'system vulnerability' where impact largely reflects on entire community.
- (ii) Household level vulnerability: This reflects the household level vulnerability which may or may not differ from that of community.

In the following table, some of the factors which may exacerbate the vulnerabilities and capacities of the households or the village community are listed. They have been segregated according to the five sustainable livelihood capitals as defined by DFID, while some of these indicators can be quantified; the others are only qualitative indicators.

Table 6 | Factors aggravating vulnerabilities and capacities

	Exacerbating Vulnerabilities	Enhancing Capacities
Social	<ul style="list-style-type: none">◆ Casteism◆ Occupation of unsafe areas for settlement and agriculture purpose◆ Gender inequity in decision making access to services◆ Women headed households◆ Illiteracy, lack of education◆ Poor health & migration◆ Resistance to change◆ Exposure to disease◆ Feeling of helplessness	<ul style="list-style-type: none">◆ Social relations, networks kinship◆ Local leadership◆ Community institutions/ groups, strong social capital◆ Knowledge about climate impacts and adaptation strategies◆ Education and training on alternative livelihood options
Political/ Institutional	<ul style="list-style-type: none">◆ Access to market◆ Non- transparent government, exclusion from governance and decision-making◆ Lack of people's participation in development planning◆ Corruption◆ Poor access to updated/scientific information◆ Poor access to agricultural institutions	<ul style="list-style-type: none">◆ Inclusive and representative governance processes◆ Early warning systems◆ Disaster preparedness◆ Participation in planning◆ Effective linkage with development schemes- livelihood health, education◆ Functional and upgraded extension system◆ Easy access to agricultural institutions
Physical	<ul style="list-style-type: none">◆ Location of settlement in hazard prone location◆ Exposure to physical hazards (floods, droughts, etc)◆ Infrastructure in risk (housing, roads, electricity)◆ Unsafe critical facilities- PHC, CHC, Schools, Community Centre	<ul style="list-style-type: none">◆ Resilient life line building and infrastructure that cope with and resist extreme events◆ Diversified and improved energy systems to meet increasing demand◆ Effective natural resource management
Environmental/ Natural	<ul style="list-style-type: none">◆ Soil quality◆ Obstruction of drainage systems◆ Availability of irrigation water◆ Poor drainage facilities	<ul style="list-style-type: none">◆ Effective management of drainage channels◆ Capacities for sustainable agriculture◆ Rainwater harvesting◆ Water recycling
Economic/ Financial	<ul style="list-style-type: none">◆ Climate sensitive livelihood options◆ Lack of access to credit◆ Middleman in financial access◆ Lack of agriculture insurance facilities◆ Informal economics with limited social protection◆ Indebtedness◆ Relief/ welfare dependency	<ul style="list-style-type: none">◆ Access to credit, insurance◆ Diversified livelihoods, economics

Several factors have the ability to define the vulnerability of any area or individual and climate change is only one of the factors which aggravate the vulnerabilities. Proper understanding of these factors and their impacts are necessary to understand the vulnerabilities of the community or household.

Important Dos and Don'ts for facilitator during exercise

- Prepare lead questions first
- Identify people and appropriate place for discussion
- Don't argue. Allow them to discuss on the issue
- Help them in reaching to the consensus
- Get a heterogeneous group- caste, age and income based

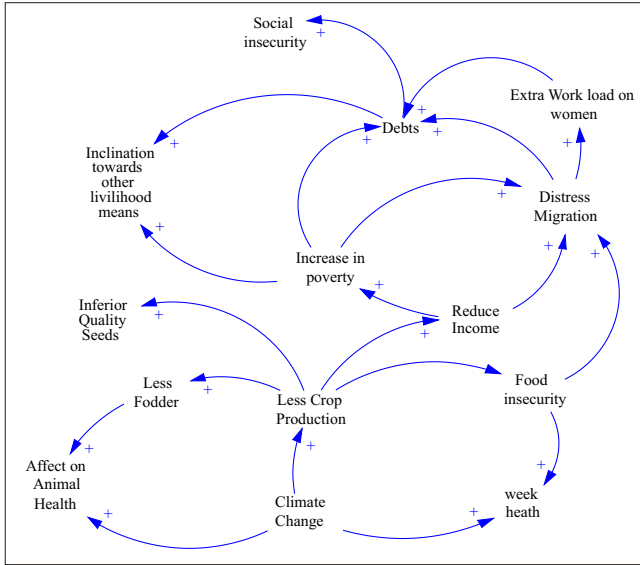
Process: This exercise should be ideally held with heterogeneous group of people. 10-12 people would be sufficient for this exercise where intense discussion is required to happen. Collect people at any appropriate place and brief them about the required topic of discussion. It would be useful to include those people who were part of earlier exercises.

However involving some new people also has its own benefits of getting new thoughts, unbiased articulation and increased participation. Start with a lead question and ask people to share their thought or points of view. One person will be expected to take notes of the points. All points can be discussed in one meeting but if required, organise more than one meeting to get variety of information from diverse groups and triangulate the information.

Tool 4 : Causal Loop Diagram: Assessing individual and household level vulnerability and associated factors
Climate change and induced disasters may have different impacts on individuals and community which are based on their capacity to respond to these events. Causal Loop Diagram, popularly termed as CLD, shows that how different variables in a system are interrelated.

It becomes important to get inter relations which will further help in developing resilience planning. A diagram showing the pictorial representation of CLD is given below. Various systems, influencing variables and their interrelation can easily be defined by using CLD exercise.

Fig 6 | Causal Loop Diagram



Process: Collect a group of people who are amongst the most vulnerable population and start dialogue with them. We have to note down all important points on separate sheet or diary in front of them. However, we should avoid making the inter-relation during discussion which is expected to be done post dialogue.

Putting Positive and Negative Signs : Inter-relation of variables is shown in positive and negative signs on the nodes. Nodes are the variables and edges are the links. Positive sign shows the change in variables in same direction and negative sign represents changes in variables in opposite direction. These signs depict the relation between two variables. For example- food intake has direct relation with malnutrition. More food reduced the risk of malnutrition. If food is reduced in quantity and quality then probability of being malnourished is often reduced. Hence, there will be negative sign here to show the appropriate relation. Food intake changes in upper direction whereas malnourishment goes down. Similarly factors associated with food availability should also be discussed and further linked.

Tool 5 : Assessing most vulnerable households and communities
The first step of this tool is to develop vulnerability indicators. Discussion on how the community observes and defines these vulnerabilities should be held with the group. For this discussion, the village map, and all the three tables developed (in earlier exercise) should be available for ready reference. Facilitate the community to discuss amongst themselves as to which households are most vulnerable and why, in their opinion. They may

compare the families on various indicators. For example- community having raised place and raised hand pump in their areas are less vulnerable to the flood than the families who do not have such facilities. We need to get the vulnerability wise indicators.

For example, for individual households, a set of indicators could be: (Annexure-4)

- Income source
- Educational qualification
- Assets
- Exposure to risk
- Social network
- Infrastructure
- Proportion of dependents in the household
- Membership of disadvantaged lower caste, religious or ethnic minority
- Sense of empowerment

Similarly for community as a whole, the set of indicators could be:

- Income source
- Educational qualification
- Assets
- Exposure to risk
- Infrastructure

- Proportion of dependents in household
- Membership of disadvantaged lower caste, religious or ethnic minority
- Sense of empowerment

The above should be discussed thoroughly in the group and a final listing of indicators should be developed and can be displayed on a chart paper.

The next step is to have the group mark the indicators on to the households in the social map developed. This will provide the quantitative data of vulnerability of the village. The households having maximum number of indicators assigned to them will be the most vulnerable households and require special attention. In addition to identifying household vulnerabilities, we also need to identify major or key vulnerabilities of the village community as a whole and of the village systems and institutions as these would add on or exacerbate the vulnerabilities of the already vulnerable households. Count the signs which come under maximum number of household. These are the areas which require attention at the community level. One can prioritise the action on the basis of which area affect majority of the community. After the discussions, the following table can be developed that gives details of the vulnerable sectors and their vulnerabilities and idea about the capacities that can be used for building resilience.

Table 7 | Sectors/ Groups and their Vulnerabilities and Capacities

Vulnerable Group/ Sector	Current Vulnerabilities	Links to other systems	Capacities
Landless households			
Households near river bank/ low lying areas	♦ Exposure to floods, inability to swim ♦ Loss of assets, shelter, risk of loss of life	All	Social networks
Women-headed households	♦ Limited mobility/ access to roads ♦ Limited access to information, early warning ♦ Limited education ♦ Limited credit, reliance on high-interest money lenders		♦ Social networks and community organisations for social/ economic assistance, information sharing ♦ Interest in learning new
Sector : Drinking Water	♦ Salinization of ground water resources ♦ Declining availability in dry season ♦ High reliance on ground water ♦ Large amounts of waste ♦ Problems with pollution	♦ Decreasing water supply will have impacts on health (longer distance to fetch water) ♦ Poor health diseases	♦ Local NGOs promoting water management initiatives ♦ Healthy ecosystems help protect water quality
Sector : Agriculture	♦ Loss of crops due to intermittent or less monsoon ♦ Delay in cropping leading to less production ♦ Less rain in catchment areas leads to less water for irrigation canals		♦ Agriculture extension systems provide better services ♦ Early warning systems give information on monsoon

Tool 6 : Detailed sector study: In-depth study of identified vulnerable sectors:

Once the core group members have identified and listed the current sector wise vulnerabilities of various households, group of households and systems in the village, we may need to carry out additional in-depth study to understand the specific vulnerabilities, what the conditions that make them vulnerable are and what kinds of capabilities (that can be developed), or the kind of action needs to be undertaken for reducing these current and future vulnerabilities.

For example, if the water sector is identified as a vulnerable sector in itself and which consequently also increases the vulnerabilities of the people/ community and the agricultural system, we may need to carry out a detailed study to understand the complete water system in the village that may also have linkages to external systems. In this study we would first map out the water systems in the area that includes rivers, springs, wells, irrigation canals, and village water distribution systems. The functioning of these systems is studied for different seasons and climate scenarios. We further probe into the reasons why a system does or does not function in a particular scenario and answer questions like whether it is a physical or technical challenge, whether the majority of irrigation water is through canal systems on which the villages or urban wards may have little control, social/political issues of

exclusion to a certain community or group of households, distance from the source that makes the access difficult, or institutional issues such as lack of maintenance. This provides a much clearer picture of current strengths and weaknesses of the water system.

The next step in this study would be to consider the future climate scenarios and see how these systems would respond/ behave in future. For example we could consider a scenario that after 10 years, the rainfall is more erratic, the water table has gone down further and it is about 2°C warmer, then how would the irrigation systems or the drinking water systems function. Similar probing queries and considering multiple future scenarios provide a better understanding and clarity on the functioning and challenges of water systems in the village to provide services like irrigation and drinking water.

Similarly, sector studies could be conducted for the vulnerable households or community groups wherein we try and understand in greater detail, their current vulnerabilities and fragility and seek answers to how these can be made more resilient.

These sector studies can be conducted by external facilitators but always in conjunction with the local people. After completing the sector specific studies, action planning is done with the community.

CHAPTER : 3

RESILIENCE PLANNING AND ACTION

Step 8 : Action Planning

The final outcome of a PVCA is the community action plan. The plan details decisions made by the community members on the best course of action to address their problems.

Once the information has been collected and analysed, partners, facilitators and community representatives are ready to decide the best course of action. A table is drawn listing the risks and vulnerabilities identified by the community. This table is used to discuss with the community what can be done to address or reduce each risk by listing potential risk-reduction activities against each of the problems.

When selecting the most appropriate actions we need to make sure we are taking predictions of possible future scenarios into consideration and we are not increasing vulnerability to climate change. It is important at this stage to decide who from the community will participate in this exercise, so that it is inclusive and yet is also based on the understanding that not everybody in the community may agree to the suggested actions and priorities. The facilitators have an important role here in making sure that member of the community work together and that they do not divide into different groups and interests.

The identified problems can be discussed and an activity plan can be developed along with the community group as shown in the table below:

Table 8 | Action Plan Format

Problem/ vulnerability to reduce	Proposed actions	Activities to be carried out	Persons responsible	Timeline	Resources required (internal/ external)

Then the community can be asked to select smaller 'task force' to decide how to implement each activity in detail. These activities can then be discussed and prioritised and then divided into:

- ♦ Activities that can be implemented by the community without outside assistance
- ♦ Activities that require external assistance (from government, other local sources or NGOs).

8.1 : Tools to be implemented in Action Planning

In order to gain better understanding of the climate and its future scenario so as to better prepare for foreseen climatic changes and plan resilience, following exercises should be undertaken:

Tool 1 : Visioning future climate scenario

Visioning exercise or a collective agreement upon the most probable future scenario is important to generate before we start planning for the adaptation options. Therefore, the first step is to build consensus over the possible future climate scenarios. This would be followed by future development scenarios and how climate change will impact the already vulnerable sectors and households. For this we proceed as given below:

♦ **Deciding time periods**

The group needs to define the time period over which they would like to build the possible scenarios. One of the quick ways is to generate three types of scenarios - short-term (up to 5 years), intermediate-term (up to 10 years) and long-term (up to 20 years).

♦ **Exploring future climate scenarios**

Considering the historic aberration in climatic behaviour and external knowledge on the possible changes in the future climate of the region, the group should be instigated to discuss and generate the possible climate scenarios over specific time periods. This can be put on a chart paper in a tabular format for instance as suggested below. The climate parameters that are better predicted are listed first like the temperature and subsequently the rainfall, floods, drought, etc. are listed later. A possible scenario, for example, is given below:

Table 9 | **Format for Future Climate Scenarios (Example)**

Climate parameteres	Short term (5 years)	Medium terms (10 years)	Long term (20 yrs and more)
Temperature	No. of days above 40°C increase	Increase of about 2-3 ^o C	Increase of about 4 ^o C
Summer months duration	Increased		
Winter months duration	Reduced	Highly reduced	Highly reduced
Rainfall	Increase/decrease in quantity	Increase/decrease in dry or wet spell	Erratic rainfalll
Monsoon Months	Reduction in number of rainy days	Highly erratic	Highly erratic
Floods	Uncertain	More annual floods and higher inundation	More annual floods and higher inundation

Photo 4 | **Future Climate Scenario Exercise**



One of the alternate methods is to divide the above table into two parts each for a particular season like Rabi and Kharif (or summer and winter). This will give more specific information and people will be able to relate to the climate change impacts in a better way.

Tool 2 : Listing impacts on communities, systems and resilience options

In this exercise, the possible impacts of each of these scenarios on the vulnerable communities and sectors should be discussed by the core group members. This exercise can be facilitated by making use of tables for each of the climate scenarios like temperature, rainfall and simultaneously, list the possible impacts on the vulnerable households and systems using the question 'what if'. Below is an example of the format that can be used to compile resilience actions and criteria:

Table 10 | **An example of Climate Change Impact on Agriculture**

Climate Parameteres	Possible scenario	Effects	Impacts on agriculture	Impacts on local people
Rainfall	Low volume	♦ Reduced soil moisture ♦ Long dry spells ♦ Low stream/ river flow	Crop failure	♦ Increased distress migration ♦ Increase input cost in agriculture ♦ Prevalent of food insecurity ♦ Dearth of fodder for cattle
	More rainfall in shorter period	♦ Frequent dry spells ♦ Flash run-off ♦ Reduced infiltration ♦ Depletion of ground water ♦ Water logging in low lying area	♦ Crops under stress at risk of drying out and vulnerable to pests and disease ♦ Top soil erosion ♦ Soil salinity in water logged area	♦ Low crop production ♦ Increase input cost in agriculture ♦ Loss of life assets ♦ Damages infrastructure
	High volume	Flooding, river scouring, land cutting, increased soil moisture	♦ Damages of standing crops ♦ Water logging in agricultural field ♦ Crops rotting and disease	♦ Flooding results in loss of land and other assets ♦ Loss of life ♦ Damaged infrastructure ♦ Impacts on health ♦ Food insecurity ♦ Distress migration

The issues identified through the above exercise will also provide a list of areas where adaptation planning is needed at the community or village level. It may be noted that in the above table while we have provided four scenarios of future rainfall, this is not absolutely necessary. Based upon the earlier exercise on exploring future climate scenarios, the group should work with the most plausible scenarios for each climate variable.

Note: This exercise may take a little more time than the earlier exercises. So if time is short, an option is to conduct one example with the whole group and then divide the group into 3 smaller groups of atleast 4 persons each. Each group should be allowed to choose on their own a combination of future climate scenario and the vulnerable group/system to list out the possible impacts.

Identification of Resilience Options

The list of impacts on various households and sectors arrived from the above exercise would then result in the kinds of resilience options or adaptation activities to be undertaken at the village/ community/household level for resilience building. The facilitator needs to be aware of the knowledge

and capacities of the core group members. Though in several cases, the core group members may be able to identify the resilience building options, in some cases, external knowledge and experience from other areas could also be incorporated. The facilitator should initiate discussions of such kinds and bring in the external knowledge.

Tool 3 : Development of Resilience Matrix

This listing of adaptation actions so generated can now be tabulated and checked if they contribute to building resilience by discussing how each one meets the four characteristics that define a resilient system. The idea behind developing such a matrix is that if the group feels that any of the actions chosen are either missing or weak in one or more of the criteria, then what can be done to improve or complementary action that can be initiated that would meet the criteria.

A sample table format is given below to help facilitate the discussions. For each of the actions identified, a short description is to be provided to show how it meets the said characteristic. This needs to be based upon discussions amongst multiple stakeholders to develop shared understanding of planned actions.

Table 11 | Matrix for Resilience Actions

Proposed Actions	Redundancy	Flexibility/Robustness	Reorganisation/Responsiveness	Capacity for learning
Climate Resilient Agriculture (CRA)	CRA is not focused on any single option. It includes livestock, agriculture, horticulture, etc. with diversity of species and variety hence there is no possibility of failure of all the options. Hence, it is a redundant option.	CRA follows various theories like time management, space management, diversity of species, diversity of crops, diversity of livestock. Being a complex system it is flexible and robust.	There is a space for taking catch crops when the main crop destroy completely. This helps to remove the rigidity in the system and helps to reorganise.	It is learning system as it builds on new experience and is not only based on the existing knowledge.
For example Water harvesting structures like check dams				

9.2 : Undertaking Feasibility Assessment

Feasibility assessment of any project is done to find out whether a project can be implemented or not. Before undertaking the feasibility assessment exercise, we should carry out a Cost Benefit Analysis (CBA). CBA helps in determining the feasibility of the interventions. Although CBA actually clarifies another aspect of the feasibility namely, whether a project 'should be done or not'. This would be more conspicuous with the detailed economic and financial CBA analyses. In this instance however, we are conducting CBA to clarify two important aspects:

- ♦ To determine the better option if there are two competing adaptation options to overcome the same impact.
- ♦ Prioritizing actions if the resources are limited and we have to decide which activity to undertake first.

Photo 5 | Matrix for Resilience Action Exercise



Instead of a detailed financial cost-benefit analysis, a participatory and qualitative and participatory cost-benefit analysis can be done to meet with both the above objectives. This method of conducting the cost-benefit analysis enables the participation of vulnerable groups during stakeholder consultations and group discussions, especially when most village people are not comfortable with numbers and calculations for large projects.

Tool 1 : Participatory Cost Benefit Analysis (PCBA)

Participatory cost-benefit analysis (PCBA) differs from a traditional cost-benefit analysis by not requiring as much technical knowledge and allowing input from many different community groups. PCBA uses participatory research appraisal (PRA) methods to ensure that financial, social and environmental benefits and costs of an activity are identified.

As a result, the PCBA both captures information that is often unavailable from traditional data sources or is unincorporated in traditional analyses, and is relatively quick and inexpensive to implement. Participatory cost- benefit analyses are particularly effective with diverse groups of stakeholders and can be facilitated via shared learning dialogues at virtually any level (community, city, state, national).

A PCBA can be conducted by following the below steps:

- Step a :** Create a table in a large chart paper so that all members of the group can easily see it. The table should look as given below :

Table 12 | Format for PCBA

Proposed Adaptation Action	Cost					Benefit					Cost Benefit Ratio
	Economic	Social	Environmental	Others	Total Costs	Economic	Social	Environmental	Others	Total Benefits	

Step b : Fill in the various boxes for each of the cost elements such as economic, social and environmental. As given in the table above discuss within the group and fill in the costs for each intervention. These need to be descriptive rather than specific numbers. The idea is that we need a description of the cost elements such that the people are able to compare the elements across various intervention options.

Step c : In the same fashion, identify the benefits derived from the interventions. Since we are proposing these interventions to avert shocks and damages averted, these should be recorded as benefits, including the social and environmental benefits.

Step d : Once all costs and benefits for each of the adaptation options have been filled, the group needs to then rank them for each of the costs or benefits. This should be carefully facilitated and the facilitator should keep asking questions and prod for more discussions. The ranking could be on a scale of 1 to 5 where 1 is low cost or benefit and 5 is the highest cost or benefit. These numbers should be noted in the small squares given in each of the cells of costs and benefits. The process is to discuss all the interventions against a single variable like economic costs and the numbers/ranking noted, before moving on to discuss the next variable like social costs.

Step e : The next step is to add up the costs for each intervention and note in the total costs cell. Similarly, the benefits for that intervention may be added and noted in the Total Benefits Cell. These two numbers can be now compared to derive the cost versus benefits for that intervention. To get a single number or ratio, the Total Benefits by the Total Costs. This ratio can be noted in the Benefit Cost Ratio cell.

The cost benefit exercise is complete and now we have specific numbers for each intervention that tells us which intervention is more beneficial. The higher the ratio, the better will be the intervention.

Tool 2 : Feasibility Analysis and Finalising Action Plan

The criteria for conducting a feasibility analysis are discussed below. These need to be discussed within the community before making the final decision on implementation priorities. The community has the best experience to resolve these issues and only needs good facilitation for focused discussions.

Technical feasibility : If the intervention entails technical know-how for implementation, then we need to discuss what the technology is and/or technique is needed and whether it is available locally within the village or has to be sourced externally. The stakeholder mapping exercise conducted in the earlier section would be useful for

this discussion and needs to be displayed prominently during this discussion. Another question to be answered is that whether this technology is new and if this has been already used/ tested in similar conditions elsewhere or in a nearby village.

Human capacity/ local knowledge: Similarly for 'soft' interventions that need human capital, we need to assess whether we have this capital within the village or have to be dependent on external resources. For example, capacity building of households for alternate vocations may be an intervention but the training is to be provided by an agency which is situated in the State Capital. Even for 'hard' technology oriented interventions, we need to assess whether the village has adequate knowledge and capacity to support the implementation and later on undertake operation and maintenance. If not, then this gap needs to be addressed.

Financial feasibility : For most of the interventions, financial resources are crucial for its sustainability. It may be large or small. The village group needs to assess how much and from where are these resources to be arranged. At this stage a simple financial assessment to prioritise and/or select the options is adequate. In some cases, we may identify programmes like Indira AwasYojana (IAY) and integrated development programme that would provide financial resources for low cost housing that can be utilised to make flood resistant houses. However, once the implementation options have been finalised, the group and the village need to conduct a fairly detailed financial analysis for each of the selected interventions.

Cost Benefit Analysis : Cost-benefit analysis is one of the basic tools used to measure the costs of intervention against the benefits they provide in monetary terms to compare the competing investment strategies. Though this criterion is used in most public or private sector investment decision making, in most of the cases, the CBA exercise is relegated merely to the hard economic and financial calculations. In activities such as resilience building, the social and environmental factors also need to be factored in and this makes the social CBA somewhat more challenging. The qualitative CBA exercise is conducted mainly for prioritisation and selection purposes.

Inclusiveness : Another important criterion in the resilience building process is the impact of interventions on the marginalised groups including women. Since the impacts of climate change is different for different groups of people (mainly due

Photo 6 | Action Prioritizing Exercise



to their capacities to respond), we need to actively think about identifying and including their concerns into the implementation plans and activities. For each potential resilience building action, the group needs to check the ideas with the above mentioned criteria. This will provide clarity over choosing the best actions among various actions and developing resilience plan.

Prioritising Actions : Based on the above analysis, a detailed final action plan is made after prioritising actions in format given below. In order to prioritise actions, following steps needs to be carried out:

Step a: Prepare a chart similar to the one developed for CBA analysis with all the adaptation options noted in the left hand column of the table. The other columns need to be titled as per the Feasibility Analysis criteria namely, technical feasibility, human resource availability, financial resource availability, cost benefit ratio, and gender inclusion.

Step b: The group then needs to discuss the practical issues of implementation from the technical feasibility point of view and rank the interventions. Similar discussions and exercise needs to be carried out for all the criteria.

Step c: The sum of all rankings across the row would give the final ranking of the intervention and can be used to prioritise the intervention actions. One example has been illustrated through below mentioned table.

Please rank each option for the various criteria from 1-5, where 5 is very good or high.

Table 13 | Action prioritisation matrix

Resilience options	Technical feasibility	Human resource/ capacity	Financial feasibility	Cost benefit ratio	Gender and marginal group inclusion	Final Ranking
Check dam	5	3	3	3	3	17
Climate resilient agriculture	5	4	3	2	2	16
Rain water harvesting	4	2	2	3	4	15

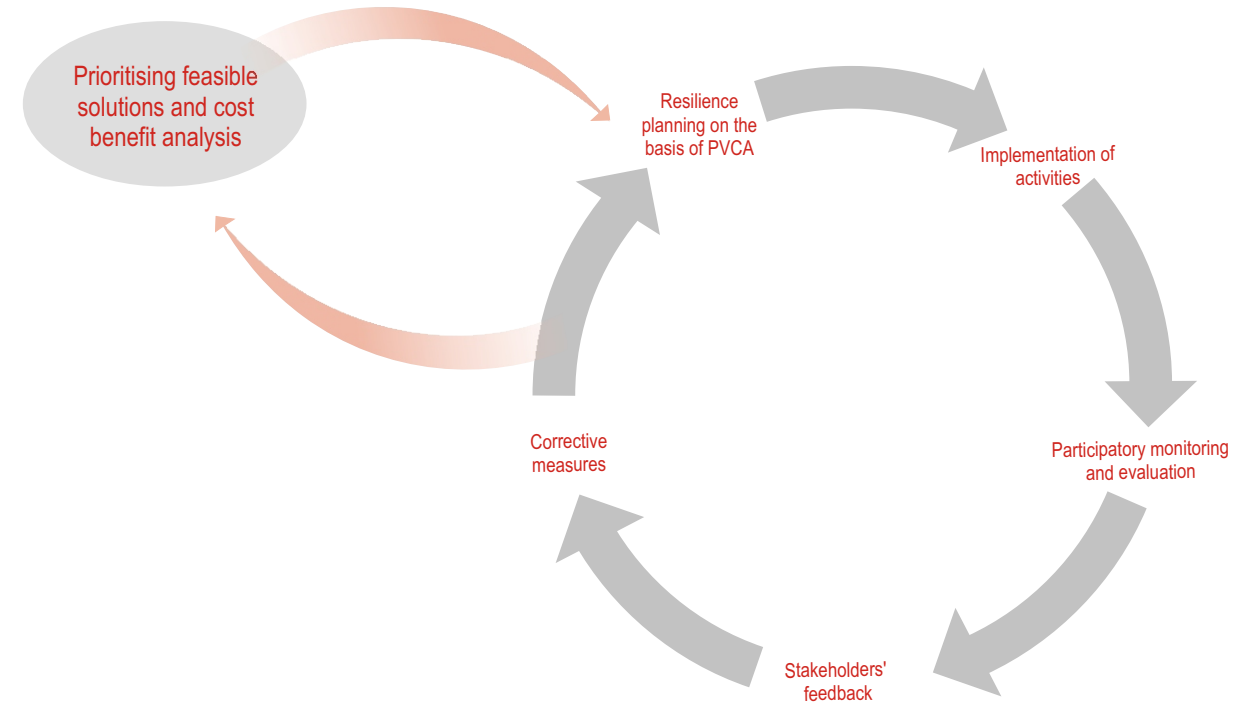
Step d: These findings need to be presented to the larger group of villagers for their comments and discussions. Here we need to make sure that the marginalised groups and women are present and they voice their concerns. This is to ensure that the resilience action plan developed by the core group members gets accepted by the village members and the implementation is easier.

A sample format of an action plan that can be used by the communities to prepare their action plans has been mentioned in Annexure- 5.

Step 9 : Implementation of Planned Actions

After formulation of action plan and mobilising resources, implementation of actions is required to be done with community and other stakeholders. Below is the cycle of the process of implementation and further steps.

Fig 7 | Plan Implementation Cycle in context of CCA and DRR



After the formulation of action plan, the next step that comes in is the implementation of the planned actions. In order to implement the community action plans that were prepared in the previous section, the ideal way is to carry out the implementations in a participatory way. As per the action plan, community institutions can be formed and they can be assigned responsibilities of different works that need to be carried out for building resilience. The process of formation of community institutions should be totally participatory and voluntary. The members of the institutions should own the problems that need to be tackled and should themselves discuss and come out with feasible solutions. In order to make the institutions sustainable, they ought to be governed by certain principles and rules. Collaborative actions at the local level help in addressing the multiple challenges that the communities face and accordingly build resilience. The community institutions gain strength over a period of time and become on their own. They do need hand holding support from the local NGO at times but most of the time, they assemble together to hold meetings and arrive at solutions to specific problems that the community is facing. They get a sense of empowerment, are informed and confident of handling their problems systematically. The uniqueness of the whole initiative lies in the adoption and methodology in building resilience at the local level and making the system responsive and accountable. The whole implementation then becomes a model that can be tried and replicated elsewhere.

Participatory Monitoring and Evaluation (PM & E)

Participatory monitoring and evaluation should be used to empower the local citizens to analyse and solve their own problems. This involves local people, development agencies, and policy makers deciding together how progress in development should be measured, and results acted upon. It can reveal valuable lessons and improve accountability. It is a challenging process for all concerned since it encourages people to examine their assumptions about what constitutes progress, and to face up to the contradictions and conflicts that can emerge. A wide range of methods and tools have been developed to carry out PM&E. They all seek to compare the situation before and after a particular project implementation. They include home-made questionnaires and scientific measurement techniques adapted for use by local people, as well as more innovative methods such as oral histories, and the use of photos, videos and theater.

The PM&E tools are needed to :

- ◆ Facilitate discussion between different groups
- ◆ Gather and analyse information
- ◆ Present conclusions and recommendations

The following are some straight forward tools that can be employed with little, if any, outside intervention. Becoming familiar with such processes can help communities to reclaim control over the evaluation of their work. It is important to remember that the tool alone does not initiate a participatory process; it is how the tool is used. Practising working together helps people to learn to work together more effectively.

Tool 1 : Participatory Cost Benefit Analysis

When used in an evaluation, this tool can get groups together to create straight forward list of the costs and benefits associated with the project, programme, or other activities, can even think for future plans. Determining the social, economic, and ecological, governance, and learning implications of a project, for example, can help to evaluate the sustainability of that project over time. Comparing costs and benefits can also help the group make decisions around 'tradeoffs', that is, which costs the group is willing to incur to achieve the benefits, or which risks they are willing to venture to meet the stated objectives.

Tool 2 : SWOT Analysis

SWOT is an acronym that stands for strengths, weaknesses, opportunities and threats. The first two components refer to the strengths and weaknesses internal to the group conducting the analysis. They are a basic inventory of what the community groups do well, and what areas are in need of improvement. The last two components refer to opportunities and threats in the external environment. Opportunities can include discovering potential sources of funding, creating partnerships with other organisations, finding out what relevant literature is available. Threats can emerge from the political-economic climate, organisations with competing goals and ideologies, or changing community demographics.

The process of a SWOT analysis can be as simple as a group brainstorming meeting, or longer-term research endeavour, depending on the time and resources available. The key is that the evaluation is initiated and controlled by people in the group. Going through a SWOT analysis as a group can think about ways to capitalise on its strengths, and take steps to improve its weaknesses. They can also think about how to take advantage of new opportunities, or create plans to avoid the threats, or contingency plans. Furthermore, while they may not have control over

the external environment, knowing the opportunities and threats that exist can help them to be aware of and more prepared to deal with pressures that affect them from outside while building resilience.

Tool 3 : Indicators-based Analysis

Through this tool, the programme beneficiaries themselves determine indicators of success and set standards against which their programmes are evaluated. The process of collectively stating indicators can occur before a project is initiated, so that community members can return to those indicators at decision points throughout the project implementation. Group members choose which indicators they consider important. As the group proceeds with the project, they can return to these indicators to determine whether and how they are being addressed through their efforts.

Feedback and Corrective Measures

A 'feedback system' is a systematic approach which aims at collecting views of beneficiaries and other key stakeholders about the quality and impact of the climate resilience work undertaken. Two examples of feedback systems that can be used are citizen report cards and community scorecards:

- ◆ Citizen report cards generate satisfaction ratings about public services from a random sample of

users. Results suggest that report cards can increase the pressure for reform and support the efforts of internal reformers, but are unlikely to force reform on unwilling or constrained public leadership.

- ◆ Community scorecards bring together the service provider and service users to strengthen understanding, reinforce shared responsibility and identify improvements.

Carefully used, perception-based indicators are empowering and strengthen dialogue between local people and service providers about what works in the local context and why. They can measure outcomes (like impacts of resilience against climate change, income changes, empowerment, extent of damage due to disasters, etc.); outputs (like technology adoption, access to services and capacities); and operational effectiveness (like the quantity and quality of services received, and the quality of participation).

Post the feedback session, suitable corrective measures should be undertaken which may be necessary for enhancing the resilience against climate change. These corrective actions should feed into the planning for such projects elsewhere.

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Annexure : I

Participatory Learning and Action (PLA) Tools

Before going to field exercise in the villages, it is essential to have a brief discussion with all team members regarding the use of tools. Finally team members collectively decide the tools according to the need of project outcomes. Some common PLA tools are listed below:

Transect Walk

For better understanding of the location of village, the observing its landscape, land uses, becoming familiar with the community and their daily practices.

Social Mapping

For knowing the existence of natural resources, service availability, institutions, inhabitation according to the castes etc.

Livelihood seasonal calendar

To collect data on seasonality of food gap months and employment options available to the community.

Seasonal calendar

For knowing different kinds of hazards (flood, drought, fire, changing rain pattern, dry spells, water logging etc.), its intensity, severity and community's ranking on it.

Service opportunity (chapati, wealth ranking)

For knowing accessibility of different kinds of Govt. schemes to the community, assets of the community in the village and its surrounding area and dependence of the community on it.

Vulnerability matrix

To indicate the type of hazards having serious impact on important livelihood resources and understanding which livelihood resources are most vulnerable.

Causal Loop Diagram (CLD)

For collecting information on causes of poverty, identification of issues for vulnerability reduction and planning strategy for actions.

Focus Group Discussion (FGD)

For understanding the community's perceptions about climatic changes, events, and phenomena indicated in the seasonal calendar, discussing the impact of these changes on their livelihoods and identifying their strategies to cope with and adapt to any perceived changes.

Annexure : II

Green House Gases

Carbon dioxide	:	CO ₂
Carbon monoxide	:	CO
Methane	:	CH ₄
Nitrous Oxide	:	N ₂ O
Tetra fluoromethane	:	CF ₄
Hexa fluoromethane	:	C ₂ F ₆
Sulfur Hexafluoride	:	SF ₆

Annexure : III

What is Box Game: In this exercise, some items are placed in a box (such as a pencil, a stone, a piece of paper and a leaf) and three people are invited from the team to play. The first is allowed to shake the box, listen to the sound and guess what is in the box. The second person is blindfolded and can touch the contents and guess what is in the box. The third person is allowed to open and look in the box. Now the participants have to guess who is playing the role of donor agencies, who is representing the partner organisation and who is playing the role of a community member. The conclusion should be that all three want to know what problems the community faces, but only the community knows what the real problems are. By reaching that conclusion themselves, team members can understand the importance of participation. This can also be played with community members to make them aware about the importance of their participation.

Annexure : IV

A Composite Vulnerabilities and Capacities index for the household level in rural areas (RHH-VCI)

S.No.	Types of Vulnerability and Indicators	Vul.	Cap.
1.	Material Vulnerability <u>Income Source</u> : If 100 per cent dependent on a local level productive assest, e.g. fishing, land, shop, etc upon local * Lower vulnerability score by 1 for every 10 percent of non local income reported * Subtract 2 if the income sources is stable and insensitive to local hazard * Add 2 to the score if the income sources is unstable, eg. day labour	35 10/12	
2.	<u>Educational Attainment</u> : If no member of the house hold literate * Lower vulnerability score by 1 for every 5 years of schooling of the most educated male member of the house hold * Lower the score by 2 for every female member's 5 years schooling	5	
3.	Assets : If none of the assets are immediately fungible, for eg. farm implements, household items * Lower the score by 1 for every Rs. 20,000 of fungible assets, e.g. tractor, animals, savings, jewellery (to be calibrated empirically).	8	
4.	Exposure : Distance from the source of prime hazard, e.g. river, coast line, landslide zone. If within the equipvalent of 10 yrs. flood plain * Lower the score by 1 for the equivalent of every 10- yrs, flood plain residence and or assets. * Lower the score by 1 for every piece of evidence of hazard proofing , e.g. building of a house on higher plinth for floods, light construction, low cost construction which could be rebuilt with local resources.	10	
5.	Institutional Vulnerability <u>Social Networks</u> : Members of ethnic, caste, professional or religious organisation or grouping. If none then * Lower vulnerability score by 2 for every instance of past assistance by a group/ organisation in adversity. * Lower multiple times if multiple organisations. * Lower score by proportion of respondent reporting the organisation to be efficacious.	50 10	
6.	<u>Extra local kinship ties</u> : If no extra local kinship or other ties, which could be source of shelter and assistance during adversity * Lower the score by 2 for every immediate family member living extra- locally. * Lower the score by 1 for every non-immediate family member living out side.	5	
7.	<u>Infrastructure</u> Lack of an all weather road If seasonal road then Lack of electricity Lack of clean drinking water Lack of robust telecommunications (Mobile coverage) Lack of local medical facility	4 -4 2 -2 2 -2 4 -4 4 -4	
8.	<u>Proportion of dependents in a household</u> If the proportion is greater than 50 percent * Lower the number by 1 for every additional earning member If a single parent headed household.	5 or 10	
9.	<u>Warning Systems</u> Lack of a warning system Warning system exists but people are not aware of it or don't trust it	4 or 4	-4 or -4
10.	<u>Membership of disadvantaged lower caste, religious or ethnic minority</u>	5	
11.	Attitudinal Vulnerability <u>Sense of Empowerment</u> : Self declared community leadership or Proximity to community leadership Proximity to regional leadership structure or Access to national leadership structure Lack of access to community or regional leadership Lack of knowledge about potential hazards (lower score by 1 for every type of hazard and its intensity accurately listed by respondents	15 10 5	-10 or -10 -15 or -15
	Total Possible Vulnerability Score	100	

Community level Vulnerabilities and Capacities Index for Rural Areas (Rcom-VCI)

S.No.	Types of Vulnerability and Indicators		
1.	Material Vulnerability <u>Income Source</u> : if 100 per cent household dependent upon local level asset for livelihood, e.g. land, tractor, fisheries etc. * Lower vulnerability score by 1 for every 10 percent of households reporting non-local income * Subtract 2 from the overall score if the income sources reported by more than 50 percent households are stable and insensitive to local hazard * Add 2 to overall score if the income sources are unstable, eg. day labour	30 8/10	
2.	<u>Educational Attainment</u> : If literacy rate is less than 50 percent then * Lower vulnerability score by 1 for every 10 percent of additional female literate members of the community	5	
3.	Assets : If no collectively owned community assets * Lower the score by 1 for every productive collective community asset with open assess to community members (will have to be calibrated empirically).	5	
4.	<u>Exposure</u> : Distance from the source of prime hazard, e.g river, coast line, landslide zone. It within the equivalent of 10 yrs. flood plain * Lower the score by 1 for the equivalent of every 10- yrs, flood plain residence and or assets. * Lower the score by 1 for every piece of evidence of hazard proofing , e.g. building of a house on higher plinth for floods, light construction, low cost construction which could be rebuilt with local resources.	10	
5.	Institutional Vulnerability <u>Social Networks</u> : Evidence of the existence of equitable, democratic community organization. If none then * Lower vulnerability score by 2 for every instance of the community organisation helping community members. * Raise the score based on community members perception of power imbalances in the organisation. If the organisation dominated by 1 person or family, then the score will be 10. Lower it based on evidence of wider participation.	50 10	
6.	<u>Extra local kinship ties</u> : If no extra local kinship or other ties, which could be source of shelter and assistance during adversity * Lower the score by 1 for every 20 percent of locals reporting extra-local kinship ties.	5	
7.	<u>Infrastructure</u> Lack of an all weather road If seasonal road then Lack of electricity Lack of clean drinking water Lack of robust telecommunications (Mobile coverage) Lack of local medical facility	4 -4 2 -2 2 -2 4 -4 4 -4	
8.	Proportion of dependents in a household : If unemployment or under-employment rate more than 50 percent then * Lower the score by 1 for every 5 percent drop in unemployment rate	10	
9.	<u>Warning Systems</u> Lack of a warning system Warning system exists but people are not aware of it or don't trust it	4 or 4	-4or -4
10.	Community of disadvantaged lower caste, religious or ethnic minority	5	
	Attitudinal Vulnerability	20	
11.	Sense of Empowerment : Self declared spirit of self help or Access to official levers of power or Access to national leadership structure Lack of self help ethos or access to official levers of power Lack of information on local hazards (lower vulnerability score by 1 for every 10 percent of the respondents accurately describing the nature and possible intensity of hazards)	 10 10	-10 or -10 or -15
	Total Possible Vulnerability Score	100	

