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Trainer's Manual

Capacity development on
climate change adaptation for
Women SHGs under MKSP
in Uttar Pradesh

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Capacity development on
climate change adaptation for
Women SHGs under MKSP
in Uttar Pradesh



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FOREWORD

In recent years, climate change has emerged as a new threat to the lives, livelihoods, and food security of vulnerable communities. There is scientific evidence of climate change manifested through rise in temperature levels, erratic rainfall patterns, and increase in the incidence of extreme climatic events in the form of recurring droughts and floods. The Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report warns of more intense and frequent heatwaves and humid heat stress along with increase in precipitation during the 21st century, threatening food insecurity, increase in diseases such as malaria, and water stress increasing the vulnerability of communities to climate change.

The State of Uttar Pradesh has nine agro-climatic regions and has witnessed recurrent hydro-meteorological hazards like floods, droughts, heat waves, cold waves, extreme rainfall that have not only affected the people and their livelihood systems but also the development indices of the state

Capacities for climate change adaptation are currently being built in a wide range of sectors in India. Considering the UP SAPCC, which lays special emphasis on engendering climate change adaptation, there is still scope for adaptation projects to better address the needs of the local population, especially women, by addressing high workload of women in the agricultural sector, limited access to agricultural inputs, advisory services or for decision-making and so on.

Under the Climate Adaptation and Finance in Rural India (CAFRI) – a bilateral programme supported by GIZ India, the Capacity Development Package for Women Farmers under the Mahila Kisan Sashaktikaran Pariyojana (MKSP) is an attempt to enhance capacities of women farmers through developing understanding on climate change impacts at the local level and the needed adaptation measures for building resilience.

I hope this Capacity Development Package will be useful for the trainers conducting trainings under the MKSP Programme and the related government departments at State and District levels as a reference for practical strategies to integrate climate adaptation actions at the local level.


(Manoj Singh)



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PREFACE

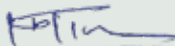
Uttar Pradesh is one of the most vulnerable states in India in terms of climate change. The recent trends of climate change have largely impacted farmers and farm production in the state. The Increasing vulnerabilities due to climate change are multi-dimensional and interlinked. It is varying across location, sectors, communities, households and individuals (gender). The state of Uttar Pradesh is not left untouched by this emerging problem. Over the past decades, Uttar Pradesh has witnessed recurrent hydro-meteorological hazards like floods, droughts, heat waves, cold waves, extreme rainfall that have not only affected the people but also the development indices of the state.

Agriculture is one of the most important primary activities across the globe. Agriculture is called the backbone of economy of Uttar Pradesh. It has not only the highest cropped area but it has the highest number of over 21 million farm holdings as well.

Rural women form the most productive work force in the economy of majority of the developing nations including India. In Uttar Pradesh the small land holding women farmers significantly contribute to agricultural production whereas they also perform multiple roles within the family and the farm. Climate change impacts the roles of women farmers in farm production, agriculture labor, livestock, horticulture and other allied activities as well as managers of households.

The access to knowledge and information on dealing with climate change impacts towards a resilient farming is important. Govt of Uttar Pradesh is committed to safeguarding the interests of women farmers and a climate resilient farm production system.

The Capacity Building Package aiming to build the capacity of women farmers, in various agro-ecological zones of Uttar Pradesh, will be helpful in enhancing the income of farmers and enabling them to deal with climate change impacts.



(Ashish Tiwari)

List of Abbreviations

CAFRI	Climate Adaptation and Finance in Rural India
CCA	Climate Change Adaptation
CBOs	Community Based Organisations
CC	Climate Change
CCA	Climate Change Adaptation
DoE	Directorate of Environment
GEAG	Gorakhpur Environmental Action Group
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MKSP	Mahila Kisan Sashaktikaran Programme
GPDP	Gram Panchayat Development Plan
MKSP	Mahila Kisan Sashaktikaran Pariyojana
NAFCC	National Adaptation Fund for Climate Change
NDCs	Nationally Determined Contributions
SLD	Shared Learning Dialogues
SAPCC	State Action Plan on Climate Change
SHG	Self Help Group
SIRD	State Institute of Rural Development
SLD	Shared Learning Dialogue
SRLM	State Rural Livelihood Mission
VDMP	Village Disaster Management Plan

adelphi

adelphi is a leading independent think tank and public policy consultancy on climate, environment and development. Our mission is to improve global governance through research, dialogue and consultation. We offer demand-driven, tailor-made services for sustainable development, helping governments, international organizations, businesses and non-profits design strategies for addressing global challenges.

adelphi has been working on climate change adaptation in many different contexts worldwide, with a specific focus on India. adelphi supports local authorities, provincial governments, government ministries and international organisations to integrate scientific information about adaptation to climate change into local, sectoral and regional programming. Furthermore, adelphi is vastly experienced in conceptualizing capacity development activities, developing training toolkits with cutting-edge didactics, and implementing highly interactive trainings.

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Gorakhpur Environmental Action Group (GEAG)

Gorakhpur Environmental Action Group (GEAG) undertakes sustainable development initiatives for communities in rural India, especially in UP. GEAG has significant experience in gender and social inclusion considerations as cross-cutting issues within development programmes. In various projects GEAG has positively impacted the lives of small-marginal and woman farmers through capacity development on agriculture-based livelihoods, climate change resilience, disaster risk reduction, health, water and sanitation.

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CTRAN Consulting

CTRAN Consulting provides services on environment, climate change and social development. CTRAN has an in-depth understanding of local climate change and climate risk realities by completing multiple State-Level Climate Change Action Plans (SAPCC) across India, including in HP, preparing climate change projects with local actors for the GCF and Adaptation Fund while also mainstreaming water, agriculture, forestry and disaster management into adaptation fund management.

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Glossary

There is more than one definition for many of the terms listed below. It is important to understand how the terms are used in this manual in order to present the material and to help participants clarify terms as needed.

<i>Training course</i>	The sum of all training modules for a target group. A training course can have a duration of one day or several.
<i>Training module</i>	The sum of all tools / sessions associated with a phase of local adaptation planning
<i>Training session</i>	Smallest training unit that can serve both knowledge and information transfer (e.g. video material, infographics, case studies) as well as a participatory, interactive approach (joint completion of a risk matrix). All sessions clustered under one phase will build a training module.
<i>Modular approach</i>	Thanks to the modular approach, a training course can be structured according to the specific needs of the target group with the help of the CDP toolkit. To this end, different sessions can be combined with each other in different ways, taken out or also expanded with additional details and facts. This ensures that the specific training needs/learning objectives and different knowledge levels of the participants can be addressed. The knowledge base of the participants can be very diverse, ranging from participants with little to no understanding of climate change to those who are already familiar with the main CCA requirements.
<i>Phases of local adaptation planning</i>	The training courses are based on a logical sequence of 6 phases for local climate adaptation planning (see section 0.2 of this trainer's manual). The term phase represents the steps of an adaptation project starting with the assessment of climate change impacts and related risks to project design and operation and monitoring of a facility.
<i>Co-creation</i>	Co-creation describes the process of early involvement of customers, end-users and experts from different disciplines in the early discovery phase of product development. In this way, co-creation broadens the perspective on problems and solutions to include different backgrounds of experience and specialist perspectives, thus increasing ownership and at the same time reducing the risk of blind spots and wrong paths due to misconceptions.

0 INTRODUCTION TO THE TRAINING



0.1 Background

Relevance of the topic and need for capacity development

Climate change is affecting land, water, forestry, and other dependent livelihoods. While the Covid-19 pandemic dominated our lives in 2020, climate change continued to intensify, making 2020 one of the warmest years on record. Despite encouraging trends towards climate adaptation at the global level, the 2020 Adaptation Gap Report (UNEP 2020)—which is a flagship report published by the UN since 2014 looking at where the world stands in planning, financing and implementing adaptation actions—describes the extent of adaptation progress at the national level as insufficient. However, the longer we wait to take effective adaptation action, the more expensive and consequential the impacts of climate change will become at multiple scales, with the potential to far exceed the costs of adaptation.

The Global Climate Risk Index 2021 (Germanwatch 2021) ranks India as the seventh most vulnerable country to climate change. The key contributing factors for this were the prolonged monsoon phase in 2019, which affected 11.8 million people with the economic damage estimated to be US \$ 10 billion, and the eight tropical cyclones in 2019 that formed one of the most active cyclone seasons in the northern Indian Ocean since records. The State of Uttar Pradesh has nine agro-climatic regions, which includes Bhabhar and Tarai, western plain, mid-western plain, southwestern plain, eastern plain, central plain, northeastern plain, Vindayan and Bundelkhand region. The large proportion of state's population lives in rural areas and its occupation is agrarian. Nevertheless, over the past decades, due to climate change impact, the variability in climatic components (rainfall, temperature) has explicitly manifested. The state has witnessed recurrent hydro-meteorological hazards like floods, droughts, heat waves, cold waves, extreme rainfall (Envistats India report 2020) that have not only affected the people and their livelihood systems but also the development indices of the state (Scoping assessment of Uttar Pradesh, 2020). Thus, from climate variability perspective, the state of Uttar Pradesh is one of the most vulnerable areas in India.

Capacities for climate change adaptation are currently being built in a wide range of sectors in India. With the establishment of the National Adaptation Fund for Climate Change (NAFCC) in 2015 and the initiated revision of the State Action Plans on Climate Change (SAPCCs) in 2019, the Indian government has created important incentives for the implementation of ambitious adaptation measures and projects. Considering the UP SAPCC, which lays special emphasis on engendering climate change adaptation, there is still scope for adaptation projects to better address the needs of the local population, especially women. While most current projects comply with generally valid standards, the actual needs on the ground and especially those of women (e.g. high workload of women in the agricultural sector, limited access to agricultural inputs, advisory services or for decision-making) need urgent attention to implement the climate adaptation actions.

Purpose and scope of the capacity development package

About the project:

In order to reduce the risks of climate change for vulnerable groups, the Indian Ministry of Environment, Forests & Climate Change (MoEFCC) has initiated the Climate Adaptation and Finance in Rural India (CAFRI) programme together with GIZ. The Directorate of Environment, Govt of UP, is the nodal agency in UP for the programme and coordinating all capacity building efforts. As part of this programme, adelphi, GEAG and CTRAN supported the development of a Capacity Development Package (CDP)—of which the trainer's manual is part of—for mainstreaming climate change adaptation into local planning processes in Uttar Pradesh.

For women farmers, as one of the main target groups of the CDP, knowledge products and tools are provided to raise awareness and change behaviour towards climate resilience. Further, women farmers will be trained and empowered to successfully plan, implement and operate evidence-based adaptation projects by making use of existing governmental support schemes.

In this regard, the CDP follows the following overarching principles:

- supporting local adaptation needs,
- considering convergence with ongoing schemes,
- strengthening the role of intermediary organisations,
- supporting gender responsive participatory planning,
- fostering behavioural change towards CCA/ climate resilience,
- providing inputs for indicating CCA element in policy,
- enhancing ownership and advises on financing mechanisms for the local adaptation needs.

Multiple workshops with key training institutes and relevant departments as well as interviews with target group representatives to assess the local needs and site visits laid the groundwork for the CDP.

0.2 Training programme and methodology followed for planning, implementing and operating adaptation projects

The methodology used by the capacity building package follows the logical sequences of local adaptation planning. Figure 1 below shows the arrangement of the CDP's modules and their key steps and assessment methods.

To develop, implement and operate adaptation projects, the CDP considers seven main steps:

Module 1. Understanding climate change and its impacts

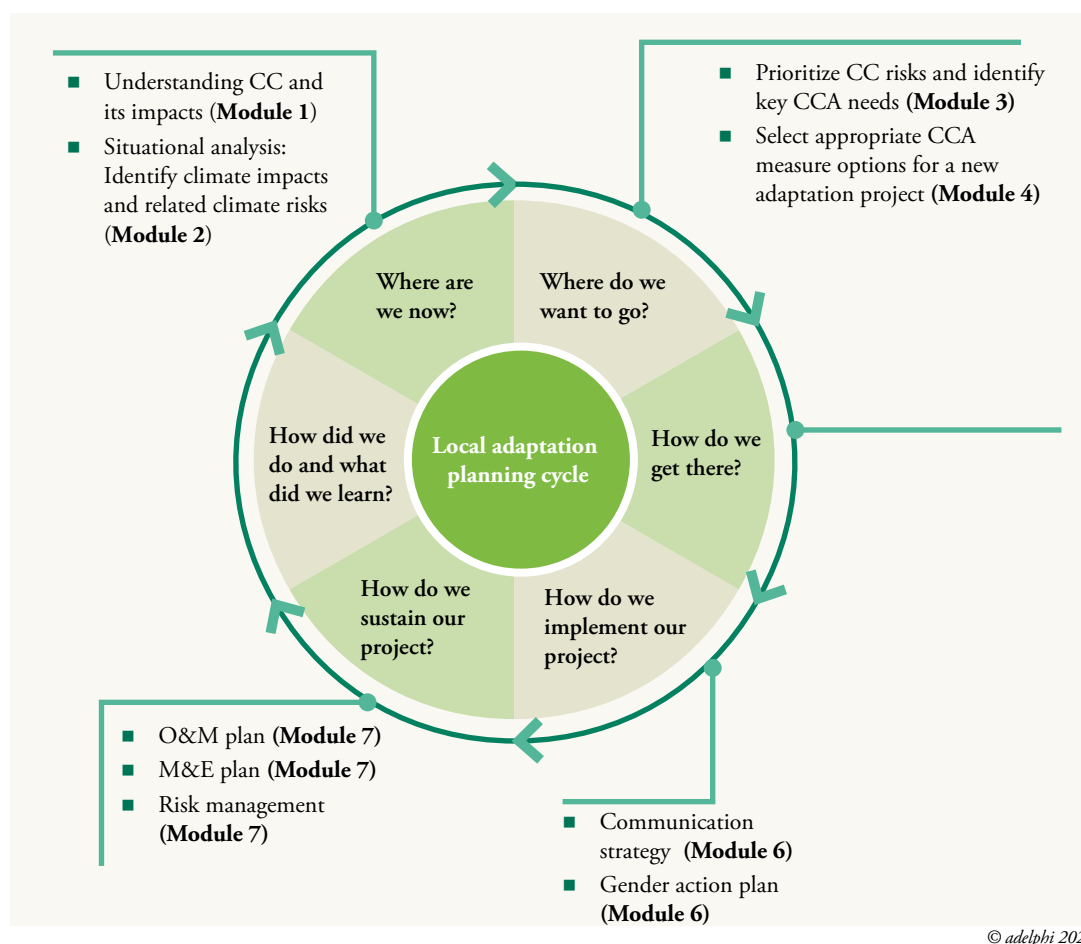
First and foremost, before starting to plan an adaptation project, participants will be provided with a **basic understanding of climate change, its causes and impacts** on their sectors and livelihoods.

Module 2. Climate change impacts and related risks

Having taken an overarching perspective on climate change phenomena, Module 2 looks at the **impacts of climate change on the lives and livelihoods of women farmers**. The participants will be sensitised to their **significant contribution to agriculture and income in UP**, as well as to their own **vulnerability to the impacts of climate change**. The module concludes with the **identification and assessment of relevant climate impacts and related risks to the participants**.



Figure 1. Arrangement of the CDP's modules along a local adaptation planning cycle



Module 3. Adaptation needs

Once climate risks have been identified, participants **identify their related adaptation needs** to address prioritised risks. These needs provide a first rough idea for an adaptation approach. Participants are informed about the results of a recent needs assessment of the target group in UP and receive an overview of relevant adaptation approaches on farm, ecosystem and extension level.

Module 4. Adaptation measures

Participants will learn about **adaptation measures and best practices** at three levels: farming system resilience, ecosystem services, resilient extension, before they **identify, assess and select the most appropriate adaptation measures** for their own most pressing needs.

Module 5. Designing adaptation projects

Participants design their own interventions at farm, ecosystem and extension levels while making optimal use of synergies between different measures. The **project design** involves: (1) the definition of specific objectives and project outputs, (2) the development of an action plan with timeline, resources and roles, (3) a stakeholder analysis and (4) final feasibility check. After having developed a basic project design, participants will **link their adaptation actions to relevant support schemes** and institutions and learn how to **apply for them**.

Module 6. Implementing adaptation projects

Module 6 provides participants with key concepts for implementing adaptation projects. Developing an internal and external **communication strategy** enables participants to gather ideas and create ownership in their communities for their adaptation efforts, demonstrate their adaptation efforts to government agencies, and neighbouring communities, and network with others on the topic of CCA.

Module 7. Operating and sustaining adaptation project

Participants will learn key concepts for increasing the sustainability of their adaptation projects. This includes the development of an **operation and maintenance plan**, a **monitoring and evaluation plan**, and **risk management**.

0.3 Materials provided with the CDP and their preparation

This training manual is part of a larger capacity development package for CCA planning that additionally includes presentation slides, participant's handouts and a course planner:

Trainer's manual: The trainer's manual helps the trainer plan and conduct the training. The introductory chapter provides helpful information on the motivation for the trainings and the identified local needs, how the training help drive local adaptation planning processes, how to adapt the training content to the specific target audience including suggestions for designing different training lengths, and what documents are included in the overall CDP. In addition, guidance on the accessibility and use of local past and future climate data is provided. Chapter 1 includes didactic principles for the trainer, including how to open the training, help participants focus, consolidate input learned and collect feedback, and evaluate the training. The heart of the Trainer's Manual is Chapter 2, which guides the trainer through the implementation of each training module designed for the target audience. It provides a step-by-step introduction for each training session, including an overview of the different steps, the methodology used, the objectives, the purpose, and details on how to use the tools. In addition, detailed instructions are provided on how to present the tool/ examples using cards, sticky notes, or flip chart paper. The trainer's manual should be studied by the trainer prior to conducting the training.

Presentation slides for each session: including a first slide for each tool with a step-by-step introduction and an overview of the different steps taken as well as objectives, purpose and one application example. In addition, for each session a concluding slide provides the participants with key take-away and follow-up questions if appropriate. An additional slide for each module (PowerPoint presentation: "Adaptation Planning Cycle") shows what stage the participants are at in the adaptation planning cycle, which steps are completed and which topics they can expect in upcoming sessions.

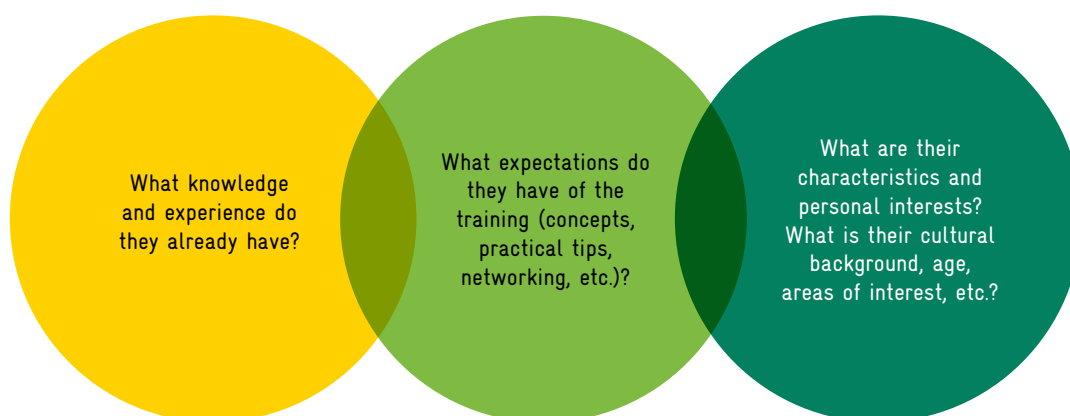
Handouts for each session: For each session, participants receive handouts with background reading, illustrative examples and worksheets. The worksheets summarise the tasks of the exercises and provide a framework for group work. The handouts are designed to help participants follow the training sessions and collect their results from the exercises. This way they can easily remember their results and assumptions and reuse them at a later stage both during the training and after the training. The handouts are prepared in a way that they can be used by the participants to replicate the exercise for new contexts.

Course planner: A course planner supports the trainer in planning the whole training by providing an overview of the available sessions with their objectives, duration, suggested methods, materials needed and suggestions for session constellations for different training durations.

Excel tool: The ExcelTool helps the trainer to collect key results during capacity development. This clear compilation of the results will make it easier for the participants to prepare, apply for, implement and monitor CCA projects in a structured way after the course. Following the structure of the CDP's modules, the tabs of the ExcelTool provide the possibility to collect results of the following key topics: Climate change impacts and risks (tab 1), CCA needs (tab 2), CCA measures (tab 3), project design (tab 4), scheme matching (tab 5), Gender Action Plan (GAP, tab 6), communication (tab 7), operation and maintenance (tab 8), M&E and risk management (tab 9).

0.4 Adapting the training materials and programme to the target group

A key success factor of any training workshop is that the training content and methods are tailored to the specific needs, interests and expectations of the participants. Before conducting a training, get to know your participants' expectations, needs and constraints. By involving them and relating to their experiences, you will be able to keep their interest and attention and enable them to transfer training content to real life situations. Important questions when adapting the training content to the specific group could be:



To support the trainer in adapting the training programme to specific participant groups, the CDP provides a **modular design**: The CDP offers several stand-alone, optional sessions that the trainer can combine according to the needs, knowledge level and time allotment of the participants. This approach allows the inclusion of participants with little understanding of climate change to those who are already familiar with the main CCA requirements. Depending on the target group, in-depth engagement with different topics starting at different levels is possible. In addition, given the range of CCA measures, new details and facts can be easily added to each training course allowing adaptation to current CC scenarios and the needs of the specific participant group.

The following list includes important hints for preparing and adapting the materials (further hints can be found in the sessions' descriptions):

- **Adjust the wording** to prior knowledge, interests and skills of your target group.
- **Adjust the workshop method** depending on the literacy of the group (identify before you start your training).
- **Choose appropriate methods**: the CDP materials proposed specific methods (discussions, transect walk, seasonal calendar, etc.) you are free to adapt these methods if you consider a

different approach more suiting for the specific participant group. A selection of different methods with short instructions on how to apply them can be found in chapter 1.

- **Choose additional interactive methods** (examples found in chapter 1) for better learning results and to make your training more interactive and less tiring, especially if the session is composed mainly by input.
- **Choose relevant, local climate data, examples and case studies** (for guidance on how and where to access current and future climate data, see chapter 0.4.1)
- **Integrate your participants expertise and experience.** Mostly it's easier to follow the workshop and learn, when there is a base in the local knowledge and experience, and the participants can talk also about their daily life.
- For trainings that take place on several days, **integrate feedback and evaluation**, in order to keep track on the understanding, learning progress and the mood of the participants. Depending on the results, always stay flexible for better adapting the training to the needs of the target group.

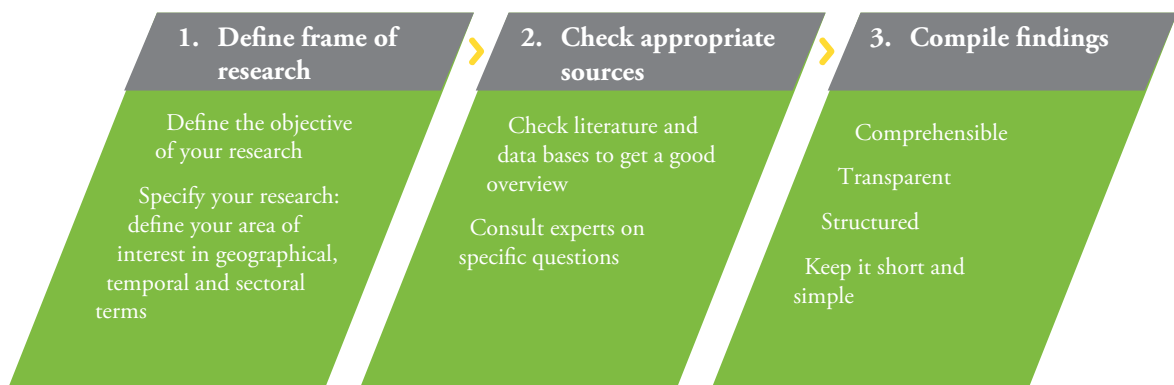
0.4.1 Using relevant, local current and future scientific data on climate variations and vulnerability

The sessions include climate data as well as examples and case studies of practical application to better understand and illustrate the theories and exercises of the sessions, which may be adapted to the context of the specific group. In particular, specific provided climate data may be up-to-date at the time of the CDP's creation (2021), but may no longer be relevant in 2-3 years. It is therefore recommended to do a short research on current climate scenarios and risks before conducting a training.

1. For what do I need scientific climate data?

- Identifying key challenges (e.g. which regions/sectors are vulnerable to climate change)
- Selecting strategies (e.g. how to reduce vulnerability in a region/sector/ how to achieve development objectives despite climate change?)
- Designing technical responses (e.g. define storage capacity of a new reservoir/select irrigation technology)

2. Guiding principles for data research and management



Source: adapted from GIZ 2009: Climate information for effective adaptation

3. Where to access scientific climate data?

On international level: Studying climate data on a global level helps to compare your specific situation with other regions and put it in the big picture. Knowing where people are facing similar challenges can help in finding best practices.



Exemplary websites:

- **Climate Change Knowledge Portal (CCKP) by World Bank Group:** online platform for access to comprehensive global, regional, and country data related to climate change and development. The CCKP consists of spatially and temporally referenced historical and future data. Users are able to evaluate climate-related vulnerabilities, risks, and actions for a particular location on the globe by interpreting climate and climate-related data at different levels of details. Enter the platform here: <https://climateknowledgeportal.worldbank.org/>
- **Global and Regional Adaptation Support Platform (ci:grasp) by Potsdam Institute for Climate Impact Research (PIK):** climate information service providing sound knowledge on current and projected climate stimuli, climate impacts and adaptation options at the national, sub-national and regional level
Enter the platform here: <http://www.pik-potsdam.de/cigrasp-2/index.html>
- **On local level:** it is important to study how the climate change scenario is presented for India in general and specifically for the regions of your training participants. The platforms below provide data on past and future trends of climate hazards and risks, but also proven tools for adaptation. You may use this information as case studies in your trainings to guide and inspire participants in developing their adaptation strategies.

Exemplary websites:

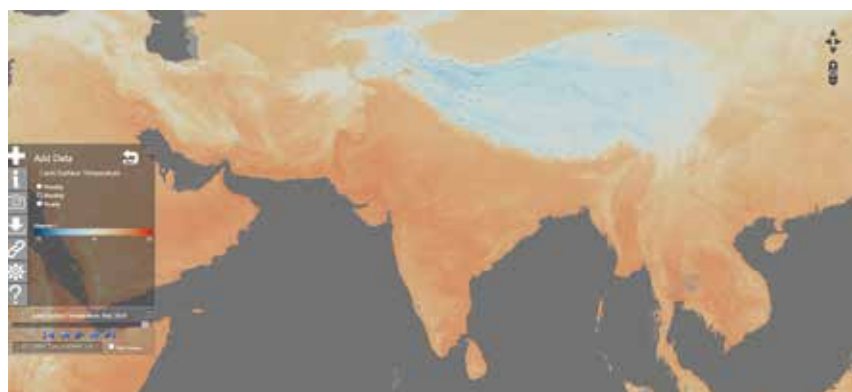
- **State action plan on climate change published by Ministry of Environment, Forest and Climate Change: for Uttar Pradesh:** http://moef.gov.in/wp-content/uploads/2017/09/SAPCC_UP_final_version_0.pdf
- **Flood Management Information System Center of Uttar Pradesh:** platform providing predicted and actual flood inundation maps, customised analysis outputs for planning new/strengthening existing flood protection works, river training works, emergency flood management etc. Enter platform here: <http://fmiscup.in>
- **Climate Change Knowledge Portal (CCKP) by World Bank Group:** Explore the CCKP historical and projected climate data, impacts, key vulnerabilities and what adaptation measures are being taken for India: <https://climateknowledgeportal.worldbank.org/country/india>
- **Indian Meteorological Department (IMD):** Historical (5 years), forecast at 7-day frequency, agro-advisories are available. Website: <https://mausam.imd.gov.in/>

4. How to present and visualize climate data to the training group?

Maps and other illustrative material help participants to easier access scientific data. There are a number of online platforms and software packages available to access or generate image maps or graphs of historical climate data or future climate projections. Some free examples are presented below:

- **NOAA View Data Exploration Tool by National Oceanic and Atmospheric Administration (NOAA):** Image map viewer with more than 60 global datasets. You can also display specific dates, animate time series, and download .png images or KMZ (Google Earth) files. Enter the platform here: <https://www.nvdl.noaa.gov/view/globaldata.html>

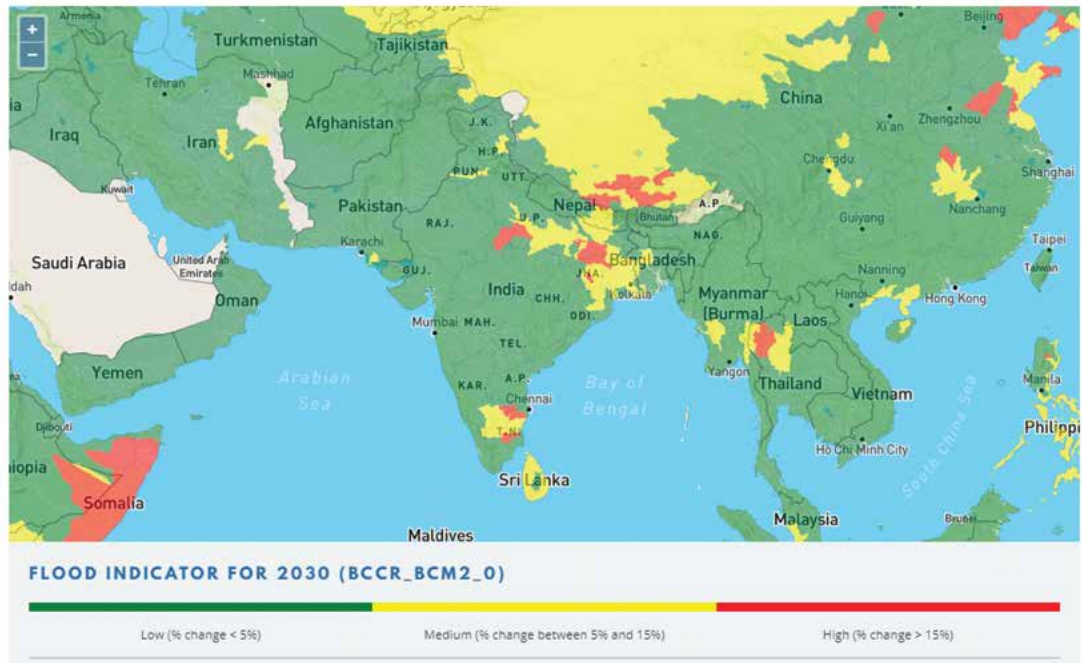
Figure 2. Monthly land surface temperature by NOAA View Data Exploration Tool



- Climate Change Knowledge Portal (CCKP) by World Bank Group: Various maps and graphs presenting past and projected climate data. Enter platform here: <https://climateknowledgeportal.worldbank.org/country/india>

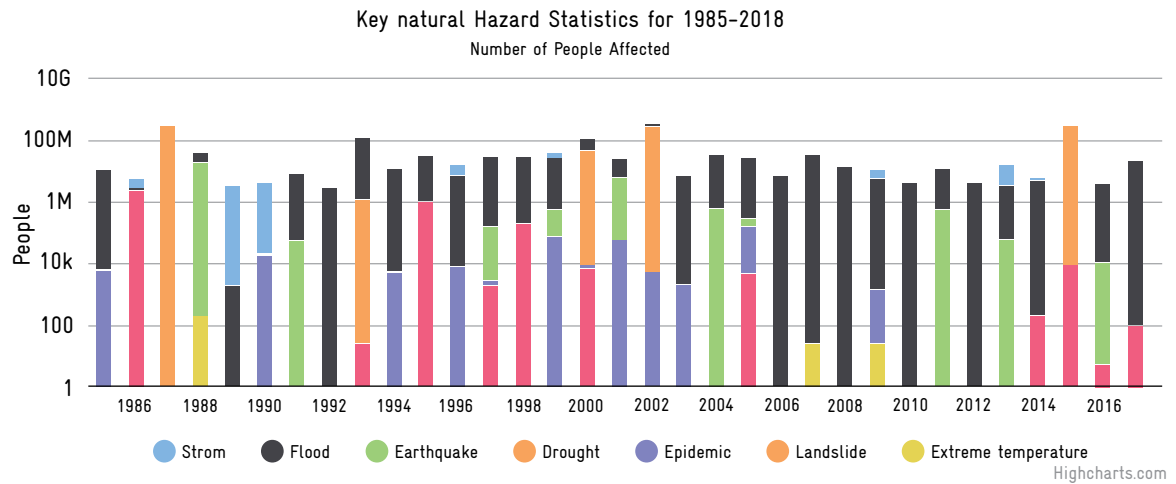
Examples are presented below:

Figure 3. Flood indicator for India (and the world) for 2030



Source: World Bank Group <https://climateknowledgeportal.worldbank.org>

Figure 4. Bar chart presenting key natural hazard statistics for India for 1985–2018



Source: World Bank Group <https://climateknowledgeportal.worldbank.org>

- <https://earth.nullschool.net/> - Visualization of current weather patterns can be accessed.
- <https://climatevulnerability.in> - visualization of historical and projected average climate data



0.5 Training course options

The following three calendars show options for training courses of varying duration and focus.

For successfully carrying out the training courses, a participant size of about no more than 20 participants is recommended.

Half-day Training

Half-Day
Introduction, purpose of training (10 min)
Session 1.2 Impacts of climate change on agriculture and farm-based livelihoods (60 min)
Session 2.1.4 Vulnerability of Women Farmers to Climate Change Impacts (15 min)
Session 3.1 Recently conducted needs assessment (20 min)
Session 4.1 Input sessions on best practices (selection: 30 min)
Session 5.2 Step 2. Understanding the objectives and components of relevant support schemes (35 min)
Wrap-up and feedback (10 min)
<i>Lunch break</i>

3-Day Training

Day 1	Day 2	Day 3
Inauguration, introduction, purpose of training, expectations	Session 3.3 Defining climate change adaptation needs (2 h)	Session 5.2 Identifying support schemes and institutions (1 h 30 min)
Session 1.1 Climate change and its causes (45 min)	Session 4.1 Input session on best practices (60 min)	Session 5.3 Applying for support schemes (1 h 30 min)
Session 1.2 Differential impact of climate change in most vulnerable agro-climatic regions of HP (60 min)		
Session 2.1.2 Small-landholding farming system and the impact of climate change (45 min)		
Session 2.1.4 Vulnerability of women farmers to climate change impacts (15 min)		
<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>
Session 2.2 Identifying impacts of climate change and related risks to the lives and livelihoods of women farmers (2 h)	Session 4.2 Identifying, assessing and prioritising adaptation measures (2 h)	EITHER:
Session 3.1 Recently conducted needs assessment (20 min)	Session 5.1 Step 2 Developing a basic project design for selected CCA measures (60 min)	Session 6.1 (Step 2) Developing a communication Strategy (2 h)
Summary of Day	Summary of Day	Session 6.2 Step 2 Gender Action Plan (45 min)
		Session 7.1 Step 1 Operation and maintenance plan (30 min)

		<p>Session 7.2 Step 1 Monitoring and evaluation plan (30 min)</p> <p>Session 7.3 Step 1 Risk management (30 min)</p> <p>OR</p> <p>Selection of 1-2 complete sessions from module 6 & 7:</p> <p>Session 6.1 Communication Strategy (45 min)</p> <p>Session 6.2 Gender Action Plan (2 h)</p> <p>Session 7.1 Operation and maintenance plan (1 h 30 min)</p> <p>Session 7.2 Monitoring and evaluation plan (1 h 30 min)</p> <p>Session 7.3 Risk management (1 h 30 min)</p>
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5-Day Training

Day 1	Day 2	Day 3	Day 4	Day 5
<p>Inauguration, introduction, purpose of training, expectations (15 min)</p> <p>Session 1.1 Climate change and its causes (45 min)</p> <p>Session 1.2 Differential impact of climate change in most vulnerable agro-climatic regions of UP (60 min)</p> <p>Session 2.1.1 Contribution of farming in income and livelihoods in UP (30 min)</p>	<p>Session 2.2 Identifying the impacts of climate change and related risks to the lives and livelihoods of women farmers (2 h)</p> <p>Session 3.2 Prioritising identified climate risks (45 min)</p>	<p>Session 4.1 Input sessions on best practices for climate adaptation (60 min)</p> <p>Session 4.2 Identifying, assessing and prioritising adaptation measures (2 h)</p>	<p>Session 5.1 Step 1-4 Designing climate change adaptation projects (3 h min)</p>	<p>Selection of 1 session of module 6:</p> <p>Session 6.1 Developing a communication strategy (2 h)</p> <p>OR</p> <p>Session 6.2 Gender action plan (2 h)</p>
<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>
<p>Session 2.1.2 Small-landholding farming system and the impact of climate change (45 min)</p> <p>Session 2.1.3 Status of women farmers in Uttar Pradesh and their significant contribution in agriculture (60 min)</p> <p>Session 2.1.4 Vulnerability of Women Farmers to Climate Change Impacts (15 min)</p> <p>Summary of Day</p>	<p>Session 3.1 Recently conducted needs assessment (20 min)</p> <p>Session 3.3 Defining climate change adaptation needs (2 h)</p>	<p>Field Summary of Day</p>	<p>Session 5.2 Identification of support schemes and institutions (1 h)</p> <p>Session 5.3 Applying for support schemes (1 h 30 min)</p>	<p>Selection of 2 session of module 7:</p> <p>Session 7.1 Operation and maintenance (O&M) plan for environmental infrastructure measures (1 h 30 min)</p> <p>OR/AND</p>

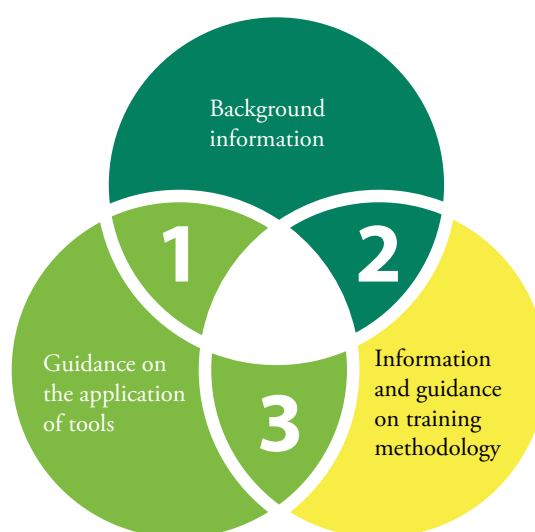


	Session 3.4 Approaches towards adaptation needs (30 min) Summary of Day		Session 5.1 Step 5 Feasibility assessment: Finetune the action plan (30 min) Summary of Day	Session 7.2 Monitoring and evaluation plan (1 h 30 min) OR/AND Session 7.3 Risk management (1 h 30 min) Wrap-up and feedback
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0.6 Trainer's manual – approach and structure

The trainer's manual combines three components to enable trainers to effectively build capacities of women farmers to plan and implement CCA measures:

- **Background information** on important terms and concepts related to climate change impacts in India and mainstreaming adaptation in local planning.
- **Guidance on the application of exercises** to plan and implement adaptation projects
- **Information and guidance on training methodology**



The methodological advice to the trainer includes:

- At the outset of each module a **module overview** sums up learning objective, training duration and a “**module planner**” providing an overview of all sessions included
- Introduction to each session with information about the **learning objective, necessary prerequisites/ prior knowledge for successful participation**, overview of the different **steps, session duration, methods** employed, **materials** needed as well as their **preparation**.
- Relevant **background information** prepared for **input presentations** to help participants carry out suggested exercises, group discussions or present the knowledge material, definitions of key terms, etc.
- **Detailed guidance** on how to carry out **participatory exercises** with visualization instructions and useful hints for the trainer and **group discussions** and on how to use the worksheets that are provided to the participants with the handouts.
- Each session concludes with recommendations on **useful literature and databases** that stimulate further research, **key-take away** for participants and **debriefing questions** to collect feedback from the participants and to improve the training.

0.7 Who can use the trainer's manual?

The CDP aims primarily to address trainers who will engage with local community based organisations/communities. In UP, the following introduced training institutes will play a main role in using the CDP:

The **State Institute of Rural Development (SIRD) and their trainers related to PRIs and SRLM.** SIRD is an apex institute of the State Government of U.P, dedicated to the activities of training, research and consultancy for enhancing the effectiveness of the implementation of various rural development programmes. SIRD organizes a range of training programmes on different thematic areas concerning rural development such as agriculture-based livelihood promotion, integrated watershed management, disaster management, and so on. The Institute also organizes capacity development programmes for functionaries responsible for implementation of various government schemes and programmes such as MGNREGA, Indira Awas Yojana, SRLM, Sansad Adarsh Gram Yojana, etc.

State Panchayati Raj Institute of Training (PRIT) for training of PRI members.

Block, District and the State government officials of identified departments, namely, agriculture, horticulture, animal husbandry, water resources, rural development, and disaster management, especially dealing with the relevant identified schemes. An overview of these schemes able to integrate and use the CDP is provided in Table 1.

Table 1. Support schemes offered by departments that are suited to integrate and use the CDP

Department suitable to use and multiply CDP	Existing programme in which the CDP could be integrated	Target group trained	Thematic focus/ identified needs addressed
Agriculture, Horticulture and Animal Husbandry Department	Mission on Agricultural Extension & Technology (NMAET) – Sub-Mission on Agricultural Extension (SAME) National Mission on Oilseeds and Oil Palm (NMOOP), Kusum Scheme National Mission for Sustainable Agriculture (NMSA) Backyard Poultry Development Program under National Livestock Mission National Horticulture Mission (NHM) Integrated Pest and Nutrient Management RKVY	Women Farmers, MKSP women self-help groups	Resilient farming, Extension Services, Resilient inputs, Water management, Agro-forestry, Aromatic and medicinal plants
Panchayat Raj Department	Relevant sectors under Finance Commission Grants Pradhan Mantri Krishi Sinchayee Yojana	PRI members	Integrating resilient agriculture, water management and DRR aspects in GPDP
Rural Development (MNREGA)	MGNREGS SRLM/NRLM	MKSP women groups and PRI members	Planning and utilization of MNREGA resources for improving ecosystem services and risk informed GPDP



0.8 References

UNEP DTU Partnership, World Adaptation Science Programme (WASP) 2020: Adaptation Gap Report 2020. Retrieved 21 June 2021 from: <https://www.unep.org/resources/adaptation-gap-report-2020>

Germanwatch 2020: Global Climate Risk Index 2020. Retrieved 21 June 2021 from: <https://germanwatch.org/de/19777>



1 TRAINING DIDACTICS: GUIDING PRINCIPLES FOR TRAINERS



When designing a training, it is important to plan a good mix of input and interactive exercises and energisers. This not only helps at the beginning of a training to get to know the participants better, but also creates the necessary variety and movement during the training that helps:

- boost concentration,
- consolidate the input learnt and
- contributes to better networking among the participants

This chapter presents:

- 1.1 Energizers** – gets participants moving, having fun and ensures that the energy level of the group is high
- 1.2 Participatory training methods** – put the theoretical input into practice, or further developing the input by doing it yourself
- 1.3 Visualisation** – facilitates the communication of a message through images, diagrams or animations. The connection to the senses increases the learning potential.
- 1.4 Feedback and evaluation** – supports you as a trainer to get feedback from the participants: What key take-away messages could the participants take from the session? Were the participants' expectations and learning objectives met? How can you improve your training?

Learning level
It is already well known that adults have a bigger capacity to learn and absorb what is transmitted if it is not just heard, but also seen, discussed and practiced. Have the right table in mind, when you realise your session.

Only read	10%
Only hear	20%
Only see	30%
See and hear	40%
Discuss	50%
Experience (see, hear and implement)	70%
Teach	90%

Source: United nations 2001

Inform learners of the learning objectives

Setting clear goals is the key to successful training. It is necessary that participants keep on track throughout the training session. Remind them regularly of the learning objective (described at the beginning of each session).

1.1 Energizers

Why to use energizers?

Icebreakers and workshop introduction

- Break the ice and give participants the opportunity to get to know each other
- Create a pleasant working atmosphere
- Uncover the participants' level of knowledge and their expectations

During the training

- Wakes up the group when they seem tired and unfocused
- Helps with concentration
- Lets people connect and thereby qualifies the group work

Introduce your neighbour – Opening a workshop

Material needed: cards or flipchart with questions and additional cards for the participants to write something down

Steps:

- Ask the group to pair up with one of your immediate neighbours.
- Each person has 3 minutes to introduce themselves before talking about: name, age, background, where are you from, reason for participating in the training.
- Then each pair has 1 minute to introduce each other to the group

Hints:

- Write down the questions on flipchart or cards pinned to a wall. This helps the participants to remember what to talk about
- Depending on what you want to find out, adapt the questions.
- You can have participants write key information on cards, pin them on the wall and leave them there during the training/workshop

Benefits

- Participants get into direct contact
- Active listening necessary because they have to reproduce the knowledge
- This is a good exercise when you work with the topic of communication

Limitations

- Time consuming
- Participants might get distracted during the presentation round.
- Unsuitable for a group size of more than 10

Throw a ball – Opening a workshop

Material needed: 1 Ball, cards or flipchart with questions

Steps:

- Form a standing circle
- Explain that the person receiving the ball will introduce themselves and tell the group: Name, what they expect from the training and what they know about CCA interventions.



-
- Then throw the ball to the next person until everyone has been introduced.

Hints:

-
- Write the questions on a flipchart or cards pinned to a wall. This helps the participants to remember what to talk about.
-
- Depending on what you want to know and how much time you have, adjust the questions
-
- If there are people who cannot stand, you can also do the method sitting down
-

Benefits

- Participants get in touch with the whole group
- Physical movement and quick interaction
- Suitable for indoors and outdoors
- It is fast.

Limitations

- Not very profound
- People could have difficulties catching the ball.



Bingo

Material needed: Prepared Bingo-cards for each participant.

Has five or more children	Knows to sing the national anthem	Enjoys snowfalls in the hills and meadows
Likes Cherries	Has already worked in an CCA project	Believes in horoscope
Knows to stand on two hands	Has a vegetable garden at home	Had to walk for more than an hour to get here
Has a rainwater harvesting system	.....	.....

Steps:

- Distribute the prepared bingo sheets to each participant.
- Ask the participants to talk to other participants to see if he/she can answer “yes” to items in the boxes on the sheet.
- If “yes”, the other participant has to write his/her name in the corresponding box.
- Have all the participants do the same thing at the same time. The participant who gets signatures in all the boxes first has to announce the names who have to prove their “competences” and is declared the winner.

Hints:

- Design a sheet with local information
- It is better to include aspects where people need to ask and talk to each other

Benefits

- Vast not just technical information of the participants is provided
- Very interactive
- Good to cheer up the mood

Limitations

- Time consuming
- No useful for levelling expectations

Blind mathematic

Material needed: a long rope forming circles, scarf to unfold the eyes

Steps:

- The group forms a circle and blindfolds with the scarf.
- Give each person the rope in their hand.
- Now ask them to form a square.
- Then reflect with the group: what was easy, what was difficult, what helped, what made the situation more difficult?

Hints

- If the group is large, form two or three groups.
- For more difficulty, have the participants do the exercise without speaking.
- Use the exercise to assess roles within the group. In general, it is easier if the group listens to each other, or if there is a leader who gives instructions and the others follow. It is also possible to reflect on gender roles and dominance.
- Try to compare the course of the exercises with CCA projects.

Benefits

- Helps the groups trust.
- Active listening will be trained.
- Training of group cooperation and observation.
- Cheers up the mood and helps with concentration.
- Trains the tactile skills of the group (listen, feel, smell).



1.2 Participatory training methods

Participatory training methods are an educational strategy in which learners are active participants in the training, and their needs and questions, their reflection and analysis, and their strategies for change carry the process forward.

Role play

Objective: A role play is a structured activity, usually in the form of a dramatic performance, that re-enacts a real-life situation. Role play can be used to analyse a problem and identify its causes and solutions. It is also useful for making comparisons between ideal and real-life conditions.

Material needed: The “script” or scenario should be prepared with a clear focus on the selected topic or theme.

Steps:

Before the role-play:

- Select the topic or theme and identify the key points to be depicted.
- Prepare the play scenario and develop the roles to be played in light of the key points.

During the role-play:

- Explain the role play and the play scenario and its purpose.
- Distribute the different roles among the group. There can also be observers.
- Ask performers to prepare for the performance.

After the role-play

- Ask performers and observers to express what they learned from the performance (ask questions based on the theme of the performance and encourage discussion)
- Summarize the findings of the discussion.

Hints:

- You can note central information on cards or flipcharts around the room.
- Ask the participants to dive into their role, maybe even using some accessories.
- Help the performers to act out their parts if needed.
- There are different forms of role play: silent role play, statue theatre, theatre of the oppressed etc. – do some further research, if you like role plays.

Benefits

- increase self-perception and enhance the ability to identify real-life problems.
- enhances learning because the participants dive in the topic and transform knowledge in practise

Limitations

- Time consuming (for both preparation and realization)
- Self-conscious or quiet participants may not want to take part in the role play.
- The impact of the role play upon the participants depends on the capacity of the performers.
- To reduce preparation time and avoid observer boredom, a role play exercise should not be too long.

Scales

Objective: Identify the opinion or knowledge of the group.

Material needed: A line on the floor, cards marking positive and negative position

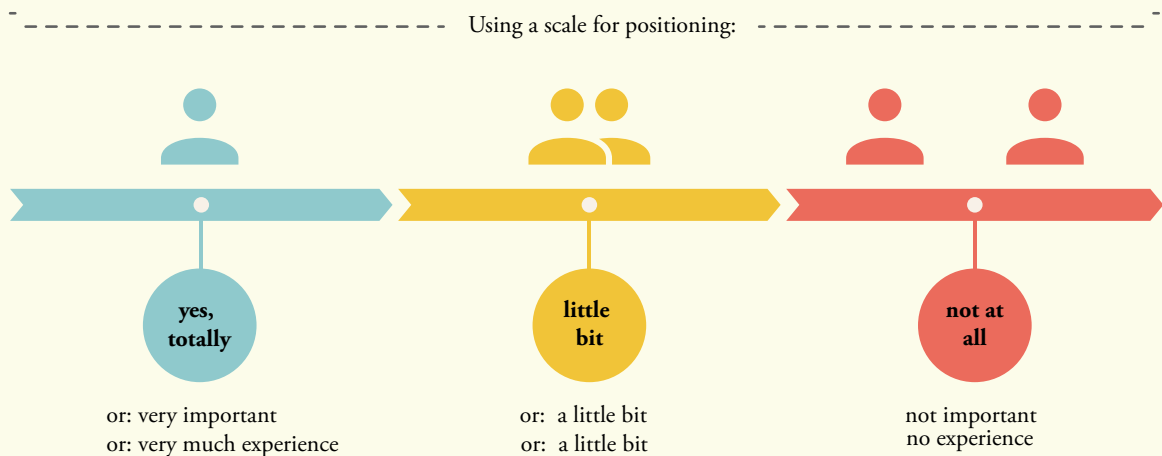
Steps:

- Draw or stick a line on the floor and mark one side with the agreeing phrase, the other line with the disagreeing phrase.
- Then the trainer asks a question and the group should position themselves to record each person's opinion/knowledge.
- Then the trainer asks some of the participants why they are positioning themselves where they are.

Examples:

- *"What topic under the training programme interests you the most? (you may offer different spots in the room as the 5 thematic modules)"*
- *"What role does climate change adaptation measures play in your life?" (Can be a scale from "no role" to a "very important role")*
- *"Do you have previous experience with project development? (a scale from "no experience" to "very much experience")"*

Using a scale for positioning:



Hints:

- If the trainer observes that there are strong (opposite) opinions, can be engaged in a more profound discussion

Benefits

- Get an overview if the opinion/knowledge of the whole group.
- The method is interactive.
- Discussion possible: can motivate the group to involve in profound discussion.
- Not time consuming

Limitations

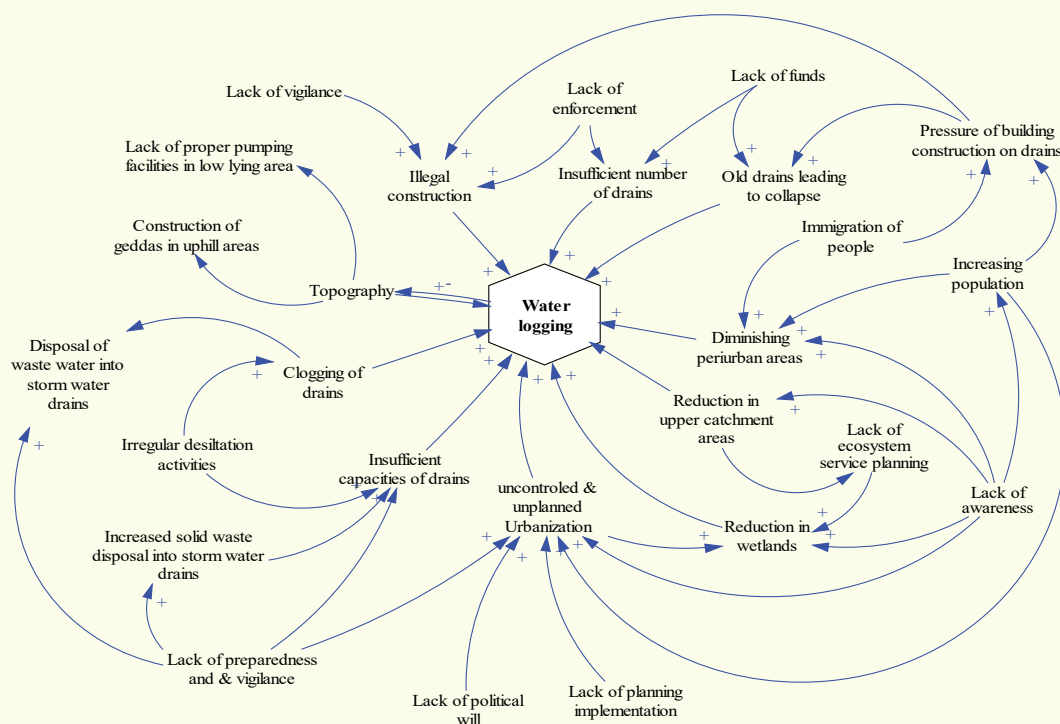
- People sometimes follow the opinion of the group, because they don't want to be exposed.

Causal Loop Diagram

Objective:

- To visualize how different variables in a system are interrelated.
- Participants themselves identify the various reasons of a problem, which are directly or indirectly linked to the problem and its intensity.

Materials needed: Flipchart, pen



Steps:

- Define a topic/problem for which a causal loop diagram shall be developed. E.g. let the participants identify the most significant changes observed during last 10-15 years (e.g. migration, change in cropping pattern, change in water situation) and write it in the center of the flipchart.
- Ask the participants to identify primary reasons/causes of the defined problem. Write them on cards and pin them on the flipchart, then draw an arrow with a “+” in the direction of the problem as done in the Figure above.
- Do the same for identified secondary causes (of primary causes, e.g. income- reduced outputs in farming, livelihood- not much work in village etc.) and tertiary causes etc. creating a system of nodes and relations.
- If participants identify something which has a positive impact on the problem (reduction of climate impact causing water scarcity), draw an arrow indicated with “-“.
- Open discussion. In the context of climate change, e.g. discuss linkages of the identified causal loops to climate change. Put a different color card on all causes that are linked to climate change. Also, discuss who (vulnerable groups) is most affected by the problem and its causes.

Hints:

- This exercise can be used more openly as mind-mapping of a specific topic.
 - The diagram consists of a set of nodes and edges. Nodes represent the variables and edges are the links that represent a connection or a relation between the two variables
-

Benefits

- participants themselves identify the various direct and indirect causes of a defined problem.

Limitations

- Very complex exercise.
- Timely.

Transect walk

Objective: A transect walk is a walk through a geographical area with one or more participants and the documentation of what you see and hear. There are three standard types: Village, Resource and Cultural transect walks. Resource transects seek to document the resources available to a particular society that could be used for development purposes. Village transects deal with infrastructure and describe the living space of the community of interest. Cultural transects are most focused on human activities.

Material necessary: paper, camera

Steps:

- Define the route and goal
 - Realize the defined route/ transect walk with the participants noting everything that is observed during the walk referring to the defined objective
 - Review and analyse material with the participants
-

Hints

- If time is short, the transect walk can also be recorded beforehand.
-

Benefits

- Very participatory
- Literacy is not necessary
- Easy applicable in a village context

Limitations

- Timely
- Need to be at the place of interest.

Seasonal analyse (e.g. seasonal calendar)

Objective: Find out community perceptions on time- and season-related variations on indicators such as climate impacts, production patterns (crops), food security, etc.

Material needed:

- Drawing on the ground: soft ground, stones, sticks and other available material to produce symbols.
- Drawing on a paper: big sheet of paper, pencils, markers.

Steps:

- Preparation of the matrix: Let the participants draw a matrix with horizontal linear time-scale (e.g. month of a year) and indicators (e.g. crop patterns, rainfall patterns) along the vertical axis
- Identify the starting event with the participants.
- prepare questions in advance to guide the participants completing the calendar.
- Discuss the result with the group.

Hints

- Forming groups of different genders or ages to fill out their own calendars can gain insights into how different groups function within a community (or household).
- Several themes can be combined within a calendar, e.g. plant growth and rainfall patterns. Use one column for each theme.
- It is possible to designate symbols for the month and for the events instead of writing (e.g. when the calendar is drawn on the ground).

Benefits

- Very participatory
- Can provide important information on gender or age-based views.
- Very relevant to analyses CC impacts.
- Easy applicable in a village context

1.3 Visualization

What:

- Use images & diagram to facilitate communication & learning
 - Express ideas emerging from dialogue and reflect and share ideas
-

When:

- During training session to record what has been done- useful in subsequent days
 - Assists the people who may first be hesitant to speak
-

Why:

- enhances the learning process and ensures that information stays in the minds of participants for a longer time
 - facilitates communication and learning
-

How:

For trainers:

- Trainers draw images and diagrams
- Use a combinations of presentation tools for 1 session. Example: Diagram on a **pin board** and present the details in a **PowerPoint presentation**, and write down the main points in a **flip chart**.
- Picture, charts, and drawings are more expressive and memorable

For participants:

- Present the results in bold, big print letters that can be legible from 6-8 meters
 - Each card can only have 1 idea
 - Color code to differentiate between different aspects of the exercise
 - Follow instructions in the hand-out
-

Hints:

- People cannot simultaneously read and listen, thus limit wordy PowerPoints. Instead use: flip charts, pin boards & moderation cards.
-

1.4 Feedback and evaluation

feedback and evaluation in training is a method to get feedback from participants on whether they liked the training (e.g. in terms of methodology, content, setting, etc.) and to determine the level of learning. Feedback guides the trainer to stay “on track” and to regularly improve the training to better achieve its goal or purpose. Effective feedback is usually descriptive rather than evaluative. Feedback can come through a formal critique/method or be perceived through informal responses.

Hints:

- Ask participants for daily feedback or at the end of each session (see debriefing questions) for better adapting the training to the participants needs. Guiding questions: “*What did you like today?*”, “*What could be improved in tomorrow’s training?*”
- Trainers should avoid responding to the feedback or defending themselves. However, they are allowed to ask for clarification.

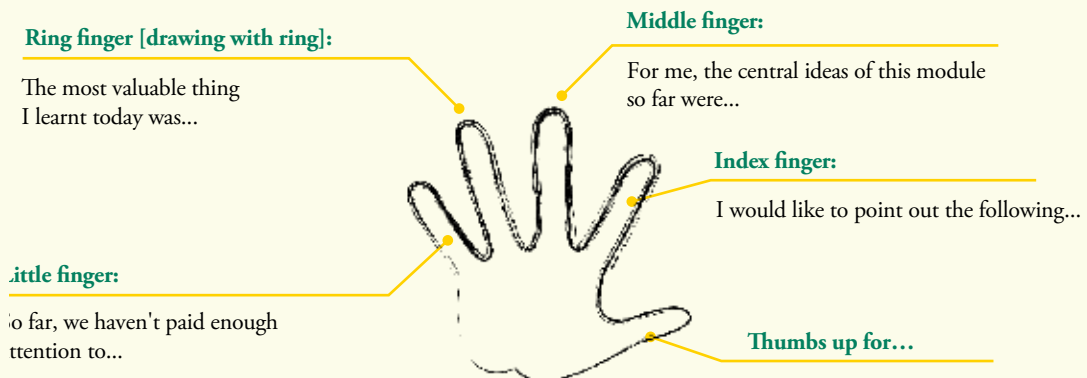
Five-fingers-feedback

Objectives:

- To receive feedback about the different aspects of your training and the perception of the state of mind of the participants

Steps:

- Two possibilities to realise this type of evaluation:
 - Individual: you give a paper to every participant and ask to draw their hand on the paper.
 - Group: Draw a big hand on a white board or the flip chart
- On each of the fingers, write the questions below. Then discuss the day’s training and write key points on the board or flip chart.



Benefits

- The individual evaluation is a good method to leave no one behind
- Group method: fast and the focus is on central points, because generally the people don't repeat a lot.
- To receive complex feedback.

Limitations

- Individual method: timely
- Group method: you lose the individuals opinion. Some person could be too shy to answer.
- Reading and writing necessary

Evaluation gallery

An effective and complex way of receiving feedback is the evaluation gallery.

Steps:

- Draw the following pictures and write the questions on a flip chart, pinning the sheets to the walls of the training room to make a sort of gallery:
 - Drawing of a light bulb: What was new to me? What important information and ideas did I get out of the training?
 - Drawing of a computer: What things that I learnt can I apply in my work?
 - Drawing of a rubbish bin: What would I like to leave behind? What was not relevant for me?
 - Name of each trainer: How did I like the trainers in this module? What did they do well? What could they have done better?
 - Did the group work well together? What was the atmosphere like?
 - What else would I like to add?
- Put pens next to each sheet and ask the participants to write their views anonymously. When everybody has finished writing, the gallery is open for viewing.
- At the end, the trainer read out some of the comments, asking for clarification where appropriate and summarizing the results.

Hints:

- Take photographs of the gallery for documentation purposes.

Benefits

- Focus on your evaluation topic.
- Good for documentation purpose.

Limitations

- Reading or writing necessary.
- Timely.

2 TRAINING COURSE FOR WOMEN SHG UNDER MKSP



Module 1. Understanding climate change and its impacts

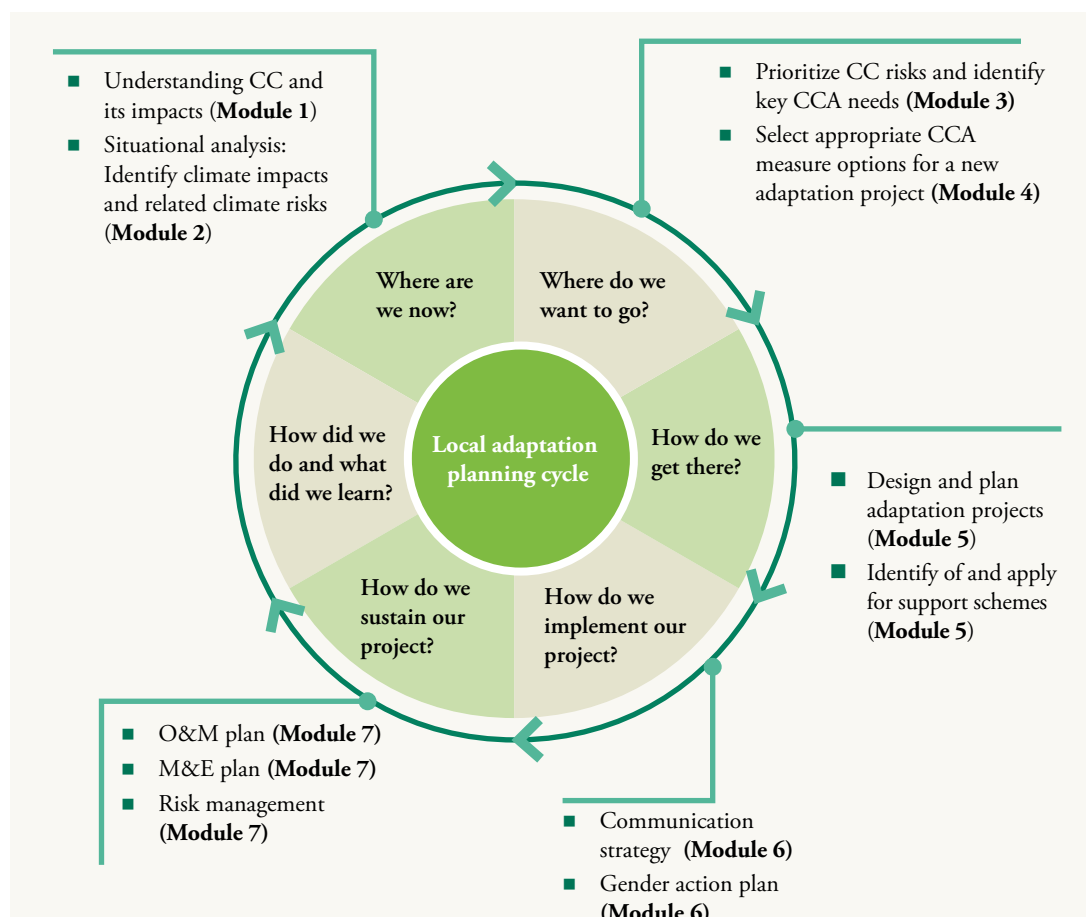
Learning objective	To understand climate change, scenarios and impacts in different agro-climatic regions of UP
Duration	Shortest version: 45 min Complete version: 1 h 45 min At the field level (including site visits): 2 h 30 min

Module planner

Duration	Sessions of module	Shortest version	Complete version
45 min	Session 1.1 Climate change and its causes	×	×
60 min	Session 1.2 Impacts of climate change on agriculture and farm-based livelihoods		×

Integration of Module 1 along the local adaptation planning cycle

The methodology used by the capacity building package follows the logical sequences of local adaptation planning. The right figure shows the arrangement of the CDP's modules, their key steps and assessment methods. The colour yellow indicates that you are in Modul 1 and Step 1 of the local adaptation planning cycle, which provides participants with an understanding of climate change and its impacts. In the Excel tool you will find a tab in the same yellow. Here you can document the results achieved by your group of participants in module 1.



Session 1.1 Climate change and its causes

Learning objective	To understand on climate change and its causes in general	
Prerequisites / prior knowledge for successful participation	Exposure and ground experience on weather and climatic changes; Hands on experience of agriculture and farming	
Steps (duration)	Step 1. Why you should know about climate change	5 min
	Step 2. Weather and climate change	5 min
	Step 3. Evidences of climate change	5 min
	Step 4. Causes of climate change	10 min
	Step 5. Climate change scenarios in the past and projections for India and UP	20 min
Total duration	45 min	
Methods/Exercises	Input presentation, discussing past and future climate variations	
Material	PowerPoint presentation 1.1, handout 1.1, Laptop, LCD projector	
Preparation of the material	You may update past global climate change scenarios and projections for UP, if they are no longer up to date (status 2021).	

Step-by-step approach

This session focuses on understanding climate change and its causes in general. Participants will learn to distinguish between weather and climate (**Step 1**) and understand what climate variability and extreme weather events are (**Step 2**), how they affect the planet and their causes, looking at natural and anthropogenic factors (**Step 3**). Finally, they analyse how past and projected global climate change scenarios affect the Earth and its livelihoods, with a regional focus on UP (**Step 4**). At the end of the session, participants discuss their learnings from the session, referring to experiences in their local contexts.

Step 1. Why you should know about climate change

Input presentation

- Present slide 3 (presentation 1.1 - Climate change and its causes) to the participants

According to IPCC's fourth assessment report, 2007 the word 'Climate change' refers to significant changes in global temperature, precipitation, wind patterns and other measures of climate that occur over several decades or longer. In the last few decades, anthropogenic causes have accelerated the rate of change in the climate significantly. Consequently, the pattern of precipitation and temperature has changed, increases the incidence of water and vector-borne diseases, deteriorated the air quality, and enhanced extreme events. Thus, in nutshell, it has not remained a global phenomenon rather it has become an everyman concern to understand how the climate is changing, what are the causes behind it and how it will make an impact on the life of people. By understanding the concept of climate will help people to prepare for the future.



Step 2. Weather and climate change

Input presentation

- Present slide 4 (presentation 1.1 - Climate change and its causes) to the participants

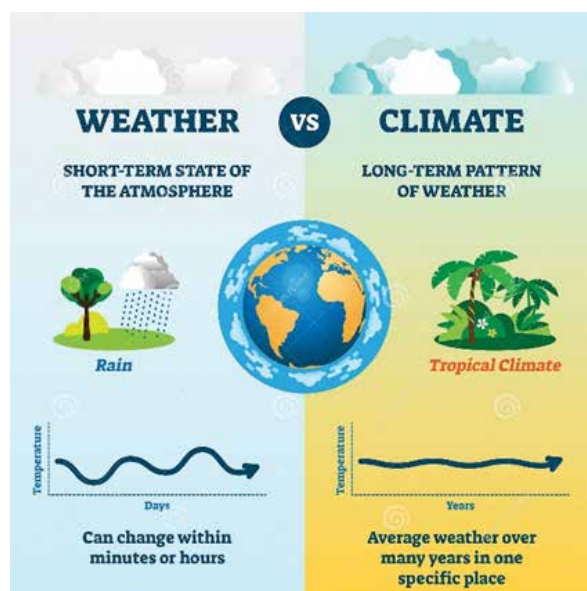
Difference between climate and weather

We hear about weather and climate all of the time. Most of us check the local weather forecast through our newspaper, TV, Radio etc. to plan our days. Some time in our usual talk we use weather and climate in the same way and confuse over the difference between the two.

Weather is an hour-to-hour, day to day condition of the atmosphere. Weather can change dramatically from day to day.

Climate represents the average weather condition of a place for a longer period of time. Scientifically, a minimum of 25 to 30 years of weather data have to be considered for reliable statistical determination of the characteristic of a climate. Climate is never static; it is subject to fluctuation. Thus, the term '**climate change**' is defined as the climatic variations in historic time over the span of a few thousand years.

Figure 5. The difference between weather and climate



Source: <https://www.dreamstime.com/weather-versus-climate-vector-illustration-educational-differences-diagram-nature-measurement-scheme-temperature-days-image162882783>

Step 3. Evidences of climate change

Input presentation

- Present slide 5 (presentation 1.1 - Climate change and its causes) to the participants

Recent climate change vs natural climate variations

The planet earth has witnessed many variations in climate since the beginning. Geological records show alteration of glacial and inter-glacial periods. The geomorphological features, especially in high altitudes and high latitudes, exhibit traces of advances and retreats of glaciers. The sediment deposits in glacial lakes also reveal the occurrence of warm and cold periods. The rings in the trees provide clues about wet and dry periods. Historical records describe the vagaries in climate. All these evidences indicate that change in climate is a natural and continuous process. Historical records of crop yield or crop failures, of floods and migration of people tell about the effects of changing climate.

However, despite natural periodic climatic changes over millions of years, since the mid-20th century humans have been exerting an unprecedented influence on the Earth's climate system, causing changes on a global scale.

IPCC 2007: "Climate change is a global phenomenon. Climate change refers to changes in the climate that are directly or indirectly attributed to human activities. This causes changes in the composition of the earth's atmosphere, which are over and above the natural variability in climate."

There is widespread consensus in the scientific community that recent climate change is caused to a large extent by greenhouse gas emissions caused by human activities. Natural factors play only a secondary, minor role (e.g. volcanic eruptions, changes in solar irradiation, or changes in the earth's rotational path). To mitigate the ongoing climate change human beings all over the world will have to drastically reduce greenhouse gas emissions.

Gradual climate change vs. extreme weather events

In addition to the gradual changes in trends (of temperatures, precipitation, humidity, sea level, etc.) over longer periods of time, the increase in extreme weather events is another face of climate change. There is a widespread understanding that these extreme weather events are influenced by higher average temperatures and are thus indirectly linked to human greenhouse gas emissions. Extreme weather events include floods and droughts, cyclones, hurricanes and tornados, heat waves, thunderstorms, hailstorms and dust storms, fog or cold waves.

Step 4. Causes of climate change

Input presentation

- Present slide 6 (presentation 1.1 - Climate change and its causes) to the participants

Figure 6. Climate change causes



Source: GEAG, 2021

Natural factors: can be grouped into astronomical and terrestrial causes. The astronomical causes are the changes in solar output associated with sunspot activities. Alike moon, Sun has also sunspots. Sunspots are dark and cooler patches on the sun which increase and decrease in a cyclical manner. According to meteorologists, when the number of sunspots increase, cooler and wetter weather and greater storminess occur. A decrease in sunspot numbers is associated with warm and drier conditions. Yet, these findings are not statistically significant. In terrestrial cause volcanism is considered as another cause for climate change. Volcanic eruption throws up lots of aerosols into the atmosphere. These aerosols remain in the atmosphere for a considerable period of time reducing the sun's radiation reaching the Earth's surface. After the volcanic eruptions, the average temperature of the earth fell to some extent for some years.

Anthropogenic factors: primary cause of climate change since the mid-20th century. The most important anthropogenic effect on the climate is the increasing trend in the concentration of greenhouse gases effect in the atmosphere which is likely to cause global warming. Due to the basic physics of heat-trapping gases and an exponential rise in population and energy consumption, humans have become a force of nature. The scientific results have shown that:

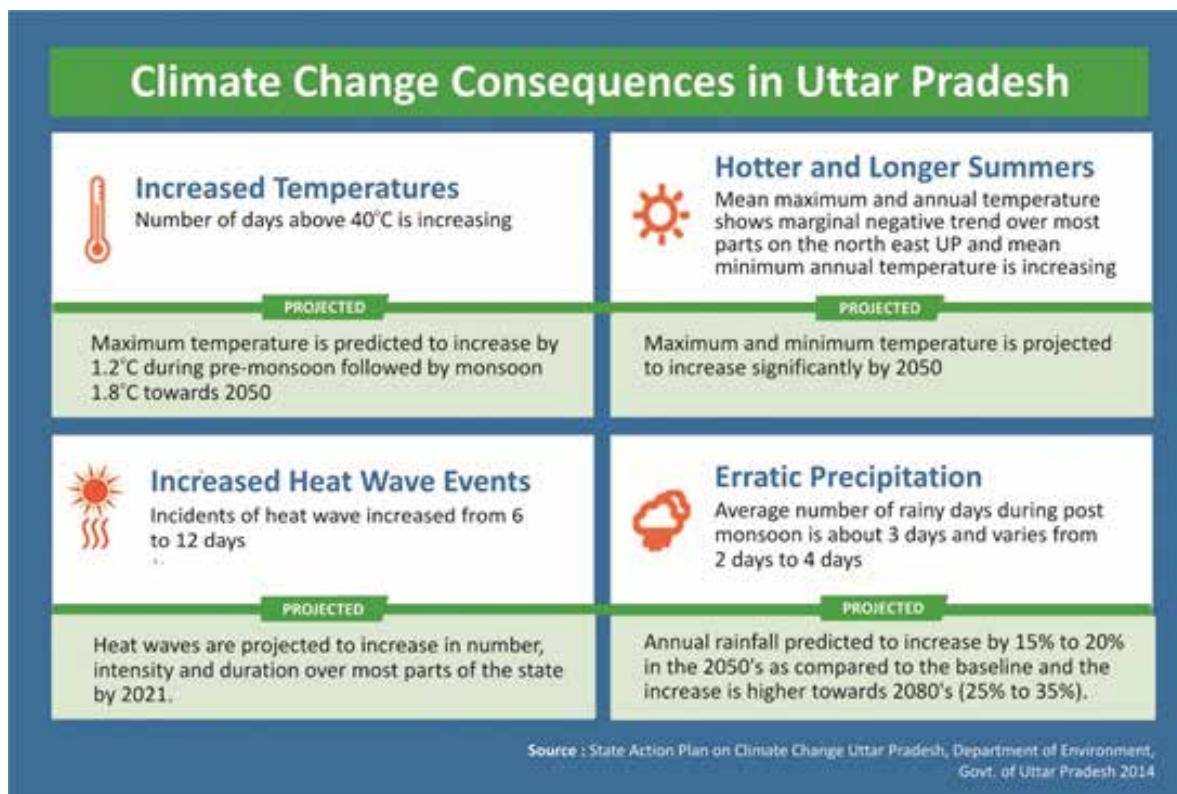
- Human activities, particularly the combustion of fossil fuels, are altering the climate system.
- Human-driven changes in land use and land cover such as deforestation, urbanization, and shifts in vegetation patterns also alter the climate, resulting in changes to the reflectivity of the Earth surface, emissions from burning forests, urban heat island effects and changes in the natural water cycle.
- Because the primary cause of recent global climate change is human, the solutions are also within the human domain.
- Because we understand the causes of climate change, that paves the way for effective solutions to be developed and deployed.

Step 5. Climate change scenarios in the past and projections for India and UP

Input presentation

- Present slide 7 (presentation 1.1 - Climate change and its causes) to the participants

Figure 7. Climate Change Consequences in Uttar Pradesh



- If time allows, you can show the video on “Global climate change scenarios in the past and projections for India”. Please find the video online available here: <https://www.youtube.com/watch?v=O5bWYMAAduU&t=95s>

Group discussion

Time: 15 min

- Encourage the participants to discuss gradual climate change and extreme weather events they observed in their regions in the past.

Guiding questions:

1. Do the different regions of the Uttar Pradesh have experienced extreme rainfall and temperature events in different seasons in recent past?
2. Does the pattern of rainfall has changed locally?
3. How much maximum and minimum temperature goes up and down during different seasons? Have you noticed any change in it?
4. What further climate change variations did you observe in your region over the last 10 years and what impact have these climate changes had on your livelihood, resources and life?

Useful literature

- National Ocean Service: What is the difference between weather and climate? Available at: https://oceanservice.noaa.gov/facts/weather_climate.html
- Lester Barber: What is the Difference Between Weather and Climate? ppt available at: <https://slideplayer.com/slide/10161379/>
- National Council of Educational Research and Training (2020-21): Fundamentals of physical geography. Chapter 12: World climate and climate change. Book available at: <https://ncert.nic.in/textbook.php?kegy2=12-16>
- Rural Agricultural Development Authority (RADA) of Jamaica: Adapting to climate change: a training manual for farmer. Available at: <https://rada.gov.jm/sites/default/files/documents/Adapting-to-Climate-Change-Farmer-Instruction-Manual.pdf>
- Intergovernmental Panel on Climate Change: Climate Change 2007, Synthesis report Available at https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf

Key take-aways

At the end of this session, participants will be able to understand:

- Difference between climate and weather
- Various causes of climate change
- Past and future local climate change relevant for UP

Debriefing questions

- What is the difference between weather and climate change?
- Ask participants to share their own experience of witnessing climate change in their lives.



Session 1.2 Impacts of climate change on agriculture and farm-based livelihoods

Learning objective	To understand the impacts of climate change on agriculture and farm-based livelihoods	
Prerequisites / prior knowledge for successful participation	Knowledge on agricultural systems and processes	
Steps (duration)	Step 1. Direct and indirect impacts of climate change on agriculture and forest	20 min
	Step 2. Vulnerabilities to CC of agriculture-based livelihood UP	20 min
	Step 3. Participants experiences of felt climate change impacts in their lives and livelihoods	20 min
Total duration	60 min	
Methods/Exercises	Input presentation, discussing climate impacts on the lives and livelihoods and the vulnerability of the participants	
Material	PowerPoint presentation 1.2, handout 1.2, Laptop, LCD Projector	
Preparation of the material	You may update the given facts and figures on climate change and vulnerability, should they no longer be up-to-date (status 2021)	

Step-by-step approach

After gaining a general understanding of climate change and its impacts in the previous session, session 1.2 provides participants with a more specific understanding of the impacts of climate change on agriculture and farmers' livelihoods and vulnerability. The session follows a strong regional focus of the participants so that they are able to identify further adaptation needs and actions. Step 1 presents the direct and indirect impacts of climate change and disasters on agriculture, peasant livelihoods and forests, showing the clear links between losses and wider impacts for local people. Step 2 discusses vulnerability to climate change impacts, presenting UP's vulnerability index. In Step 3, participants share their experiences and set the new learning in relation to their own villages and lives.

Step 1. Direct and indirect impacts of climate change on agriculture and forest

Input presentation

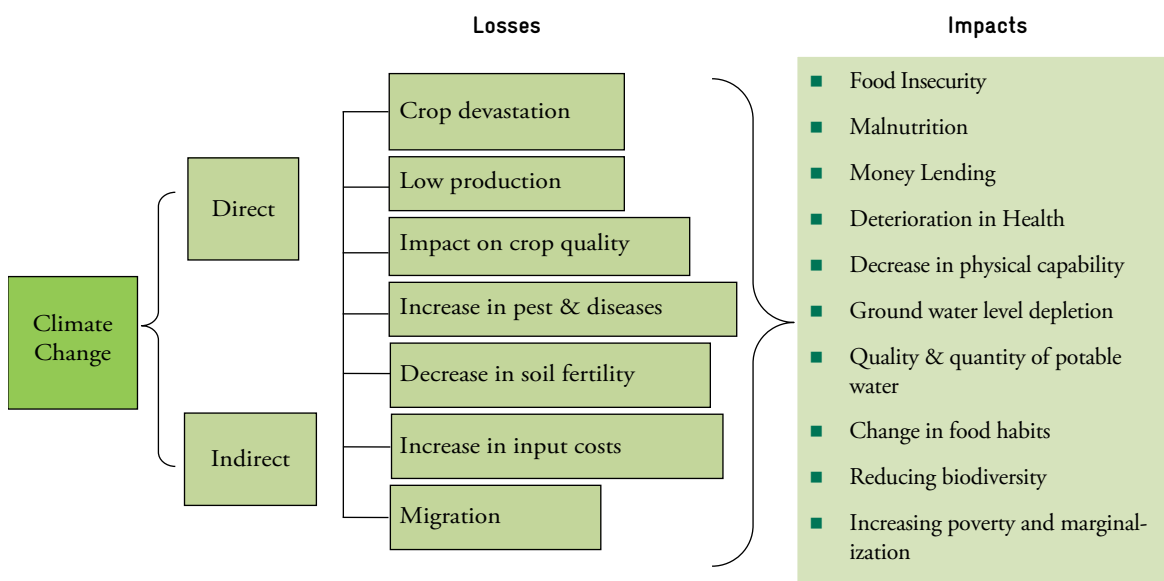
- Present slides 3-4 (presentation 1.2: Impacts of climate change on Agriculture and Farm based Livelihood) to the participants

Increasing global temperature is the greatest challenge of the 21st century. Its impact is being felt all around the world with extreme weather events becoming more frequent and also more severe. Heat waves and drought plague many countries, destroying agriculture, increasing risk of wildfires and endangering lives. Rising sea level threatens coastal communities and infrastructure by amplifying flooding and storm surges.

Agriculture is one of the most important primary activities across the globe. It is the most basic economic activity which provides food grains, fruits, vegetables, nuts, other nutrients, natural fibre for clothing, fodder for livestock which provide milk, meat and various other ingredients, materials for the construction of houses, bio-fuel & medicinal products, and industrial raw material used to sustain and enhance human life. It is the most important sector for providing livelihood and employment opportunities to humans. Hence, it is also the most important sector for social transformation and socio-economic development of the society.

Our food crops need specific conditions to thrive, which include the right temperature, humidity and sufficient water. Climate variability/change will affect agriculture and food supply in many ways. We are already observing more frequent floods (and waterlogging), droughts, storms causing challenges like scarcity of irrigation water, inundation and damages to standing crops, deteriorated quality of produced grains, increased pest attacks etc. Agriculture based livelihood comprises of horticulture, livestock rearing, agro-forestry which are also affected due to climate change and related disasters. Livestock also would be affected by an increase in temperature. It will affect their reproductive capability and also production of milk, meat and wool, as fodder availability will decrease, due to diminishing pasture lands and deforestation.

Figure 8. Impact of CC on agriculture



Source: Resource book on climate literacy, 2016

Food security is both, directly and indirectly, linked with climate change. Any alteration in climatic parameters such as temperature, rainfall and humidity, which govern crop growth, will have a direct impact on the crop yield, the quality of fruits, vegetables, tea, coffee, aromatic and medicinal plants, and basmati rice. The precipitation in India is brought mostly by southwest monsoon-which is critical for the availability of drinking water and irrigation for agriculture. The catastrophic events such as floods & droughts, which are projected to multiply as a consequence of climate change, leading to huge crop losses and leaving large patches of arable land unfit for cultivation, thereby threatening food security.

At the farmer’s level, especially for the majority of small-marginal and women farmers, agriculture is a group of activities including horticulture, poultry, livestock, fisheries and so on which constitutes the farm systems. Climate change affects these sub-systems collectively for which adjustments amongst these elements are also made at the farmer level. Agriculture, therefore, is considered as comprising of allied activities like horticulture, agro-forestry, livestock and poultry etc.

Long term impact of Climate Change on agriculture

Studies by Indian Agricultural Research Institute (IARI) projects the significant loss in the Rabi crop yield due to Climate Change. For each 1°C increase in temperature there will be reduction in wheat production by 4-5 Million tonnes. Pathogens and insect populations are strongly dependent upon temperature and humidity, and changes in these parameters may change their population dynamics. Other impacts on agricultural and related sectors include lower yields from dairy cattle and decline in fish breeding, migration, and harvests. Global reports indicate a loss of 10-40% in crop production by 2100.



Rice and wheat yields could decline considerably with climatic changes and the vulnerability of agricultural production to climate change depends not only on the physiological response of the affected plant, but also on the ability of the affected socio-economic systems of production to cope with changes in yield, as well as with changes in the frequency of droughts or floods. The adaptability of farmers in India is severely restricted by the heavy reliance on natural factors and the lack of complementary inputs and institutional support systems. The loss in net revenue at the farm level is estimated to range between 9% and 25% for a temperature rise of 2 °C to 3.5 °C. Scientists also estimated that a 2°C rise in mean temperature and a 7% increase in mean precipitation would reduce net revenues by 12.3% for the country as a whole.

Short term impact of Climate Change on agriculture (By citing context of UP)

The eastern portion of state Uttar Pradesh is largely dependent on agriculture. The area receives an average of 1200-1400 mm of rainfall per year, with adequate availability of groundwater. Land holdings are quite fragmented with more than 80 percent of farmers having less than one hectare of land. Therefore, the main effect of floods and now climate change is on agriculture, and agriculture-based livelihoods.

Although the geography of the eastern Uttar Pradesh makes the area sensitive to floods & changing rainfall patterns. While there have been short level immediate changes in ecosystem due to misuse of resources by humans, like deforestation, air pollution and land degradation due to inorganic farming, resulting in altering of agro-climatic situations. Significant events as a result of climate change like untimely and incessant rainfall etc. leads to flooding in areas lying adjacent to rivers- majorly farm fields, increased duration and area of water-logging in the farm field etc. There has also been a significant change in the monsoon period. In 2019 in Gorakhpur district of Uttar Pradesh, there was heavy rains in July causing sudden flooding in various farm field whereas in monsoon of 2020, rainfall was moreover similar to that of historical timeline. This incessant rainfall in a shorter duration is an event about which the farmers are least prepared and have very little time to respond. Consequently, this results in considerable loss in crop yield and farm land.

Reference- N.C.M.A.E. (n.d.-b). *Climate change and its Impact on Agriculture. National Centre for Management of Agricultural Extension. Retrieved June 11, 2021, from <https://www.manage.gov.in/studymaterial/CCA-E.pdf>*

Impact of CC on forest:

Forests provide many benefits and services to society, which includes a variety of forest products like timber, fodder, herbs, clean water & air, recreation, wildlife habitat and carbon storage. Climate influences the structure and function of forest ecosystems and plays an essential role in forest health. A changing climate may worsen many threats to forests, such as pest outbreaks, fires, human development and drought. Thus, the people who are dependent on forests for their farming inputs, grazing and also the minor produce get adversely affected.

Step 2. Vulnerabilities to CC of agriculture-based livelihood UP

Input presentation

- Present slide 5 (presentation 1.2: Impacts of climate change on Agriculture and Farm based Livelihood) to the participants

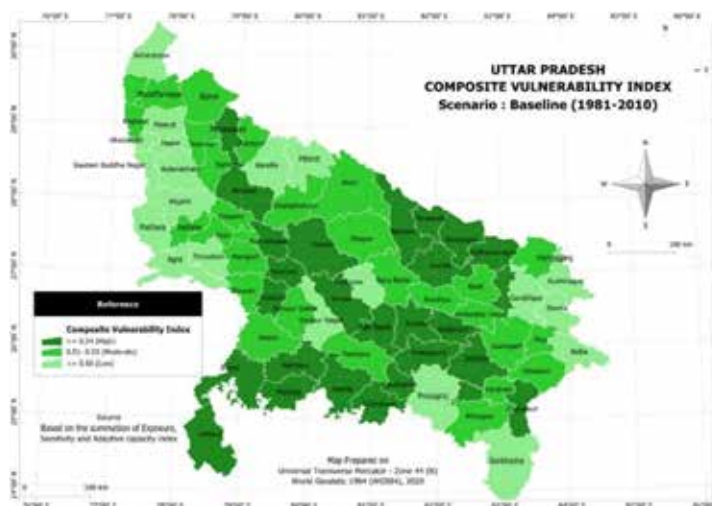
Increasing vulnerabilities due to climate change are multi-dimensional and interlinked. It is varying across location, sectors, communities, households and individuals (gender). The state of Uttar Pradesh is not left untouched by this emerging problem. Over the past decades, Uttar Pradesh has witnessed recurrent hydro-meteorological hazards like floods, droughts, heat waves, cold waves, extreme rainfall that have not only affected the people but also the development indices of the state. Especially in the north-eastern plain region, the climate change impacts are accelerating, impacting agriculture and allied activities in several ways. There are dry spells for 10 to 20 days during the monsoon, smaller rivers are causing floods and there are hot winds during winter. Erratic rainfall events are resulting in increased waterlogging. Besides, in Bundelkhand region, the constant decrease in the amount of average rainfall is leading to droughts every year resulting in crop and livelihood losses. Climate change impacts on agriculture are increasing the vulnerability of those dependent on natural resources for their livelihoods, especially the small and marginal farmers and woman farmers. The degradation of natural resources as a result of climate change has a more drastic impact on women's livelihood, since they are more dependent on the 'natural capital' to make a living. However, they have very limited control and decision-making powers over these resources because of socio-cultural norms and lack of land ownership. Moreover, their participation in developing plans and programmes and capacity building mechanisms are quite restricted compared to men.

Uttar Pradesh is one of the most vulnerable state in India in terms of climate change impacts. As per the scoping assessment report of 2020 conducted under the aegis of Directorate of Environment, Govt of Uttar Pradesh different categories of vulnerability were determined to all the 75 districts of the state to the climate induced risks. About 27 districts are categorized as highly vulnerable to climate risk; 28 districts as moderately vulnerable; and, 20 districts less vulnerable. (See Fig)

This categorization of districts was made on the basis of analysis of past observation data of climate exposure (30 years) and future scenario of climatic components of precipitation and temperature (2050), current level sensitivity and adaptive capacity of the respective districts.

In last 30 years, the trend of SW monsoon season and the annual rainfall in the state have shown a significant decreasing trends, but the rate of decrease of rainfall in western U.P. was faster as compared to other parts of U.P. The number of rainy days in different parts of U.P. ranged from 40 days in Bundelkhand region to 48 days in eastern U.P. during south-west monsoon period. This pattern has also gone changed and number of rainy days in monsoon season has decreased. All these phenomena have significantly impacted the weather based livelihood system of the state.

Figure 9. Regions of Uttar Pradesh vulnerable towards climate change



Scoping Assessment of Uttar Pradesh, 2020.

As per the scoping assessment report 2020, currently the Bundelkhand region and North eastern plain are most vulnerable regions of the state in term of climate induced risks. About 85.41 % area of total Bundelkhand region are above the state average CVI (0.53). In north eastern plain, the percentage value of vulnerable area above the state average is about 67.68 %.

Current vulnerability

At the district level, the Chitrakoot district of Bundelkhand region is the most vulnerable district in the state. Its composite vulnerability index (CVI) is 0.60. The district Bahraich, Shravasti and Sidharthnagar of north eastern plain region collectively ranked the second most vulnerable areas in the state having CVI 0.59. The reasons behind higher vulnerability score of these districts are due to its higher sensitivity index and lower adaptive capacity to respond to climate change impacts. The district Muzaffarnagar, Shamli, Baghpat of western plain region, Sambhal, Rampur, Amroha, Shahjahanpur of Mid-Western Plain, Hathras, Etah Kasganj, and Mainpuri of South Western Semi-Arid Zone, Etawah, Kheri, Sitapur, Kanpur Dehat, Fatehpur of Central plain zone, Barabanki, Ayodhya, Ambedkarnagar, Azamgarh, Mau, Ghazipur and Varanasi of eastern plain, Jalaun and Mirzapur of Bundelkhand, Basti and Maharajganj of north eastern plain zone are categorized as moderately vulnerable.

In low vulnerable category there are 18 districts. The districts like Saharanpur, Ghaziabad Hapur G.B Nagar, Bulandsahar Aligarh, Mathura, Agra, Firozabad, Bareilly, Pilibhit, Kanpur Nagar, Prayagraj, Gorakhpur, Kushinagar, Deoria, Ballia and Sonbhadra have higher adaptive capacity. Consequently, they are less prone to climatic risks.

Future vulnerability

Figure 10. Future vulnerability in different agro-climatic zones in UP

Agro climate zones	Future Vulnerable area % in 2050 (4.5 emmission scenarion)	Future Vulnerable areas % in 2050 (8.5 emmission scenarion)
Western plain zone	30.58	0.0
Mid western plain	56.03	63.9
Central Plain zone	46.06	57.7
Bundelkhad	85.41	85.4
Eastern Plain zone	35.06	25.6
North eastern Plane zone	41.63	36.4
Bhabhar and Tarai	12.08	12.1
South Arid zone	8.72	31.9
Vindhayan	61.05	100.0

Source: Scoping Assessment of Uttar Pradesh, 2020.

The future projection data of the mid of the century (2050) of the state clearly manifested about the variation in precipitation, temperature, extreme events. This projection data are mathematical based simulated data calculated on the basis of level of emission of greenhouse gases at global level and land use changes. The low emission scenario is called Representative Concentration Pathway (RCP) 4,5 while the high emission scenario is called RCP 8.5. On the basis of these scenarios the future projection of rainfall, temperature for the year 2050 was simulated. Both the scenario has predicted that in Uttar Pradesh the annual rainfall will increase by 15% to 20% in the 2050's as compared to the baseline (1981-2010). But season wise decrease in rainfall is predicted during winter and pre-monsoon and increase in post monsoon period for 2050. Monsoon rainfall shows no significant change towards 2050. Regarding the future temperature scenario both maximum and minimum temperature is predicted to increase by 2oC for 2050. Considering these predicted changes in precipitation and temperature, and current level of sensitivity and adaptive capacity, the Bundelkhand, vindhayan region are marked as most vulnerable region. The key drivers of vulnerability to the Bundelkhand and vindhayan region related to exposure, sensitivity and adaptive capacity are as below.

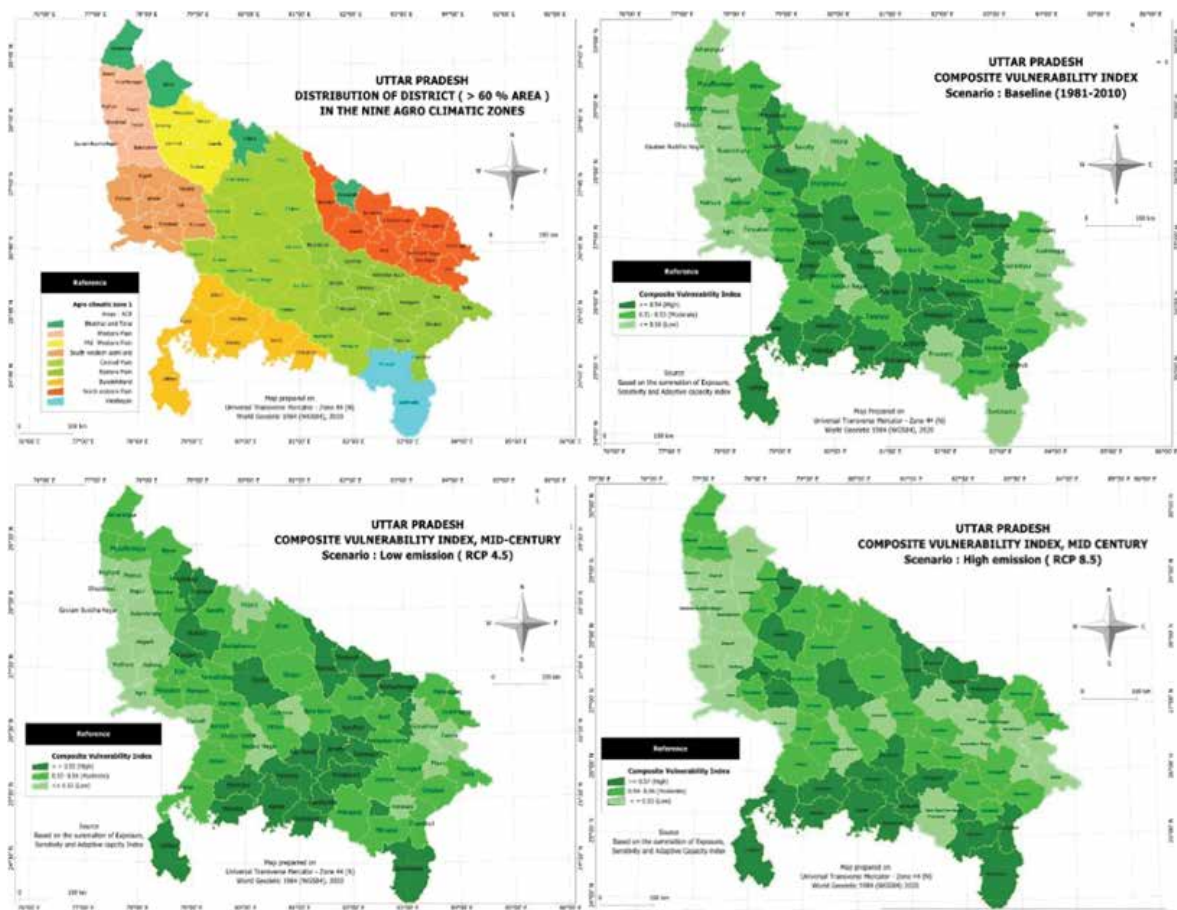
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Figure 11. Linkages between climate exposure and adaptation

Exposure	Sensitivity	Adaptation
<ul style="list-style-type: none"> • Number of heavy rainfall days (in days). • Extremely wet days. • Percentage of warm days % days. • Number of consecutive dry days (in days). 	<ul style="list-style-type: none"> • Percentage of landholding below 1 hectare. • Number of critical, semi-critical and overexploited blocks in groundwater utilization. • Percentage of net sown area to reporting area. • Percentage of gross irrigated areas to gross area sown. • Dependency on agriculture sector in % 	<ul style="list-style-type: none"> • Percentage of the population dependent on non-farm activities. • Crop insurance. • Crop diversity. • Percentage of forest coverage. • Total length of pucca roads per lakh population (in km). • Livestock development centre per lakh of livestock.

Source: Scoping Assessment of Uttar Pradesh, 2020.

Figure 12. Agro-climatic regions of UP and Current and Future Composite Vulnerability Index



Source: Scoping Assessment of Uttar Pradesh, 2020.



Step 3. Participant's experiences of felt climate impacts in their lives and livelihoods

Group discussion

Time: 15 min

- Ask the participants to group according to their home district (put a chart beforehand with names of districts under different agro-climatic region (see presentation 1.2 slide 5) and encourage the groups to discuss:

Guiding questions:

- a. What are climate change impacts in that region?
- b. What are geo-physical reasons (topography, spatial location, gradients/drainage, water conditions/regimes, etc.) that enhance the impact of climate change?

After 10 min discussion, ask the participants to present one example/story of how they have felt about climate change in the last 10 years (in terms of festivals, dress, marriage, timing of fruiting, etc.) to the other groups.

Useful literature

- GEAG 2020: Scoping Assessment of Uttar Pradesh (available on request from GIZ)
- GEAG, 2016, Resource Handbook on climate literacy, published by GEAG. Available at https://geagindia.org/sites/default/files/2018-07/91.-RESOURCE-HANDBOOK-ON-CLIMATE-LITERACY_1.pdf

Key take-aways

- At the end of this session, participants will be able to understand how climate change is impacting in different agro-climatic regions of UP, e.g. in dry regions of Bundelkhand or in flood affected areas of Terai/NE plains, etc.

Questions for the debriefing phase

- What are your important take-aways/ messages from this case study?
- Which of the presented facts do you find most relevant for your situation?
- Did the session help you understand key climate impacts of different agro-climatic regions of UP? Are there any questions left unanswered?

Module 2. Climate change impacts and related risks

Learning objective	To understand and assess the impacts and related risks of climate change to the lives and livelihoods of women farmers
Duration	Shortest version: 15 min Complete version: 5 h 30 min (without breaks) Potential complete version at the field level (including field visits): 7 h

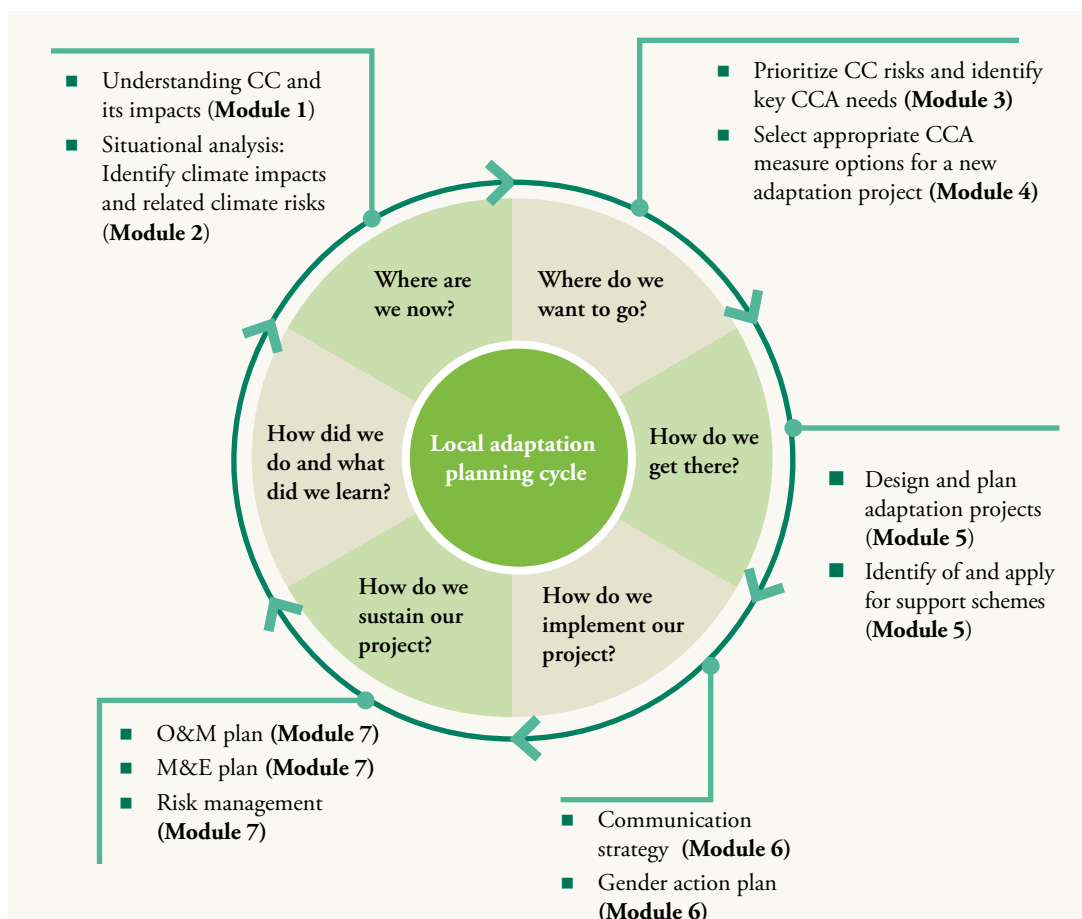
Module planner

Duration	Sessions of module	Shortest version	Complete version
	Session 2.1 Background information on women farmers and their vulnerability to climate change		
30 min	2.1.1 Contribution of farming in income and livelihoods in UP		×
45 min	2.1.2 Small-landholding farming system and the impact of climate change		×
60 min	2.1.3 Status of women farmers in Uttar Pradesh and their significant contribution in agriculture		×
15 min	2.1.4 Vulnerability of women farmers to climate change impacts	×	×
3 h	Session 2.2. Identifying the impacts of climate change and related risks to the lives and livelihoods of women farmers		×

Integration of Module 2 along the local adaptation planning cycle

The methodology used by the capacity building package follows the logical sequences of local adaptation planning. The figure below shows the arrangement of the CDP's modules, their key steps and methods employed. The colour yellow indicates that you are in Module 2 and Step 2 of the local adaptation planning cycle, which guides participants to understand and assess the impacts and associated risks of climate change on the lives and livelihoods of women farmers. In module 2, the facilitator will familiarise the participants on the status and vulnerability of women farmers, the impacts of climate change on smallholder agriculture and the overall impacts of climate change and its associated risks. By this, the participants will be provided with important background knowledge helping them identify their needs and CCA actions in the following modules. In the Excel tool you will find a tab in the same yellow colour. Here you can document the results achieved by your group of participants in module 2.





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Session 2.1 Background information on women farmers and their vulnerability to climate change

Session 2.1.1 Contribution of farming in income and livelihoods in UP

Learning objective	To understand contribution of farming in income and livelihoods in UP	
Prerequisites / prior knowledge for successful participation	Understanding of agriculture and farm-based livelihoods in UP	
Steps (duration)	Step 1. Background information of Uttar Pradesh in agriculture	15 min
	Step 2. Contribution in food production	5 min
	Step 3. Contribution of agriculture in livelihood generation	5 min
	Step 4. Contribution of agriculture in income generation	5 min
Total duration	30 min	
Methods/Exercises	Input presentation	
Material	PowerPoint presentation 2.1.1, handout 2.1.1, Laptop, LCD Projector	
Preparation of the material	You may update information provided on farming, income and livelihood, should they no longer be up-to-date (status 2021)	

Step-by-step approach

This session provides participants with an understanding of how agriculture contributes to income and livelihoods in Uttar Pradesh, to provide a basic understanding for developing adaptation approaches in later sessions. **Step 1** will provide general background information on agriculture in Uttar Pradesh, while **Step 2** will show the importance of this sector for national food production, livelihoods (**Step 3**) and income (**Step 4**).

Step 1. Background information of Uttar Pradesh in agriculture

Input presentation

- Present slide 3 (presentation 2.2.1 – Contribution of farming in Income and Livelihood in Uttar Pradesh) to the participants

Agriculture is called the backbone of economy of Uttar Pradesh. It has not only the highest cropped area of 25,785,000 hectares, but it has the highest number of over 21 million farm holdings as well. The state stands at 1st position at all India level in terms of food grain production, 80.4 % of its total area is under Irrigation and offers diverse agro-climatic conditions that are conducive for agricultural production.

In term of geographical area, the state is the fourth largest State in India which covers an area of 2,40,928 sq km and accounts for 7.3 per cent of total geographical area of the country. It is divided into four economic regions, nine Agro-Climatic Zones and comprises 75 districts, 316 Tehsils, 822 development blocks and 97,814 inhabited villages. It is one of the most populous state in the country having population of 19.98 cr. But, with increasing population, population – land ratio continuously increases, which has caused a process of reduction in size of farms and increase in marginalization of holdings for the past several decades. The average holding size of agriculture in Uttar Pradesh is 0.76 hectares which is less than the national average of 1.15 hectares.

Step 2. Contribution in food production

Input presentation

- Present slide 4 (presentation 2.2.1 – Contribution of farming in Income and Livelihood in Uttar Pradesh) to the participants

In Indian agriculture, Uttar Pradesh has a significant role. It is the largest producer of food grains in India and accounted for about 17.83 per cent share in the country's total food grain output in 2017-18. In 2017-18, food grain production in the state stood at 51.25 million tonnes. The state is a major producer of wheat (31.98%), rice (11.75%), nutri cereals (8.29%), total Pulses (8.75%) sugarcane (46.98%), potato (30.40%), vegetables (16%) and milk (18%) in the country. But, amidst increasing frequency of disasters and changing nature of monsoon, stabilization in food grains productivity during the recent past decade has become the major cause of concern. Further, the impacts of climate change will have an adverse impact on food security. Disadvantaged regions and socially and economically backward people of the state will be affected more as food cost will increase due to its less availability. The recent available trends indicate that agricultural productivity will decline up to 25% in irrigated areas which could be as much as 50% in rainfed areas. Dominance of small and marginal farmers (about 92%) with small land holdings will make Uttar Pradesh more vulnerable to climate change. Inconsistent and erratic monsoon and water scarcity has substantially affected the crop yields, cropped area and livestock in the vulnerable zones like Bundelkhand region during the last 4-5 years.



Step 3. Contribution of agriculture in livelihood generation

Input presentation

- Present slide 5 (presentation 2.2.1 – Contribution of farming in Income and Livelihood in Uttar Pradesh) to the participants

In term of employment generation, about 60.5 percent of the population subsists on this sector. As per 2011 census, out of a total population of 19.96 crores, about 12.07 crores are subsisting on agriculture sector, hence, agriculture is very vital and needs to be addressed properly. There is marked variation in the data regarding the dependency on agriculture in the state. The agro climatic zone wise, dependency of population on agriculture as livelihood is given in following table:

Table 3. Dependency on agriculture as means of livelihood in different agro-climatic zones

Agro climatic zones	Dependency on Agriculture as a means of livelihood (in %)
Bhabhar and Tarai	62.56
Bundelkhand	71.79
Central Plain	63.43
Eastern Plain	60.17
Mid-western Plain	58.94
North eastern plain	71.89
South western Plain	55.93
Vindhyan	64.12
Western Plain	36.25

Source: District wise development indicators, Uttar Pradesh, 2019, Economic and statistics division, State planning institute, Planning Department, Uttar Pradesh.

Step 4. Contribution of agriculture in income generation

Input presentation

- Present slides 6 (presentation 2.2.1 – Contribution of farming in Income and Livelihood in Uttar Pradesh) to the participants

As it is mentioned above that more 92 % of the farms in the state are small and marginal, so as per DFI Committee's estimates from NSSO 70th Round unit level data, 50.4 % small and marginal farmer have their sources on income from cultivation while for medium and semi medium farmers and large farmer it accounts 79.5% and 90.9%, respectively. The agro-climatic zone-wise annual income of farm households in Uttar Pradesh was Rs 1,29,775. It varied from 1,08,524 in Mid-Western Plain to 1,83,339 in Western Plain region. In terms of annual household income, farmers of Western Plains and Tarai & Bhabhar region are richest, followed by farmers of South-Western Plain and Eastern Zone. The farmers in the remaining five zones have relatively low household income. Large variations were found across agro-climatic zones in terms of income from agriculture. A farmer in the Vindhyan zone has an annual agricultural income of only 45,677 as compared to the highest income of 1,06,798 earned by a farmer in the Western Plain. Agricultural income is relatively higher in Western Plain, Tarai & Bhabhar Zone and South-Western Plain region. The lowest household

income from agriculture has been reported in North-East Zone, Eastern Zone and Vindhyan Zone, all falling in Eastern Uttar Pradesh.

The share of income from agriculture was only 37.9 per cent in the Eastern zone and 39.7 per cent in the Vindhyan Zone. On the other hand, agriculture contributed 65.0 per cent to household income in the Tarai & Bhabhar and around 58.2 per cent in Western Plain and 59.4 per cent in Bundelkhand Zone. The share was 55 per cent each in South-Western Plain, Mid- Western Plain and the Central Zone.

Useful literature

- Website of the State Agricultural Directorate Uttar Pradesh: Information on contribution of small and marginal landholding agriculture and the related schemes and programmes Available at: <http://upagriculture.com/Default.aspx>
- National Data Bank for Socio Religious Categories. Situation Assessment Survey of Agricultural Households, All India Debt and Investment & Land and Livestock Holdings in India (January 2013 – December 2013). Available at: http://mospi.nic.in/sites/default/files/national_data_bank/ndb-rpts-70.htm
- GEAG 2020: Scoping Assessment of Uttar Pradesh (available on request from GIZ)

Key take-aways

- Participants will be able to understand the contribution of agriculture and farming in income and enhancing livelihoods of people in UP.

Questions for the debriefing phase

- Participants can be asked to share their experiences on how they relate the contribution of farming in income and livelihood enhancement.



Session 2.1.2 Small-landholding farming system and the impact of climate change

Learning objective	To understand the impact of climate change on small-landholding farming systems
Prerequisites / prior knowledge for successful participation	Understanding the contribution of small marginal farming in the state and the emerging challenges of climate change and hydro met disasters
Total duration	45 min
Methods/Exercises	Input presentation, discussing and presenting on small-landholding farming systems
Material	PowerPoint presentation 2.1.2, handout 2.1.2, Laptop, LCD projector, chart paper, card, pen

Approach

This session will provide participants with an understanding of how climate change affects small-landholding farming systems. In the group exercise, participants will link the farming system to ecosystems and landscape to understand the circular system, which will be analysed for its vulnerabilities and benefits due to climate change impacts.

Group exercise

Time: 20 min

- Introduce the objective of this session.
- Discuss with participants regarding Small Land Holding Farming for 5 minutes and ask them:
 - What do they understand from Small Land Holding Farming?
 - What do they know about Farm System?
- Divided the participants into three groups and ask them on the basis of previous discussion, to illustrate the farming system and other allied activities linked to it in the form of a diagram.

Input presentation by the participants

- Encourage the participants in presenting on the cyclic flow system of small land holding farm systems. Complement the participant's presentations if needed, for this purpose present slides 1-5 (presentation 2.1.2 – Small Land holding farming and the impacts of climate change)

Hints for the trainer:

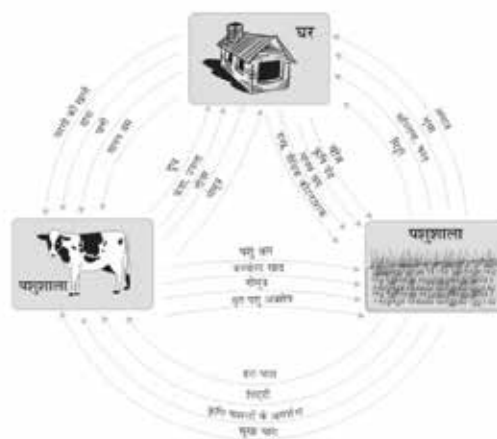
- Emphasize on the various farm sub-systems and inter-connectedness which lends robustness to the farming system.

The small holding farming has worked as a system. This system is not only producing the different types of crop rather it's an ecosystem because it is made of living and non-living things that interact and exchange most of things each other. In such a farm system **“farmers' house, the farm and the livestock/cattle shed”** are three major and basic sub systems. Along with other components like fish pond, orchard etc. the farm sub-systems are linked with flows from one system to other. The output of one sub system is used as input for another sub system and in this way the input needs of an integrated farm system is kept low.

Need of external inputs are reduced due to the diversity, complexity and the recycling processes amongst various farm sub systems. The farm system is also linked to landscape or the ecosystem which comprises of common natural resources like village fish ponds, forests, open land, orchards etc. the inputs of the farm, like fodder, fuel, food and other agricultural inputs are derived from such

natural resources thereby keeping the input costs low. This farm system is a complex system of integrated farming that involved growing food and fodder crops, horticulture, animal husbandry, poultry rearing, kitchen gardens and trees of commercial value for timber as well as fuel. The idea was to increase the overall bio-mass, the outputs from one often feeding into the other, like the crop residues go for composting and the animal dung is used as manure. If one sub-system fails, the farmers fall back on the others. Moreover, this rejuvenates the soil, as distinct from the mono-cultures that have become the norm post green revolution. Growth of fruit trees and a kitchen garden ensures the nutritional security of the farmers.

Figure 13. Cyclic flow system of small land holding farm systems

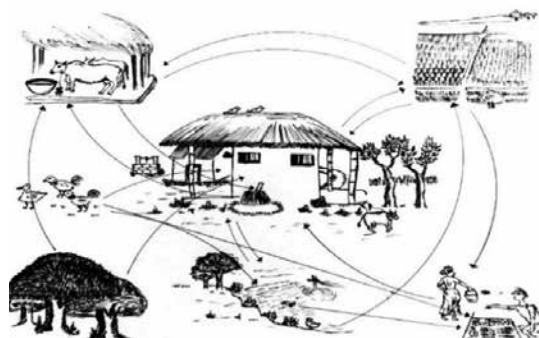


Source: Climate literacy training Manual, 2016

However, the impact of climate change has been adversely affected these various farm sub systems in different manner. In a farm where farmers do the agricultural activities, climate change affect in a number of ways, including through changes in average temperatures, rainfall, and climate extremes (e.g., heat, cold waves and storm) which will likely negatively affect pattern and production of the crops. Similarly, the livestock also would be affected by the increase of temperature. It affects their reproductive capability and also production of milk, meat and wool because they will get less chance of the fodder due to diminishing trend of the pasture land and deforestation.

In these circumstances, the concept of “Ghar-Khet-Ghari” (“farmers’ house, the farm and the livestock/cattle shed”) is much useful to make farming more resilient. In fact, it’s all a cyclic flow system of a small land holding farming. To keep farming resilient, it is necessary to understand this mechanism. The stronger this system is, the less the impact of the risk of any disaster on it or the ability to recover from the risk will increase.

Figure 14. The concept of “Ghar-Khet-Ghari”



Source: Climate Literacy Training Manual, 16

Useful literature

- Mani et al./ GEAG India (2015): Inclusive Resilience-Stories of Small Marginal Women Farmers. Available at: <https://geagindia.org/index.php/publications/inclusive-resilience-stories-small-marginal-women-farmers>
- Bhatt/ GEAG India (2012): Resilient Farming on Small Land Holdings: Adaptive Strategies to Combat Climate Change. Available at: <https://geagindia.org/index.php/publications/resilient-farming-small-land-holdings-adaptive-strategies-combat-climate-change>
- GEAG, 2016, Climate literacy training manual, (in Hindi) published by GEAG

Key take-aways

- After successful completion, the participant will be able to understand how climate change is impacting the small land holdings farming system and sub systems.

Questions for the debriefing phase

- Ask the participants to share their experiences about the impacts of climate change in their areas and the importance of cyclic flow system of small land holding farm systems in resilience building.

Session 2.1.3 Status of women farmers in Uttar Pradesh and their significant contribution in agriculture

Learning objective	To understand the status of women farmers in Uttar Pradesh and their significant contribution in agriculture	
Prerequisites / prior knowledge for successful participation	Ground experience on farming and contribution of women farmers in agricultural production (including horticulture, aquaculture, livestock and agro forestry)	
Parts (duration)	Step 1. Recognition of woman as “Farmers” and their status	20 min
	Step 2. Contribution of women farmers in agriculture	40 min
Total duration	60 min	
Methods/Exercises	Input presentation, drawing a farmer, discussing the role of women farmers, comparing the roles and contribution of men and women farmers	
Material	PowerPoint presentation 2.3.1, handout 2.1.3, Laptop, LCD projector, cello tape, meta cards, marker pens, pin-board, pins	
Preparation of the material	You may update the provided information on women farmers and given examples for the exercise, in case these are no longer up-to-date (status 2021)	

Step-by-step approach

This session provides an understanding of the status of women farmers in Uttar Pradesh and their important contribution to agriculture. In **Step 1**, participants identify and recognise women as ‘farmers’ and reflect on their status. This is an important task to acknowledge that it is mostly women who form the backbone of smallholder agriculture. In **Step 2**, assessing the contribution of women farmers in agriculture, participants conduct a group exercise and recognise the importance of looking at adaptation measures from a women’s perspective.

Step 1. Recognition of women as “farmers” and their status

Input presentation

- Present slide 1-3 (presentation 2.1.3: Status of women farmers in Uttar Pradesh and their significant contribution in agriculture).

Rural women form the most productive work force in the economy of majority of the developing nations including India. Agriculture, the single largest production endeavor in India, contributing to 16% of the GDP is increasingly becoming a female activity. Agriculture sector employs 80% of all economically active women; they comprise 33% of the agricultural labour force and 48% of self-employed farmers. About 18% of the farm families in India, according to NSSO Reports are reported to be headed by women. Almost all women in rural India can be considered ‘farmers’ once we move beyond the conventional market oriented narrow definition of the term ‘productive worker’ and factor in for the fact that the parity of wages between men and women is still a distant dream.

Source: http://mksp.gov.in/images/MKSP_Agriculture_Guidelines.pdf

Despite the critical role played by women in agriculture and allied activities, it is important to ensure their inclusion in the agricultural support mechanism in UP. This extends to a lack of rightful entitlement over factors of production as agricultural workers and cultivators. Many households, with woman farmers as heads of family units, are not able to access extension services, farmer support in institutions and production assets such as seeds, water, credit, subsidy etc. Some of the tasks performed by the women are not valued adequately and considered less important economically. Further, due to multiple roles that a woman has to perform within the family and the farm, her access to knowledge and information, is constrained and therefore, her opportunities get limited.

Individual exercise and group discussion (slide 5)

- Distribute one Meta Card to each participant and ask them to draw a figure of a farmer (whatever comes to their mind).
- Collect the cards once the participants have drawn the figure and check how many participants have drawn the face of woman as farmer.
- Discuss with the group why women need to be recognized as “farmers” because of their significant role and contribution in farming.

Hints for the trainer:

- Make sure, not to not give any background information about the exercise to the participants before beginning the session, so that they do not get any hints on whose face to draw as a farmer.

Step 2. Contribution of women farmers in agriculture

Input presentation

- Present slide 6 (presentation 2.1.3: Status of women farmers in Uttar Pradesh and their significant contribution in agriculture).

In many parts of the world today, there is an increasing trend towards what has been termed as Feminization of Agriculture. As men’s participation in agriculture declines, the role of women in agricultural production becomes ever more dominant. In UP, the major cause for this phenomenon is the migration of men from rural areas to towns and cities, in their own countries or abroad, in search of paid employment.

The division of labour between men and women in crop production varies considerably from region to region and community to community. However, it is usually men who plough the fields and drive draught animals whereas women do the major share of sowing, weeding, applying fertilizers and pesticides, harvesting and threshing.

Similarly, men tend to do the work of large-scale cash cropping, especially when it is highly mechanized, while women take care of household food production and small- scale cultivation of cash crops, requiring low levels of technology. Women make an essential contribution to producing staple crops. For instance, it is women who provide up to 80-90 percent of the labour for rice cultivation. They do almost all the work of planting and transplanting, fertilizing, weeding, irrigating and harvesting. After the rice has been harvested, they women also carry out the post-harvest tasks before the rice can be stored, marketed, cooked or eaten.

Women also play a big role in growing secondary crops such as legumes and vegetables. In addition to providing essential nutrients, these crops are often the only food available during the lean season between harvests or when the main harvest fails. Home gardens, often tended almost exclusively by women, also claim precious labour-intensive time.

Despite their complementary roles in agriculture, women tend to work longer hours than men. The difference in workloads is particularly marked for rural women, the world’s principal food producers. Women are involved in every stage of food production and, although there is a gender-based division of labour, women do tend to shoulder the larger share. In addition to food production activities, women have the responsibility of preparing and processing the food while fulfilling their fundamental role of nurturing and caring for children and attending to elderly members of the household. The absence of male labour, however, may force women with an expanded workload to grow less labour intensive - and often less nutritious - crops with a reliance on child labour. This has serious implications both for the family and the human capital of the country.



The division of labour between genders still remains poorly understood. This is because much of women's work in crop production consists of unpaid labour in fields that produce for the household rather than the market. As a result, women's work goes unrecorded in statistics. Only by the collection and analysis of such gender disaggregated data will development strategies target women as active and equal partners in agricultural development.

Group exercise (slide 6)

- Using participatory discussion, list out all the activities in a cropping cycle on separate cards (one activity per card).
- Place one card with male farmer photo and the other with female farmer photo on the pin-board.
- Now take the cards in which cropping cycle activities were listed and ask the participants which activity is done by female farmer and which by male farmer (see examples in the table below).
- Compare the roles and contribution of male and female farmers in the open house discussion.
- Ask the participants to note their results of this exercise on worksheet 1 of handout 2.1.3.



Agricultural activities	Male Farmer	Female Farmer
Crop Production		
Sowing	+	+++
Weeding	++	++++
Transplanting		
.....		
.....		
(OR) Livestock management		
.....		
.....		
(OR) Horticulture		
.....		
.....		

Useful literature

- National Rural Livelihood Mission of Rural Development (2012): Mahila Kisan Sashaktikaran Pariyojana (MKSP) Handbook. Transforming Agriculture Touching Live. Available at: http://mksp.gov.in/images/MKSP_Handbook_English.pdf

Key take-aways

- Understanding on contribution of women farmers in agriculture across different activities

Debriefing questions

- Women's role in various agricultural activities is comparatively more than men
- Facilitator can ask questions related to women's access and control over resources given their large share of contribution in agriculture as compared to men.

Session 2.1.4 Vulnerability of women farmers to climate change impacts

Learning objective	To understand how climate change and disasters impact the farm-based livelihoods and women farmers	
Prerequisites / prior knowledge for successful participation	Understanding of ground experiences on climate change impacts in agriculture	
Steps (duration)	Step 1. Women: A vulnerable group to climate change	5 min
	Step 2. Impacts of climate change on women farmers	10 min
Total duration	15 min	
Methods/Exercises	Input presentation	
Material	PowerPoint presentation 2.1.4, handout 2.1.4, Laptop, LCD projector, cards, markers, cello tapes, scissors, chart papers, board	
Preparation of the material	You may update the provided information on women farmers and examples given on relevant climate impacts, in case these are no longer up-to-date (status 2021)	

Step-by-step approach

This session creates an understanding of how climate change and disasters affect farmers' livelihoods and in particular women farmers, whose role has been addressed in previous sessions. This knowledge will be used to begin,

Step 1 will once again focus on women as a particularly vulnerable group to climate change and bring regional examples from UP. What this means for women farmers in the context of climate change impacts will be discussed and analysed in Step 2. This will conclude the session with important background knowledge for the participants to prepare them to identify climate risks relevant for their local contexts in Session 2.2.

Step 1. Women: A vulnerable group to climate change

Input presentation

- Present slide 3 (presentation 2.1.4: Vulnerability of women Farmers to climate change impacts) to the participants.

The impacts of climate change are not uniform. It can impact women and men in different manner. Women are highly vulnerable to climate change as they are more prone to the adverse impacts of climate change. Their inability to address the climate variability arise from prevailing social inequalities, and social and economic roles due to the differences in their property rights, access to information, lack of employment and inequal access to resources. At the advent of climate change, women are exposed to lose of harvest. Hence, traditional food sources become more unpredictable and scarcer. Women are also prone to drudgery due to climate change as they are responsible for water collection in their communities and are therefore, more affected when accessibility changes. Climate change threatens to widen existing gender-based disparities. Internationally, studies have also noted that women face higher risks and experience a greater burden of climate change impacts. This is notably true for health impacts, making climate change a risk-multiplier for gender-based health disparities. Loss of crop yield and livestock due to climate change affects the women empowerment in rural and agrarian society.



In Uttar Pradesh, there is dominance of women workers in agriculture, animal husbandry and forestry. Women are typically responsible for providing their household with water, food, fodder and firewood, and have lesser education, opportunities, authority and resources. Socio-cultural barriers and women's traditional role as caretakers of their households means they have little time for taking part in community discussions, so their perspectives and needs are often not heard in decision making processes. They collect water, gather cooking fuel from forests, village commons and fields and participate in agriculture, gardening and animal husbandry activities. But their time and labour is unaccounted for in the national gross income. (Resource Handbook, GEAG)

Women are not a homogeneous category, their vulnerability usually being directly proportional to class/caste/ethnic hierarchies in the society and within their village community. The successful adaptation to climate change will require recognition of women as critical partners in both driving and delivering solutions needed to increase resilience of communities, especially those living in disaster prone areas across India. This will also require a close collaboration between adaptation research, agriculture-related government services and women farmers. Poor and marginalized rural women are the worst sufferers of climate change impacts, but they are also critical change agents in implementing climate solutions. Their traditional knowledge and skills are often a resource to adapt to climatic vagaries and they have a valuable influence over their households' consumption patterns and lifestyle choices, both critical in the wake of climate change. Women suffer climate impacts more than men, but they are also integral to the solutions. (Resource Handbook, GEAG).

Step 2. Impacts of climate change on women farmers

Input presentation

- Present slide 4 (presentation 2.1.4: Vulnerability of women Farmers to climate change impacts) to the participants.

Table 4. Climate change impacts on women farmers

Climate Change Impacts	Examples: Effect on Women Farmers
Low food production	Less to eat, sleep on an empty stomach, need to take on additional work as wage labour, feminization of agriculture labour
Cyclone, Floods, Water logging, Droughts	Longer walk to get water and fuel wood, loss of fodder and livestock, contamination of water resources making it more difficult and time intense to get fresh water, woman's primary livelihood, drought/ infrequent spell of rain makes ground harder to work on
Higher summer temperature	Low milk production among animals, more tiring work in fields, longer working hours
Effect on regeneration of species	Medical herbs and fodder unavailability in forest
Heavy rainfall	More weeding, water, fodder, fuel difficult to access during rain/low rainfall, women opportunity for wage employment declines
Untimely rainfall	Lower farm production and consequences of male distress migration, work overload on own farm or as wage labour
Social impact: Higher debt	Women go to take loans and have the responsibility of paying them back
Social impact: Male migration	Women and child trafficking/HIV-AIDS
Social impact: Domestic violence	Increase in domestic violence

Useful literature

- National Rural Livelihood Mission of Rural Development (2012): Mahila Kisan Sashaktikaran Pariyojana (MKSP) Handbook. Transforming Agriculture Touching Live. Available at: http://mksp.gov.in/images/MKSP_Handbook_English.pdf

Key take-aways

- After the session, the participant will understand and have an idea of key impacts of climate change and disasters on the farm-based livelihoods and women farmers.

Questions for the debriefing phase

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- How did the session support you in understanding the vulnerability of women farmers to climate change impacts?

Session 2.2 Identifying the impacts of climate change and related risks to the lives and livelihoods of women farmers

Learning objective	To identify climate risks impacting in specific agro-climatic context on the lives and livelihoods of women farmers	
Prerequisites / prior knowledge for successful participation	Hands on experience in farming in specific agro-climatic setting	
Steps (duration)	Step 1. Identifying relevant climate hazards	30 min
	Step 2. Determining negative impacts of climate hazards	1 h 15 min
	Step 3. Identifying the risks of climate change impacts	15 min
Total duration	2 h	
Methods/Exercises	Identifying past and future climate hazards, transect walk, seasonal calendar, creating a climate impact chain	
Material	PowerPoint presentation 2.2, handout 2.2, Laptop, LCD projector, flip chart, post its, markers, cards, transect walk video	
Preparation of the material	When preparing the Session, identify local climate data on predicted climate hazards when available. Prepare a transect walk video showing a common village to facilitate the exercise in Step 2 if time does not allow to do a physical walk through a village with the participants. You may adapt the examples given to facilitate the exercises of this session to the participants' contexts.	

Step-by-step approach

After learning about past and future climate hazards and the vulnerability of farming systems and women farmers to climate change in Module 1, participants are guided through the essential steps to determine their own climate impact chain and assess related climate risks for their own lives and work environment. In Step 1, relevant climate hazards are identified, on the basis of which climate impacts are determined in the next Step 2. Two approaches are used for this: First, the negative climate impacts are identified by assessing the exposure of different elements in one's own village as well as the exposure of different seasonal farm activities. Finally, in Step 3, associated climate risks of the identified impacts for the target group are identified.

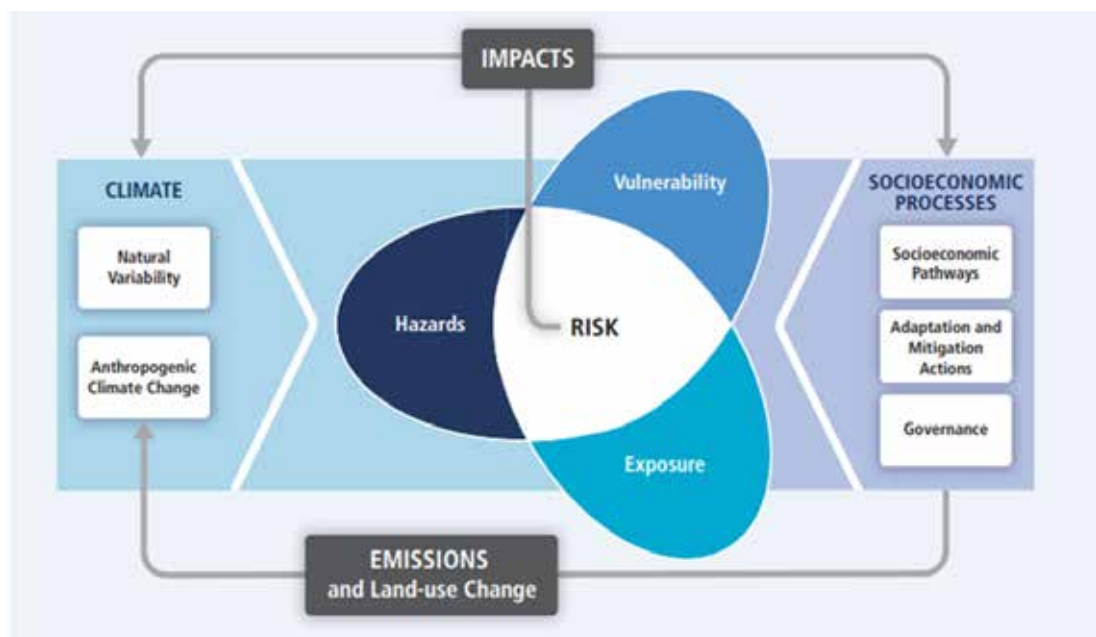


Input presentation

- Present slides 3 (presentation 2.2 – Identifying climate impacts and related risks) to the participants.

The figure below shows the interrelationship of climate change risks/impacts at the intersection of hazards, vulnerability and exposure. The risk of climate-related impacts increases with increasing climate-related hazards (including hazardous events and trends) (left side of the figure) in relation to the vulnerability and exposure of human and natural systems. Socio-economic processes (right side of the figure) cause additional emissions and land use changes and can thus exacerbate climate change. On the other hand, socio-economic processes such as adaptation and mitigation measures can reduce vulnerability and exposure and thus reduce climate risk.

Figure 15. Risk of climate-related impacts results from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability and exposure of human and natural systems.



Source: IPCC 2014

Climate Impact: consequences that result from the climate event or change or climate-related modifications of ecosystems. There are two types of impacts: direct impacts that are immediate consequences from climate change trends and events e.g., a greater number of drought events mean water scarcity and crop loss and indirect impacts that result from the direct impacts e.g. water scarcity leads to water borne diseases (human and livestock health), crop-loss leads to food insecurity & migration, indebtedness.

Risks: The potential for consequences of hazards [consequences of hazards = impacts] where something of value is at stake and where the outcome is uncertain.

The risk of climate-related impacts results from the interaction of climate-related hazards (=climate change trends and extreme events) with the vulnerability and exposure of human and natural systems. Risk = F (Hazard, Exposure, Vulnerability).

Climate hazards: A physical process or event resulting from climate change (e.g. heat, flooding, landslide) that cause negative impacts on people, their assets and their livelihoods.

Exposure: Who/what element is under threat/impacted by the hazard? Examples: smallholder farmers, village XY

Vulnerability: Why is the element susceptible to this threat? Examples: poverty, lack of knowledge; Vulnerability has two parts:

- Sensitivity: Attributes that determine whether/ how strongly a hazard will affect the element under consideration (e.g. drinking water availability, poverty, water quality).
- Capacity: Focusing on the a) Coping Capacity: Ability to respond to current / future hazards and b) Adaptive capacity: Ability to prepare for current / future hazards.

Step 1. Identifying relevant climate hazards

Input presentation

- Present slides 4-6 (presentation 2.2 – Identifying climate impacts and related risks) to the participants.

Climate hazards: A physical process or event resulting from climate change that cause negative impacts on people, their assets and their livelihoods.

Hazards include:

- climate signals, e.g. heavy rain, change in monsoon patterns, temperature increase;
- direct physical impacts of climate signals on geo-physical systems, e.g. flood, drought, sea level rise

India is particularly exposed to flooding (rivers and coasts), landslide, cyclones, water scarcity, extreme heat and wildfire (for more information see module 1).

Participatory exercise (slide 6)

- Ask the participants to list climate hazards that they observed or anticipate as hazardous for their daily lives (e.g. frequent droughts, increase in dry spells, flooding, landslides, a greater number of hot days) and let them insert relevant climate hazard in the table below (worksheet 1, handout 2.2)
- If the participants get stuck, introduce them to local climate databases (for more information, find some recommendations for international databases at the end of the session.)
 - State action plan on climate change published by Ministry of Environment, Forest and Climate Change: for Uttar Pradesh: http://moef.gov.in/wp-content/uploads/2017/09/SAPCC_UP_final_version_0.pdf
 - Flood Management Information System Center of Uttar Pradesh: <http://fmiscup.in>
 - Climate Change Knowledge Portal (CCKP) by World Bank Group: <https://climateknowledgeportal.worldbank.org/country/india>
 - Indian Meteorological Data, Govt of India - <https://mausam.imd.gov.in/>
- In order to assess the relevance of the listed climate hazards (e.g. drought, floods, landslides, heatwaves, dry-spells), ask the participants to put in each column /for each selected climate hazard dots for the number of villages in their home district that have been highly impacted by the climate hazard
- Give some examples, in case the participants get stuck
- After completion, ask the participants to present and discuss their findings in plenary. Ask them to analyse what climate variations they could observe in their regions and villages in the near past and currently that negatively affected their lives and livelihoods. This can be a good basis to analyse future hazards.

Hints for the trainer:

- Keep in mind the chosen geographical scope as this will likely affect the range of climate-related hazards.



Year	Droughts (Example 1)	Rain/ Floods (Example 2)	Cold waves (Example 3)	Heat waves (Example 4)	Add here other relevant climate hazards
20 years ago	•			•••	
10 years ago	••••	••		•	
Last year	••	•••••	•		•
This year		••••	••		
Anticipated for the future	•	•	•	•	

Step 2. Determining negative impacts of climate hazards

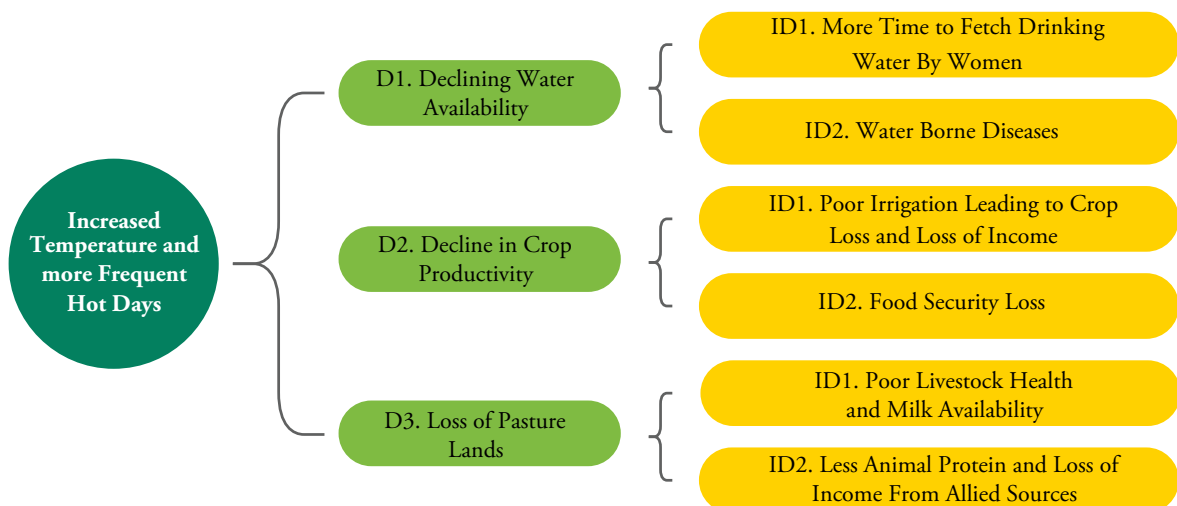
Input presentation

- Present slides 7-11 (presentation 2.2 – Identifying climate impacts and related risks) to the participants.

After past and future climate hazard in the regions of the participants have been identified, step 2 will guide the participants through two approaches to determine the negative climate impacts on their lives and livelihoods. With the help of the results of Step 2.1 and 2.2 the participants will be able to create their own climate impact chain (see example below). Depending on whether the participants want to develop adaptation measure(s) together as the goal of the whole training course (e.g. if they come from the same village), it may make sense to create a joint impact chain. In this case, to save time, the group can be divided into two groups so that the next Steps 2.1 and 2.2 can be conducted in parallel.

Impact chain: A climate impact chain is a general representation of how a given climate trend effects directly and indirectly a system of interest.

Example of an impact chain:



Step 2.1. Identifying climate impacts by assessing elements under exposure to climate hazards

Exposure is the presence of people, ecosystems, assets or other valuable elements in places that could be negatively affected by climate-related hazards. Hence, assessing exposure is about identifying people or things in your region that are / will be threatened by climate-related hazards.

How to best identify and assess exposure

A large number of elements will be affected by hazards. Start with those that are of most value to you. Further exposure elements can be added later on.

In addition, a “transect walk” is highly recommended to help the participants identifying people or things in their regions that are / will be threatened by climate-related hazards. A transect walk is a walk-through of people in a given location to identify different places, people and their interaction with the environment and their experiences. This activity is usually done in a village setting and extremely useful for local level planning exercise like Gram Panchayat Development Plan (GPDP). In classroom, a prototype of the same can be attempted. Ideally, the facilitator may collect a 5 min video of a particular village if possible that can be shown to the participants during training.

Examples of different elements that may be exposed / impacted by climate hazards:

Impacts of climate change include damages to production facilities or agricultural areas from floods, health impairment during heat waves or failing crops due to saltwater intrusion after storm surges.

Table 5. Examples of different elements that may be exposed/impacted by climate hazards

Impact areas		Exposed elements
Physical infrastructure	Homestead land/Farmland	Backyard cultivation at risk, low yield
	Roads	Transport of inputs & outputs
	Ponds	Drying of kuls reduces stream flow, less water availability
Exposed stakeholders	Small & marginal farmers	Poverty and indebtedness
	Women & Children	Health and hygiene affected
Economic infrastructure	Markets	Quality of fruits affected, less demand
	Financial institutions	Access to institutions

Group exercise: The transect walk (slides 11-12)

- Ask the participants to watch the prepared video and evaluate the places shown from their village according to the following criteria (if the video shows another village, the participants should associate similar places from their village with the ones shown):
 - What is shown (people, objects) and
 - How are they exposed to climate change extreme weather events/change in resource availability)?
 - Guiding questions: How are households socio-economically affected by waterlogging or drought? How does water scarcity increase the cost of irrigation? How are forest dwellers, women affected (e.g. they need more time to fetch drinking water due to poor water availability).



- List the exposed elements/groups and the direct and indirect impacts (high, moderate, low) they face from climate change hazards, using worksheet 2 of handout 2.2. Focus on the climate hazards that were considered most relevant by the participants in Step 1.
- After completion, encourage the groups to present their results in plenary

Hints for the trainer:

- For the transect walk, ideally participants from the same village are grouped together. If there are too many different villages represented among the participants, take a video of one village as an example and apply it to all villages.

Climate hazard (insert the hazards identified in Step 1)	Settlement	Forest	Barren	Settlement	Home garden	Dense forest	Canal/kul
Extreme rain events	Direct impacts on the selected element: Flash floods, etc.	Direct impacts: ...					
	Indirect impacts: Damage to houses and infrastructure	Indirect impacts: ...					

Step 2.2. Identifying climate impacts on seasonal farm activities

Input presentation

- Present slide 13 (presentation 2.2 – Identifying climate impacts and related risks) to the participants.

The Seasonal Calendar tool is used to document periodically recurring (here: monthly) agricultural activities for different crops (here: Rabi and Kharif) as well as important climatic, weather events that occur at the same time of the year. The seasonal calendar is a useful tool to relate daily agricultural activities and crop cycles to CC trends and events, and makes it easier for the women farmers to understand how agricultural activities, and thus the community, are affected by climate change.

Example of a seasonal calendar:

Rabi Activities	Crop 1: Wheat	Crop 2: Mustard
September	e.g Ploughing	Xx
October	.....	Xx
November		
December		
January		
February		
March		
April		
May		



Group exercise: Seasonal calendar (slide 14)

- Divide the participants in 2 groups, use worksheet 3, handout 2.2.
- Ask both groups to draw a seasonality table of Rabi Crops (first group) and Kharif Crops (second group) (months on one axis and name of crops on another axis, similar to the table above) on a flip chart and to insert various activities undertaken by female farmer for that specific crop. Take a few months extra for spread of season.
- Encourage both groups to discuss how the different farming activities are impacted by the prior identified climate hazards (step 1). Ask the groups to note their identified direct and indirect climate impacts on circular sticky notes / cards and to place them next to the activities in the table on the flip chart according to which activity is impacted by which climate change situation and impact. This will provide an understanding how CC and its impact affect the cropping cycle of Rabi and Kharif crops.
- Close the session with a discussion round on CC impacts and effects on specific crops representing an increasing problem for female farmers. Moderate and facilitate the discussion with helpful background information when needed.

Hints for the trainer:

- The group exercise table can be explained with the role of women farmers and the probable impacts of climate change on agricultural activities.

Step 3. Identifying risks on climate change impacts

Participatory exercise (slide 17)

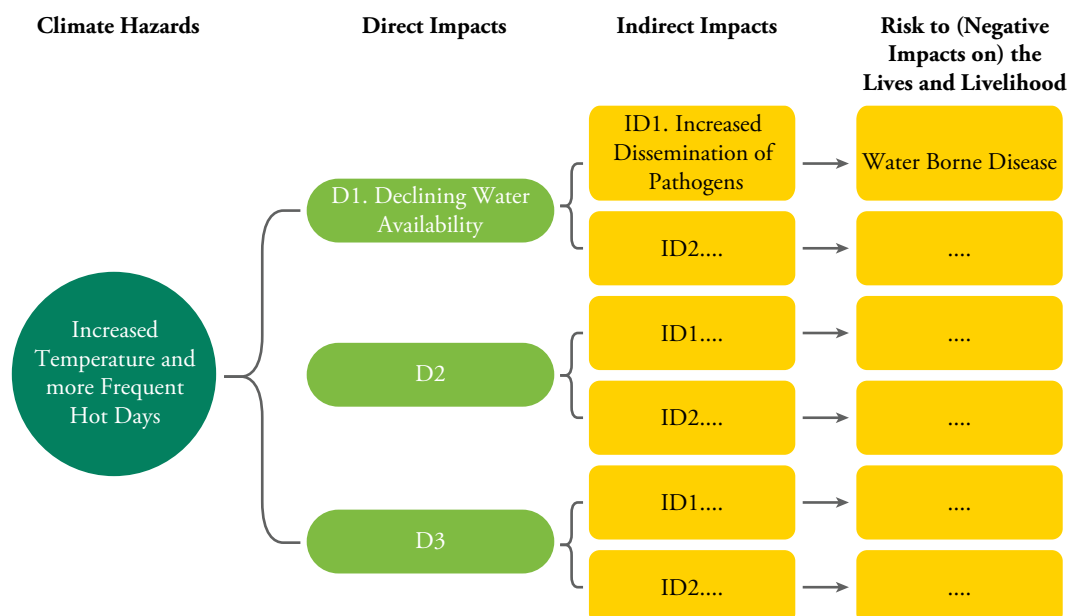
Step 3 aims at identifying relevant climate risks to the lives and livelihoods of women farmers under the determined climate change scenarios and impacts in Step 2.

- Ask the participants to insert their findings from Step 1 and Step 2 in the graphic below in order to create their own climate impact chain.
 - Select the most relevant climate trend or event they observed or anticipate for the future on the round field on worksheet 4 of handout 2.2 (use the prior discussed trends identified in module 1)
 - Ask the participants to use the rectangular cards to add direct impacts and indirect impacts of the selected climate trend as done in the impact chain example
- Finally, ask the participants to determine the climate risks to / negative effects on the lives and livelihoods of women farmers resulting from the identified climate impacts. Note: Depending on the indirect impacts identified, these may already be the negative effect for which adaptation strategies can be developed. In this case, reformulate the identified indirect impact or leave this column out.

Hint for the trainer

- When talking about hazards, instruct participants to focus not only on past hazards, but also to think about what the most important future climate variations/ hazards and their impacts/ risks might be in their village, neighbouring villages and the whole region.





Useful literature and databases

- IPCC, Climate Change (2014): Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc.ch/report/ar5/wg2/>
- GIZ and EURAC (2017): Risk Supplement to the Vulnerability Sourcebook. Guidance on how to apply the Vulnerability Sourcebook's approach with the new IPCC AR5 concept of climate risk. Bonn: GIZ. Available at: https://www.adaptationcommunity.net/wp-content/uploads/2017/10/GIZ-2017_Risk-Supplement-to-the-Vulnerability-Sourcebook.pdf
- GIZ: Toolkit to develop climate adaptation strategies for small and medium-sized enterprises (SMEs): Climate Expert. Available at: <https://www.climate-expert.org/en/home/>
- Rural Agricultural Development Authority (RADA) of Jamaica: Adapting to climate change: a training manual for farmer. Available at: <https://rada.gov.jm/sites/default/files/documents/Adapting-to-Climate-Change-Farmer-Instruction-Manual.pdf>
- ActionAid (Village Book: Community led planning and development processes. A training manual. Available at: https://actionaid.org/sites/default/files/village_book_training_manual_english__0.pdf

Local climate databases:

- Ministry of Environment, Forest and Climate Change (2014): State action plan on climate change. Available at: http://moef.gov.in/wp-content/uploads/2017/09/SAPCC_UP_final_version_0.pdf
- Flood Management Information System Center of Uttar Pradesh: <http://fmiscup.in>
- Climate change information portal available at www.climatevulnerability.in
- <https://mausam.imd.gov.in/>

International climate databases:

- World Bank Group: Climate Change Knowledge Portal providing global data on historical and future climate, vulnerability, and impacts. Available at: <https://climateknowledgeportal.worldbank.org/>
- World Bank Group: Historical data on CO2 Emissions. Available at: <https://data.worldbank.org/topic/climate-change>

Key take-away

- Identifying climate impacts and risks are the starting point of local adaptation planning.
- Climate risks are the potential for consequences of climate hazards [= impacts] where something of value is at stake and where the outcome is uncertain.
- The risk of climate-related impacts depends on the climate-related hazards and the vulnerability and exposure of human and natural systems.
- After the session, the participants should be aware of relevant risks their lives and livelihoods face from climate change as well as of most vulnerable places and people.

Debriefing questions

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- How did the session and exercise support you in understanding climate change impacts and associated risks relevant to your work?

Hints for the trainer

- Ensure that participants start with the same knowledge about fundamental concepts of climate change for successfully participating in the training
- The duration of the session can be adapted as needed. For example, it is recommended to spend more time in the on-field work (e.g., a transects walk can ideally take 1 to 1.30 h)



Module 3. Climate change adaptation needs

Learning objective	To prioritize identified climate risks and evolve CCA needs of women farmers to be addressed first
Duration	Shortest version: 20 min Complete version: 3 h 5 min

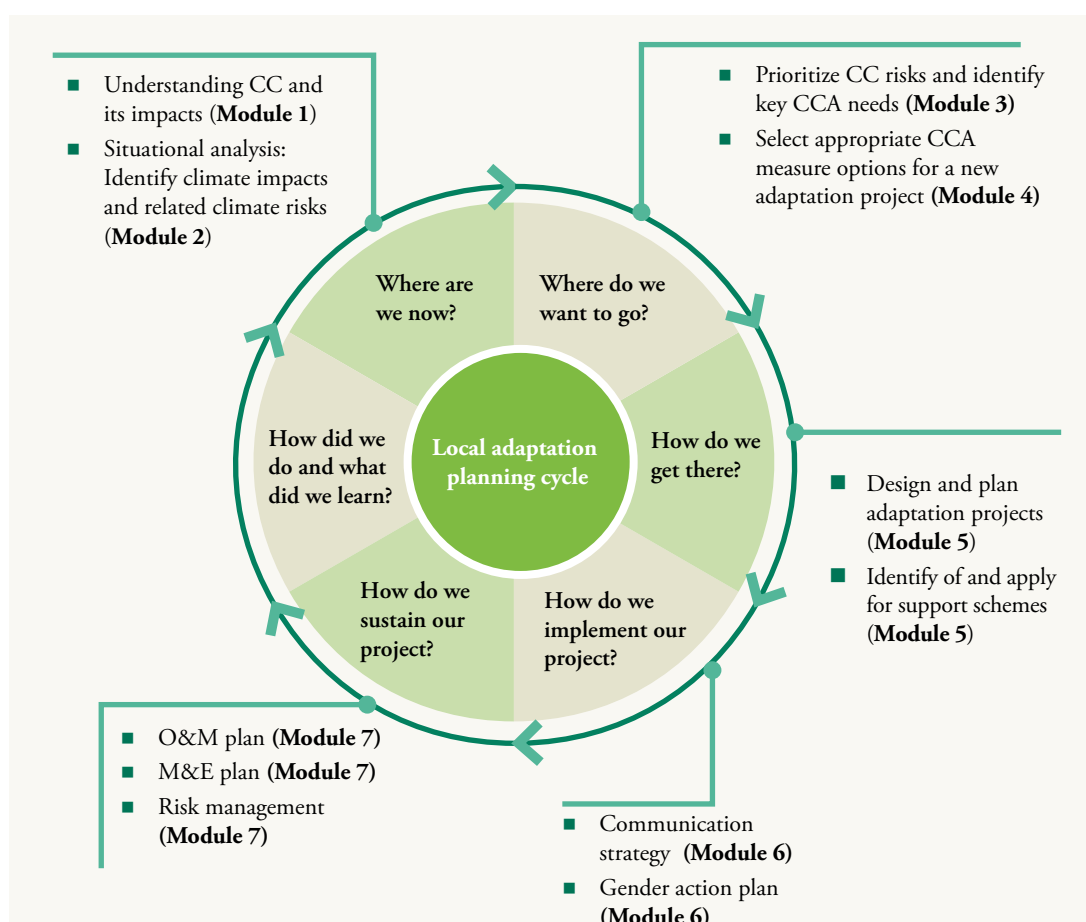
Module planner

Duration	Sessions of module	Shortest version	Complete version
20 min	Session 3.1 Recently conducted needs assessment	×	×
60 min	Session 3.2 Prioritising identified climate risks		×
120 min	Session 3.3 Defining climate change adaptation needs		×
45 min	Session 3.4 Approaches towards adaptation needs		×

Integration of Module 3 along the local adaptation planning cycle

The methodology used by the Capacity Building Package follows the logical processes of local adaptation planning. The right Figure shows the arrangement of the modules of the CDP, their main steps and methods employed. The colour orange indicates that you are in Module 3 and Step 3 of the Local Adaptation Planning cycle, which provides different methods for working with women farmers to assess their climate change adaptation needs. The training sessions in this module will include the results of a recent needs assessment, the prioritisation of identified climate risks and identification of adaptation need. This will enable participants to identify and assess locally adapted CCA measures in module 4.

In the Excel tool you will find a tab in the same orange colour. Here you can document the results achieved by your group of participants in module 3.



Session 3.1 Recently conducted needs assessment

Learning objective	To be informed on recently conducted needs assessment study and identified adaptation needs for Women SHGs
Prerequisites / prior knowledge for successful participation	Hands on experience in climate resilient farming in specific agro-climatic setting
Total duration	20 min
Methods/Exercises	Input presentation
Material	PowerPoint presentation 3.1, handout 3.1, Laptop, LCD projector

Approach

Based on a recent needs assessment, this session will provide participants with an overview of the interventions needed for agricultural system resilience, improved ecosystem services, resilient extension and linkages with relevant regulations and programmes.

Input presentation

- Present slides 2-6 (presentation 3.1: Recently conducted needs assessment) to the participants

The Scoping Assessment in Uttar Pradesh and field experiences indicate that the climate resilience of small land holding farmers, especially the women farmers, need several interventions which can be grouped as follows. The adaptive measures will need to be evolved in consultation with farmers in the specific agro-climatic context:

1. Farm system resilience

- Farm planning- diversity/complexity in farm sub-systems, bio-input production (manure, seeds, bio-pesticides), time and space management,
- Agro-forestry with diversification
- In-situ soil moisture and water conservation, Water budgeting in Bundelkhand and Vindhyan regions
- Participatory Resilient Technology Development with the synergy of science and technology, local wisdom and local resources
- Time and space management in small farms for reduced losses and resilience (multi-tier, agro-forestry, crop rotation, etc.) (esp. in North Eastern region)
- Promotion of small animal farming for diversifying income generation sources
- Integrating Medicinal and Aromatic plants for enhancing farmer's income as well as crop diversification contributing to CC resilience

2. Enhancing ecosystem services

- Role of natural resources and linkage of farm with ecosystem services and need to conserve natural resources (waterbodies, green areas etc) (both in drought and flood affected regions for varying roles)

3. Resilient extension

- Training of Trainers for developing women Master Trainers for Resilient Farming
- Relevant programmes and schemes helpful in resilience building including required institutional credits
- Crop and livestock Insurance: access, rights, benefits and claim processes
- Orientation on relevance and linkage with climate services- weather forecasts and advisories with adequate focus on actions to be taken



4. Linkages with relevant schemes and programmes - Government and other Schemes which may help in enhancing the resilience capacity of farming system

Useful literature

- GEAG (2020): Scoping Assessment of Uttar Pradesh (available on request from GIZ)

Key take-aways

- Participants will be provided with an overview of identified key adaptation needs of women farmers in Uttar Pradesh.

Session 3.2 Prioritising identified climate risks

Learning objective	To assess and prioritise key climate risks identified in Module 2 based on determined climate impacts	
Prerequisites / prior knowledge for successful participation	Basic understanding of climate change scenarios and their impacts. Climate risks are identified (Module 2, Session 2.2.)	
Steps (duration)	Step 1. Understanding prioritisation methodology	5 min
	Step 2. Prioritizing identified climate risks	
	Step 2.1 Assessing probability and time horizon	15 min
	Step 2.2 Assessing vulnerability of the exposed elements	15 min
	Step 3. Comparing final scores of assessed risks	10 min
Total duration	45 min	
Methods/Exercises	Prioritising identified risks with a probability-time horizon matrix and sensitivity-capacity matrix	
Material	PowerPoint presentation 3.2, handout 3.2, Laptop, LCD projector, flip chart, post its	
Preparation of the material	You may prepare some examples and hints to facilitate the group exercises. Support the participants conducting the risk assessment with available literature and regional studies. Seek expert advice when necessary and possible to validate assessments and clarify assumptions.	

Step-by-step approach

In this session, participants assess and prioritise the key climate risks identified in Module 2, guiding them through different aspects and participatory exercises (Step 1). The prioritisation is done under the criteria of probability and time horizon (Step 2) and sensitivity and coping capacity (Step 3) of the climate hazard and impacts on the target group. A final summary matrix (Step 4) gives participants a basis for developing further steps to adapt to climate change.

Step 1. Understanding prioritisation methodology

Input presentation

- Present slides 3-5 (presentation 3.2: Prioritise identified climate risks) to the participants

Before deciding on adaptation measures (Module 4), it is important to compare and prioritise the identified climate risks according to their relevance for the participants.

Risks do not have the same relevance and urgency to act upon them as there is always uncertainty involved when estimating the impacts of climate change. The relevance of the risks depends on:

- The probability: how likely it is that the identified climate hazard occurs?
- The time horizon: when does or is the hazard and negative impact expected to occur? Which of the identified climate risks arise from past/current climate variations, and which are expected to arise from future climate variations?
- The vulnerability: how vulnerable are the exposed elements to the climate hazards?

For example, if the probability of a drought and the vulnerability of the crops are high and impacts are already observed now, i.e. farmers already face crop and harvest loss and resulting lower production levels. Therefore, the climate-related risk from droughts require immediate attention for example through the implementation of soil water conservation measures.

The proposed assessment provides a targeted approach for the subsequent design and selection of appropriate adaptation measures.

Step 2. Prioritizing identified climate risks

Participatory exercise: Prioritizing identified climate risks

- The facilitator should prepare prior identified climate risks for women farmers from the session 2.1.4 and 2.2 step 3 written on cards and pin them on a flipchart, so they can be used in this session. A short discussion round can be held so that the group remembers what was previously identified and is aware of their climate impact chain (hazards that occurred and the climate impacts/risks caused).
- For each of the risks identified in Module 2, ask the participants to assess their relevance by reflecting
 - Step 2.1: the probability and the time horizon of occurrence
 - Step 2.2: the vulnerability of the exposed elements / persons to the climate risk
- They can use worksheets 1-2 (handout 3.2).

Hints for the trainer:

- As the assessment of risks is always fraught with uncertainty, it is crucial to ask the participants to make uncertainties and personal assumptions transparent within the assessment. This helps them to validate made assumptions and decision taken in future.
- Be aware of the following psychological biases during the risk assessment: Often risks from personal experience which are particularly engrained in memory are over-estimated. For example, personal loss experienced during a storm. Orientate yourself more closely to the facts during the risk analysis.



Step 2.1 Assessing probability and time horizon

- Prepare the matrix below on a flipchart or draw it on the ground depending on the setting.
- Ask the participants to define
 - If there is a low, medium or high probability that the impact occurs and
 - The time horizon for the climate hazard causing the identified risk (observed now, expected in 5 or 10 years).
- Depending on the answers let the participant place the climate risk cards (that have been prior prepared) on the matrix.
- Go through the assessment process for all risks relevant to the participants. Final results will be compared in Step 3 of this session. As this exercise is time-consuming, it is recommended to ask the participants to assess not more than 3 selected, relevant risks.
- The participants can note their results using worksheet 1 of handout 3.2.

Guiding questions:

- Probability:
 - How likely it is that the identified climate hazard impact occurs?
 - Ask the participants the last time climate hazard occurred and what kind of impact it caused: was it always the same? When was the impact more or less severe?
- Time horizon:
 - When does or is the hazard and it's negative impact expected to occur?
 - When was the last time it occurred and before that?
 - What could be signals of this hazard?

High probability	Immediate attention required	Immediate attention required	Attention required in the next years
Medium probability	Immediate attention required	Attention required in the next years	Caution over the long term
Low probability	Attention required in the next years	Caution over the long term	Caution over the long term
	Impacts observed now	Impacts expected in next 10 years	Impacts expected mid-century

Step 2.2 Assessing vulnerability of the exposed elements

Participatory exercise

Vulnerability has two elements:

- **Sensitivity:** Attributes that determine whether/ how strongly a hazard will affect the element under consideration. One way of determining the damages caused by impacts is trying to quantify the possible damage in monetary values (Indian Rupees), e.g. how much would it cost to repair the damages done to the houses by flooding?
- **Capacity:** Focusing on the ability to respond to current / future hazards (in terms of knowledge/ skills, technology, financial/economic)

Ask the participants to follow the same instructions as before:

- Prepare the second matrix below on a flipchart or draw it on the ground depending on the setting.
- Ask the participants to define
 - If there is a low, medium or high sensitivity to the impacts and
 - if they have a low, medium or high coping and adaptive capacity
- Depending on the answers let the participant place the climate risk cards (that have been prior prepared) on the matrix.
- Go through the assessment process for all risks relevant to the participants. Final results will be compared in Step 3 of this session. As this exercise is time-consuming, it is recommended to ask the participants to assess not more than 3 selected, relevant risks.
- The participants can note their results using worksheet 2 of handout 3.2.

Guiding questions:

- Sensitivity:
 - How vulnerable are you to the impact of the climate hazards?
 - What strong are the negative impacts after a climate hazard?
- Coping/adaptive capacity:
 - How well can you manage/are you prepared to the impacts of climate hazards?

High sensitivity	Immediate attention required	Immediate attention required	Attention required
Medium sensitivity	Immediate attention required	Attention required	Caution over the long term
Low sensitivity	Attention required	Caution over the long term	No negative impact expected
	Low coping and adaptive capacity	Medium coping and adaptive capacity	High coping and adaptive capacity

Note: In case the participants assessed the vulnerability of more than one exposed element, calculate the final vulnerability score by: $\text{Sum vulnerability scores} / \text{number of exposed elements}$



Step 3. Comparing final scores of assessed risks

Participatory exercise

- After having rated identified climate risks in Step 2 and 3, ask the participants to insert their results in the table on worksheet 3, as example below, by noting down the following scores:

Scoring legend:

- red area = score 5
- light red area = score 3
- grey area = score 1
- white area = score 0

Climate risks	Probability	Time horizon	Vulnerability		Final score
			Sensitivity to the climate hazard	Vulnerability of the exposed elements	
Risk 1: Small and marginal farmers facing water stress					
Risk 2: ...					

Useful literature

- GIZ: Toolkit to develop climate adaptation strategies for small and medium-sized enterprises (SMEs): Climate Expert. Available at: <https://www.climate-expert.org/en/home/>
- GIZ and EURAC (2017): Risk Supplement to the Vulnerability Sourcebook. Guidance on how to apply the Vulnerability Sourcebook's approach with the new IPCC AR5 concept of climate risk. Bonn: GIZ. https://www.adaptationcommunity.net/wp-content/uploads/2017/10/GIZ-2017_Risk-Supplement-to-the-Vulnerability-Sourcebook.pdf
- IPCC, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc.ch/report/ar5/wg2/>

Key take-aways

- Risks do not have the same relevance and urgency to act upon them as there is always uncertainty involved when estimating the impacts of climate change.
- The relevance of the risks depends on: the probability of occurrence, extent and time horizon of the climate hazard and thus climate impacts, and the vulnerability of the exposed elements.

Debriefing questions

- What are your important take-away messages from this session?
- How did the tool support you in identifying the most relevant climate risk for your local context?

Session 3.3 Defining climate change adaptation needs

Learning objective	To identify climate adaptation needs at farm, ecosystem and extension levels to address the identified climate risks	
Prerequisites / prior knowledge for successful participation	Hands on experience in farming in specific agro-climatic setting	
Steps (duration)	Step 1. Identifying CCA needs at farm level of women farmers	60 min
	Step 2. Identifying CCA needs for related to ecosystem services	30 min
	Step 3. Identifying extension services which can help in adaptive measures	30 min
Total duration	120 min	
Methods/Exercises	Defining climate change needs for identified risks	
Material	PowerPoint presentation 3.3, handout 3.3, Laptop, LCD projector, chart papers, markers, cards	
Preparation of the material	You may adjust the given examples and hints for the group exercises to the participants contexts	

Step-by-step approach

In this session, participants will be guided with exercises to identify their specific key adaptation needs on different levels.

In **Step 1** they will focus on CCA needs at farm level of women farmers, in **Step 2** for related to ecosystem services and in **Step 3** they will identify extension services which can help in adaptive measures. The importance here is to transmit the relation between climate risk and adaptation need.

Step 1. Identifying CCA needs of women farmers at farm level

Interactive exercise

- Present slide 3 (presentation 3.3: Defining climate change adaptation needs) to the participants for giving overview and explanation of the exercises.
- The participants will be divided in 3 smaller groups of 5-10 persons and they will be provided with chart paper and markers to draw a matrix in the specific agro-climatic situation (as shown below). Accordingly, the matrix will include crop-wise climate change impacts and the climate adaptation needs. Each group will be named after cropping season viz 'Rabi group', 'Kharif group' and 'Zayad group'. Each group will be asked to work on crops of that specific season. Based on discussions, following matrix (worksheet 1 of handout 3.3) will be developed separately by each group for their specific cropping season (following is a comprehensive matrix which can be divided in specific cropping seasons). Participants can increase the number of crops (more than 2) if they wish so. Also, participants can add column on livestock, orchards, aquaculture also in addition to crops if they consider the impact and risks of climate change on/for those sectors.



Table 6. CCA needs at farm level

Cropping Season	Crops	Climate change impact/risk	CCA Needs
Rabi	Crop 1	Example: Reduced soil moisture, lack of winter rains, early summer damaging quality of grains, etc.	Retention of moisture in soil, Frequent Irrigation facility, Seeds of varieties which are more robust to sustain temperature regimes
	Crop-2	.....	.....
	Crop-3	.....	.....
Kharif	Crop 1	Example: Increased waterlogging duration, increased pest attack, inundation losses, etc.	Quick draining out of water, Crop varieties which can grow in water logged situation, effective pesticide
	Crop-2	.....	.....
	Crop-3	.....	.....
Zayad	Crop-1	Example: Water for livestock, heat wave damaging crops, increased diseases in vegetables, mango crops etc.	Availability of potable water, guidance for appropriate pesticides
	Crop-2	.....	.....
	Crop-3	.....	.....

This matrix can be discussed in plenary to explain how different crops and other farm components (like livestock, poultry, orchards etc.) get impacted due to climate change in different cropping seasons with additions/deletions/modifications from other groups.

Finally, facilitate identifying needed actions (approaches) for addressing these challenges.

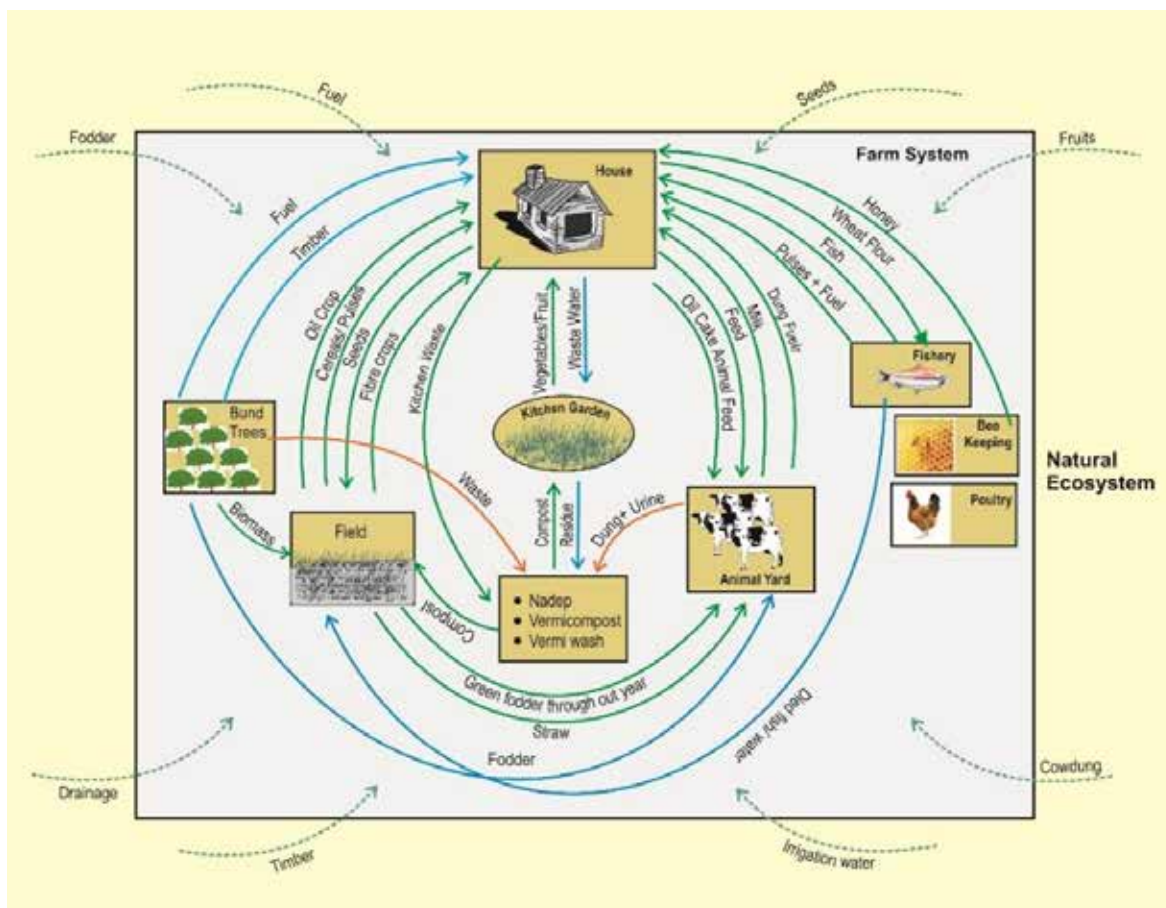
Step 2. Identifying CCA needs related to ecosystem services

Interactive exercise

- Present slide 4 (presentation 3.3: Defining climate change adaptation needs) to the participants for giving overview and explanation of the exercises.
- Provide a diagram of farm system (comprising of farm, livestock shed, trees, fish pond, farmer’s house, kitchen garden etc.) – all within a line boundary. Initiate discussions what inputs of this farm system comes from nearby natural ecosystem (like ponds, streams, orchards, grass land, nearby land etc.) and show each input (ecosystem service) through an arrow.



Figure 16. Ecosystem services relevant for farm systems



Source: Resource book on Climate literacy, 2016

Now enlist all the natural ecosystems thus identified and discuss what changes have been observed in these ecosystems in the last few years primarily because of climate change impacts and how the losses in ecosystem services are impacting farm system and its productivity.

Finally, facilitate identifying needed actions (approaches) for protecting these ecosystems and its services, by using worksheet 2 of handout 3.3 (see table below).

Table 7. CCA needs related to ecosystem services

	Climate change impact/risk	CCA Needs
Ecosystem	Example: Water logging in nearby land affecting the farm	Improved drainage
	Example: Water scarcity	Rain water harvesting, conservation of waterbodies



Step 3. Identifying extension services that can help in adaptive measures

Interactive exercise

- Present slide 5 (presentation 3.3: Defining climate change adaptation needs) to the participants for giving overview and explanation of the exercises.
- The identified needs in Step 1 and Step 2 above (farm level and ecosystem level) can be projected/shown on a chart and needed extension support for each of these needs can be discussed. Discussion can also be held on possible sources (*formal* like government schemes, weather services, information and trainings, equipment and tools and *informal* like farmer-farmer information, grain and seed bank, self-help groups etc.) and related institutions.
- Ask the participants to note their results on worksheet 3 of handout 3.3 (see table below).

Table 8. CCA needs at extension level

	Climate change impact/risk	CCA Needs
Ecosystem	Example: Sudden events of rain fall, dry spells	Access to weather and agro advisories
	Example: Increased diseases in livestock and mortality, crop damages	Livestock and crop insurance

Key Take-aways

- Participants will be able to identify the needed actions and approaches to be adopted at farm system level, ecosystem services and extension services level which can help them to improve resilience capacities of their farm.

Debriefing questions

- What are your important take-away messages from this session?
- How did the session and exercise support you in understanding adaptation needs relevant to your live and livelihood?

Hint for the trainer

- Adaptation needs should be fairly broad at this stage. Help participants to see the “big picture” at this point in the process so that they do not inadvertently skip some steps in adaptation planning.



Session 3.4 Approaches towards adaptation needs

Learning objective	To understand key approaches towards climate change adaptation to cater to the needs of woman farmers for combating their climate risk exposure	
Prerequisites / prior knowledge for successful participation	Hands on experience in climate resilient farming in specific agro-climatic setting	
Steps (duration)	Step 1. Approaches at farm level	25 min
	Step 2. Approaches at ecosystem level	10 min
	Step 3. Approaches at extension level	10 min
Total duration	45 min	
Methods/Exercises	Input presentation and discussion	
Material	PowerPoint presentation 3.4, handout 3.4, Laptop, LCD projector	

Step-by-step approach

This session outlines the successful and field-tested approaches towards climate change adaptation to cater to the needs of woman farmers for combating their climate risk exposure, which can be adopted by the farmers according to their agro-climatic conditions, cropping systems and available local resources at the farm (**Step 1**), ecosystem (**Step 2**) and extension level (**Step 3**) to enhance adaptation. The aim of the session is to provide an understanding of the opportunities and needs for improving farmers' adaptive capacity to climate change, on the basis of which they are prepared to develop their own adaptation measures in the following module.

Step 1. At farm level

Input presentation

- Present slide 3 (presentation 3.4: Approaches towards adaptation needs) to the participants.

Integrated and diversified farming systems

It is a sustainable approach of farming system which focuses on increasing farm productivity by increasing diversification, integration of sub systems, resource integration and creating market and other linkages. It is important that the inter-linkages amongst various farm sub-systems are enhanced. It helps to increase robustness of the farm, minimize losses and support quick recovery. (Reference: Diagram...)

Time and space management

It is an approach to adjust the timing of cropping cycle (preponing or postponing) and optimum management of space for two to three crops in a single farm through appropriate farming techniques to compensate the losses of crop due to flooding and water stagnation.

Appropriate crop varieties

This approach depicts the selection of appropriate resilient crop varieties as per geographical needs like water stress or water tolerant seed varieties. It helps to minimize the crop losses and enhance coping ability of vulnerable communities to the climate induced risks.



Adopting Low External Input Sustainable Agriculture (LEISA)

This approach is focused on replacing the use of high-cost external inputs like chemical fertilizer and pesticides by low-cost organic inputs in agriculture like organic manure, pesticides, bio repellent etc. This helps the small and marginal farmers to maintain the soil health of their farms and enhance net gains by reducing the market dependency even through small farm.

Step 2. At ecosystem Level

Input presentation

- Present slide 4 (presentation 3.4: Approaches towards adaptation needs) to the participants.

At the ecosystem level, the approaches must be focused on protecting the provisioning, regulating, cultural and supporting services of the ecosystems and maintain the continuity of livelihoods of people in general and specific to small and marginal and women farmers even during the climate shocks.

In-situ soil and water conservation

This is important for maintaining all the ecosystems services. The approach includes practices which maintain soil moisture, reduce soil erosion and promote ground water recharge and thus helps to reduce irrigation need of crops and maintain top soil nutrients for good growth of plant/crop.

Figure 17. Ecosystem services



Source: Mitra, A, Wajib, S, Singh BK, 2015.

Step 3. At extension level

Input presentation

- Present slide 5 (presentation 3.4: Approaches towards adaptation needs) to the participants.

At this level providing or strengthening alternative extension system in farming is important to mitigate the impacts of climate change and enhance capacity of farmer to take an appropriate decision at appropriate time.

Community led Institution Building: It facilitates the exchange of information among farmers and increase their confidence in implementing the newly learned practices.

Establishment of linkages and networking: This helps in establishing linkages and connections of farmers with experts, and government line departments. This further facilitates farmers to access updated information on farming related activities from experts and the various welfare schemes and their benefits.

Useful literature

- GEAG (2020): Scoping Assessment of Uttar Pradesh (available on request from GIZ)
- Department of Environment Government of Uttar Pradesh (2014): Uttar Pradesh State Action Plan on Climate Change. Available at: http://moef.gov.in/wp-content/uploads/2017/09/SAPCC_UP_final_version_0.pdf
- Mitra, A, Wajih, S, Singh, BK, (2015) Wheezing ecosystems, livelihood services and climate change resilience in Uttar Pradesh, Asian Cities Climate Resilience Working Paper Series 18: (2015), published by IIED, Available at <https://pubs.iied.org/sites/default/files/pdfs/migrate/10732IIED.pdf>

Key take-aways

- This session will enable participants to understand ready- to -take approaches which are not only helpful in reducing the losses from climate risk, maintain ecosystem service but also provide new directions to earn profit from agriculture in climatic shocks.

Debriefing questions

- What are your important take-away messages from this session?
- How did the session help you in understanding adaptation approaches?



Module 4. Climate change adaptation measures

Learning objective	To understand and select appropriate CCA measure based on risk analysis, identified challenges and needs.
Duration	Shortest version: 1 h Complete version: 3 h Potential complete version at the field level (including site visits): 4 h

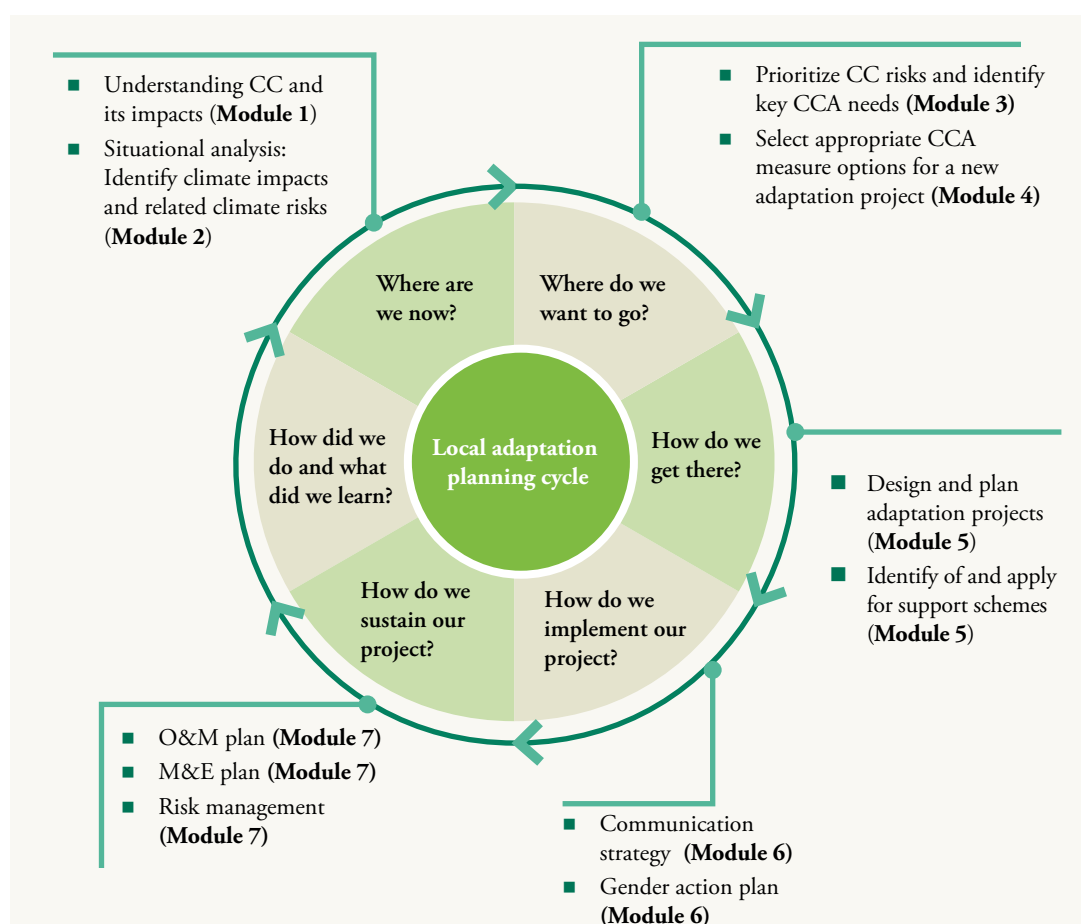
Module planner

Duration	Sessions of module	Shortest version	Complete version
1 h	Session 4.1 Input sessions on best practices	×	×
2 h	Session 4.2 Identifying, assessing and prioritising adaptation measures		×

Integration of Module 4 along the local adaptation planning cycle

The methodology used by the Capacity Building Package follows the logical processes of local adaptation planning. The figure below shows the arrangement of the modules of the CDP, their main steps and methods employed. The colour dark orange indicates that you are in Module 4 and Step 4 of the Local Adaptation Planning cycle, which provides women farmers with an understanding of best practices of local adaptation projects and guides them to assess and select appropriate CCA measures based on their climate risks and adaptation needs identified in the previous modules. The results from Module 4 are the foundation and prerequisite for developing CCA projects.

In the Excel tool you will find a tab of the same colour. Here you can document the results achieved by your group of participants in Module 4.



Session 4.1 Input sessions on best practices for climate adaptation

Learning objective	To learn about adaptation measures and best practices	
Prerequisites / prior knowledge for successful participation	Hands-on experience on various resilient agricultural practices adopted in different agro-climatic regions of UP	
Steps (Duration)	Step 1. Best Practices on Farm System Resilience	30 min
	Step 2. Best Practices on Ecosystem Services	10 min
	Step 3. Best Practices on Resilient Extension	10 min
	Step 4. Understanding mal-adaptation practices in developmental activities	10 min
Total duration	60 min (this session contains presentation material for a longer session. However, we recommend using 1 h for this and selecting the most relevant adaptation measures and case studies for the participants)	
Methods/Exercises	Input presentations	
Material	PowerPoint presentation 4.1, handout 4.1 chart paper, markers, Laptop, LCD projector	
Preparation of the material	You may prepare actual case studies relevant to the participants' context.	

Step-by-step approach

This session provides best practices for climate adaptation at **farm level (Step 1)**, **ecosystem level (Step 2)** and **extension level (Step 3)**. These include:

Step 1. Farm level:

- Integrated Farming model
- Resilient Seeds
- Enhancing farm adaptation by promoting organic farming
- Agro forestry on farm bunds
- In-situ soil and water conservation
- Participatory Water Budgeting – a tool for efficient water management at local level
- Synergy of science and indigenous traditional knowledge
- Production and use of Bio insect repellent as IPM strategy
- Multi-layered Vegetable farming with appropriate crop combinations
- Diversifying farming with medicinal and aromatic plants

Step 2. Ecosystem services:

- Natural Ecosystems for Resilient Farming

Step 3. Resilient extension:

- Farmer Field Schools – A participatory extension approach



Step 1. Best practices on farm system resilience

Input presentation

- Present slides 3-18 (presentation 4.1: Best practices) to the participants for exemplifying different best practices for farm system resilience.

Integrated farming model (slide 4)

The integrated farming model is the better option of employment opportunity and source of income for the small landholders. This farming model follows the properties of integration and diversified approach of farming and is best-suited farming practices for the frequent flooding and drought-prone areas of different agro-climatic regions of India. The key objective of this farming model is to maximise agriculture production, enhancing net gain and enhance the risk-bearing capacity of the farmers to minimise the losses due to disaster. By its virtue, the practice is low external input, increase diversity, complexity and recycling-based and it supports intra-components of farming, make the farming least capital oriented and dependable on household labour. The model is focused on the integration of agriculture-horticulture-aquaculture-livestock rearing; and common property resources management (including forest, water and land).

The diversity component (growing food and fodder crops, horticulture, animal husbandry, poultry rearing, kitchen gardens and trees of commercial value for timber as well as fuel simultaneously in the farm) in model supports the farmers to increase the overall biomass in the small piece of land. The outputs of one subsystem act as the input of another subsystem. For example- the crop residues of the farm are used for fodder for animals as well as raw materials for composting and manure. The advantages of this diversification and integration in the model are that it reduces the external input requirement significantly and make the whole farming practice robust to climate shocks. If nature's socks are intense, then in that situation the whole system does not collapse. It means if one subsystem in the model fails, the farmer compensates for its losses from another subsystem.

The complexity and recycling component in the model also help to rejuvenate the ecosystems services (provisioning, regulatory, supportive and cultural services) naturally and thus helps to improve the health status of soil, reduce soil erosion, maintain common property resources and enhance groundwater recharge. All this cumulatively maintain the functioning of ecosystem services and continuity of the production system.

Figure 18. Integration of Crop-Poultry-Fish-Horticulture



Source: GEAG

Figure 19. A highly diversified farm land of a small farmer



Source: GEAG

Considering the robustness feature of the model, GEAG¹ in the last four decades has scaled the practice with small and marginal farmers in different agro-climatic regions like North Eastern Plain, Bundelkhand region, eastern plain, of Uttar Pradesh and northern parts of Bihar state which are frequently and rampantly inundated for several months. The farmers who have adopted this practice and followed the farming approach of integration and diversification in their small land holdings have not only sustained their livelihood amidst climatic socks but also, enhance the net gains more than double.

Resilient seeds (slides 5-6)

Resilient seed systems are central to sustainable food systems that are renewable, climate resilient, equitable, diverse, healthy, and interconnected. In the light of critical global challenges such as climate change and food and nutrition security, use of drought and flood tolerant seed varieties are increasingly being preferred and adopted by farmers. For instance, the International Rice Research Institute (IRRI) has successfully developed improved, stress-tolerant paddy seed varieties for cultivation in eastern India that are tolerant to drought (Sahbhagi dhan) and submergence (Swarna-Sub1). Adoption of these varieties by farmers have proven to give potential benefits in the wake of changing climate.

Here we discuss the paddy variety which is tolerant to submergence and its benefits.

Rice is a staple crop of Uttar Pradesh with several districts in different agro climatic zones occupying large land areas with its cultivation. Flash flood or submergence is a common phenomenon in rice growing lowland areas that seriously affects crop establishment leading to severe yield losses. Of the total of 2.3 million ha of flood-prone rice lands in eastern India, eastern Uttar Pradesh alone has 0.39 million ha. These areas are located in the low-lying areas adjacent to rivers in different districts—Basti, Maharajganj, Gorakhpur, Deoria, Ballia, Chandauli, Ghazipur, Varanasi, Gonda, Faizabad, Barabanki, and Bahraich—and are subject to various types of uncontrolled flooding ranging from 50 to 400 cm water. Transient flash floods that result in complete inundation of rice fields can occur at any growth stage, from crop establishment to harvest, and for durations of a few days to several weeks.²

With early flood damage, farmers usually re-transplant their fields using aged seedlings of local varieties, but this is costly and, in some cases, not possible as water accumulation is fast in the fields. In general, farmers are not tuned to adopt location specific and environment friendly technologies to overcome or mitigate these stresses.

Because of the extensive heterogeneity in flood-prone ecosystems, coupled with submergence hazards, farmers still grow many different types of traditional rice cultivars. These cultivars are low yielding but possess one or more of the adaptive traits required for this ecosystem, with challenges ranging from temporary submergence of one to two weeks to long periods of stagnant water, to even daily tidal fluctuations that may sometimes cause transient complete submergence. The farmers in submergence and flood-prone areas are resource poor or no resources, and fewer options for their livelihoods. The main constraint is a lack of suitable high yielding varieties that can tolerate complete submergence and have good grain quality.

The Swarna Sub-1 paddy variety is similar to Swarna rice variety grown in eastern parts of the country in all characteristic features except submergence tolerance. Swarna Sub-1 is effective at all growth stages from seedlings to about a week before flowering and has proven to be highly tolerant to flooding/waterlogging in rice breeding. Swarna Sub-1 has now become a popular rainfed lowland paddy variety having high yield, adaptation to low input, moderate tolerance to various stresses, and

¹<https://geagindia.org/index.php/sustainable-agriculture-and-livelihoods>

²A Maurya , H. N. Singh, H Choudhary. Comparative study of Cost and Returns of Swarna Sub1 Rice Variety Cultivation in Chandauli District Of Uttar Pradesh. Res. J. Chem. Env. Sci. Vol 6[4] August 2018. 08-14



good grain qualities. The effects of Swarna Sub-1 on plant survival under submergence are dramatic and it equally performs well under non-submerged conditions. This variety is seen as a boon for farmers in the flood prone areas.

Several such varieties which are tolerant to droughts and water-stressed situations are also being adopted and practiced by farmers in the dryland areas.

Enhancing farm adaptation by promoting organic farming (slides 7-8)

The adoption of diversified adaptive approaches by farmer tends to alleviate their risk towards adverse impacts of Climate Change. The usage of chemical fertilizer in farms are reducing the soil fertility, reducing farm yield, increasing the soil erosion and causing water pollution. Organic farming done by using organic manure is a solution to problems caused by inorganic farming.

Benefits of Organic manure- Organic manure reduces the soil erosion and enhances its fertility. It not only increases the carbon content in the soil but also reduces the industrial greenhouse gas emissions by restricting the usage of chemical fertilisers-prepared by burning fossil fuels. At the same time, it enhances the porosity and soil moisture retention in the soil reducing the demand of frequent irrigation. Organic manure replaces the nitrogen rich chemical fertilizer leading to reduction in air pollution and water pollution A few of the methods for preparation of organic manure has been mentioned below:

Vermicompost- It is a biotechnological process of composting, in which earthworms are used to convert the biodegradable waste into a better fertilizer product. Procedure for preparing vermicompost is- prepare a plastic or concrete tank depending upon the availability of raw material. Collect the biomass, place it under sun for 8-10 days and chop it. Then, sprinkle the cowdung slurry on chopped biomass for quick decomposition. Add a layer (2 - 3 inch) of soil at the bottom of the tank. Now prepare fine bedding in tank upto 0.5-1 ft by distributing the decomposed cow dung, dried leaves and other biodegradable wastes on the layer of soil. After adding bio-wastes, release the earthworm & cover it. Sprinkle water regularly within 1-2 days to maintain the moisture in the pit. Cover the tank for 24 days and finally, compost is ready¹.

Figure 20. Vermicompost



Source: earth911.com

Compost Pit- This is a simple way of producing organic manure by digging a deep hole into the ground, for decomposition of collected biodegradable waste (kitchen waste, agricultural waste, fruit waste, plants & animal residue, wood etc.) into organic manure. This method involves digging a deep hole of size (length*breadth*depth) as 10*4*3 feet into the ground, followed by adding biodegradable wastes into the pit till the piling of waste reaches the level of ground. Finally, cover the pit with 30-40 cm thick layer of animal refuse and then leave it for 6-8 months for the preparation of manure.

Figure 21. Compost pit



Source: GEAG

¹AGR 304: NADEP Method. (n.d.). Ecourse Online. Retrieved May 14, 2021, from <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=108180>

Nadep Compost- It is the process of converting vegetable, other biodegradable substances and animal refuses to manure. NADEP method of composting is aerobic decomposition of organic matter. The procedure for making nadep compost is construct an aerated brick tank of size as 10 ft (length) x 5 ft (breadth) x 3 ft (height). Then, fill the tank with biodegradable waste followed by mixing of waste with cattle dung & water followed by adding layer of dry soil. The approximate ratio of mixing of green waste to cattle dung to water to dry soil in a single layer will be 10:1:10:10. Repeat this layer formation till the compost is filled and then cover it for next 3 months for making final manure. The intermediary moistening of compost at an interval of 6-15 must be regularly carried out for complete 3 months².

Figure 22. Nadep compost



Source: *digitalgreen.org*

Agro forestry on farm bunds (slide 9)

Practising agroforestry (trees and shrubs) with farming simultaneously is a sustainable method of land use management at the farm level to ensure alternative food, fodder, fuel and timber requirements for the small and marginal farmers.

There are various ways to practice agroforestry with farming like planting trees, shrubs, timber and fruit plants on farm boundaries, around ponds/wetlands, over pasture land and orchard, block plantation, lane cropping etc. Among these, the agro forestry on farm bunds is very common throughout the state (Uttar Pradesh).

Figure 23. Agro forestry on farm bunds



Source: *GEAG*

The agro forestry on farm bunds offers various provisioning (nutrient, biomass, timber, fuel, fodder and fruits), regulating (soil erosion due to flood, wind checker), supporting (maintain soil moisture, nutrient recycling through leaf litter decomposition, bio-fence, etc.) and cultural services (demarcation line) at individual farm level in different agro-climatic zone to mitigate climate change impacts, sustain agriculture productivity and most importantly helps to mediate microclimate during summer, winter and rainy season.

Figure 24. Agro forestry on farm bunds



Source: *GEAG*

²How to prepare vermicompost. (n.d.). BYJU. Retrieved February 15, 2021, from <https://byjus.com/biology/vermicomposting/>

In-situ soil and water conservation (slides 10-12)

In the emerging crisis of decreasing rainfall amount and consequently depleting groundwater table and base flow of river water, due to climate change impacts, the approach of In-situ soil and water conservation is an effective measure in drought prone and rain fed areas to capture rainwater and conserving water bodies to retain moisture in soil and ground water recharge. It helps in plant's growth, increased grain production, biomass yield, and maintain groundwater table.

In this approach, there are varieties of practices that can be used to conserve soil moisture and soil erosion and water conservation. These are:

Mulching

Mulching is the practice to place materials on a soil surface for the purpose of reducing evaporation, retaining moisture, reducing soil erosion, and suppressing weed growth and prevent soil erosion. With increasing rainfall variabilities and increasing average temperature due to climate change, maintaining soil moisture has become an important issue in agriculture.

There are several types of mulching practices,

- **Biomass Mulching:** Covering the soil with crop residue, leaves and other biodegradable items.
- **Live Mulching:** Covering land with a cover crop like multi-layer farming, intercropping, etc.
- **Mechanical Mulching:** Breaking the top layer of soil to check capillary action. It can be done by weeding or hoeing the field for reducing the competition for sunlight, air, moisture and nutrient uptake between the main crop and weeds.

Farm pond

Farm ponds are small water tank or reservoir's structure used for the purpose of storing the surface runoff, rainwater to use in irrigation, and fish rearing. Due to climate change, rainfall has become erratic in most part of India and even in Uttar Pradesh. These uncertainties of rainfall have enhanced the crisis of water resource and affected the livelihood of small and marginal farmers and their farming activities significantly. In drought-prone areas, the farm ponds.

Figure 25. Mulching



Source: www.agriculturejournal.org, volume 5 number 3/organic-mulching

Figure 26. Farm pond



Source: GEAG

Constructing farm ponds is one of the successful interventions in the state especially in Bundelkhand and Vindhya region and even in flood-prone areas also. These farm ponds are not only the source of irrigation in agriculture and but also an important means of groundwater recharge. In flood-prone areas, it provides ground for fish rearing and alternative livelihood. In case of extreme heavy rainfall event, farm ponds help in reducing soil erosion.

Farm bund

In undulating topographic areas, the construction of a Farm bund along the boundary of farm fields is a successful practice. It helps to contain rainwater in the field for a longer time and to maintain soil moisture, reduce soil erosion during heavy rain and protect fertile soil. The farm bunds are also being used to grow fruit, fodder and other trees to supplement the family's nutrition, fodder, fuel and support to generate additional income for the households during the stress period.

Figure 27. Farm bund



Source: GEAG

Participatory water budgeting – a tool for efficient water management at local level (slide 13)

In the stir of climate change and persistent rainfall aberrations, water becomes a limited resource especially in semi-arid regions like Bundelkhand. Even where watershed development successfully augments water stocks, conditions of water scarcity persists. This is particularly so in cash crop based agrarian economies which draw heavily from groundwater reserves for irrigation. The major challenge in the water sector lies in changing the existing mind-set of people from 'private ownership' to 'water as common pool' and to promote demand side management. Climate change, and specifically the increasing erratic rainfall, worsens the situation. As there is a limit to harvest water in any location, the wise use of available water with a systematic planning process holds the key to achieve the water security in villages. Implementation of water budget plans helps to deal with this challenge.

The water budgeting tool is important in following manner:

- Efficient tool for contributing to drought proofing strategies and drinking water security in semi-arid areas
- Addressing water shortage for domestic and livelihood needs of rural and agrarian communities as well as water required for ecosystem sustenance.
- Dealing with incidences of crop failure and low crop yield because of water scarcity.
- Supportive for implementing major provisions of policies and Acts in water and agriculture sector at centre and state level, such as Groundwater Act, 2020, Centre's Model Groundwater Bill 2017, etc.
- Evaluating the cumulative effects of land and water uses within watersheds and setting the targets for water conservation
- Addressing growing water scarcity due to projected climate change and erratic rainfall in context of projected 1.5-degree Celsius global temperature rise.
- Achieving Sustainable Development Goals (SDGs), especially SDG 6-Ensuring availability and sustainable management of water and sanitation for all, and SDG 12-Ensuring sustainable consumption and production patterns (of natural resources)

Water budgeting is similar to balancing the bank account. Consider, all water getting available annually for the village from rainfall (in terms of soil moisture, surface and groundwater) is your savings whereas the total amount of water getting lost and used for all needs (such as domestic, crops, irrigation, evapotranspiration etc.) as withdrawal from your account. In short, water budgeting is 'an estimate of harvest of water resources and its utilization for a set period of time. It is the process which mainly assess

- a. the volume of available water (in form of surface water and groundwater recharge and soil moisture),



- b. water required for different needs throughout the year (human, livestock, agriculture), and
- c. if there is a deficit in amount of available and required water, then preparing action plan to recover this deficit.’

In short, water budgeting tool helps communities to understand the amount of water available for different uses and plan their water needs, mainly drinking water and cropping pattern, within available amount of water. In simple terms, water budget is process of calculating water required for our overall different needs against the total water available to us from different sources. This leads to arrive at decision whether we are in water deficit or surplus condition, providing choices to communities to address the water deficit.

Major data required for preparing water budget

- Total area of watershed and its distribution in terms of forest land, fallow land, area under crops, details of all existing soil and water conservation interventions and structures, cropping pattern and proposed crops by farmers, village population and livestock details etc.
- Rainfall is one of the important inputs for calculating the water budget. For preparing pre-monsoon water budget, average annual rainfall for last five years should be considered whereas for the post monsoon budget, actual rainfall occurred during the monsoon in the villages should be considered.

The cycle of water budgeting (slide 14)

- The scale or unit for water budgeting is the important factor, technically a micro watershed or catchment is the ideal scale for water budgeting, but considering the management and practical implementation opportunities, water budgeting should be calculated at village (administrative boundary) level. However, the areas where village area and watershed area matches are the ideal location for conducting the water budgeting exercise.
- Water budgeting needs to be done twice in a year, pre-monsoon (for kharif season) and post monsoon (for rabi and summer season)
- Water budget is not a one-time process. It results in follow-up plans for changing crop pattern, plans for harvesting additional water and for saving water or efficient water-use. To ensure that, the people follow the collectively prepared plans, Gram Panchayat should make necessary rules through Gram Sabha regarding water-use and crop practices. Above depicted cycle needs to be repeated continuously for few years in the village to gain few tangible results.

Figure 28. The cycle of water budgeting



Source: NABARD and Watershed Organisation Trust, WOTR

Synergy of science and indigenous traditional knowledge (slide 15)

Sustainability of livelihood systems depends on strengthening human capital in ways that support the management of the natural capital. Traditional knowledge, the knowledge and insights acquired through extensive use or observation of an area or species, can play an important but often undervalued role, enabling local communities to manage vulnerability, uncertainties, shocks

and stresses. New innovations based on modern science can be developed building on it, clearing some of the knowledge and technological bottlenecks that limit its applicability and effectiveness. Local community institutions and individuals within a community can be strengthened to identify, conserve, manage, and add value to local diversity and other renewable land resources when traditional knowledge is improved by modern science and technology.

New innovations based on traditional knowledge or improvements of traditional resource use and management practices can provide local solutions in response to emerging climate change impacts and possible adaptive measures. Resource use and management practices developed elsewhere based on traditional knowledge also need to be tested in new situations.

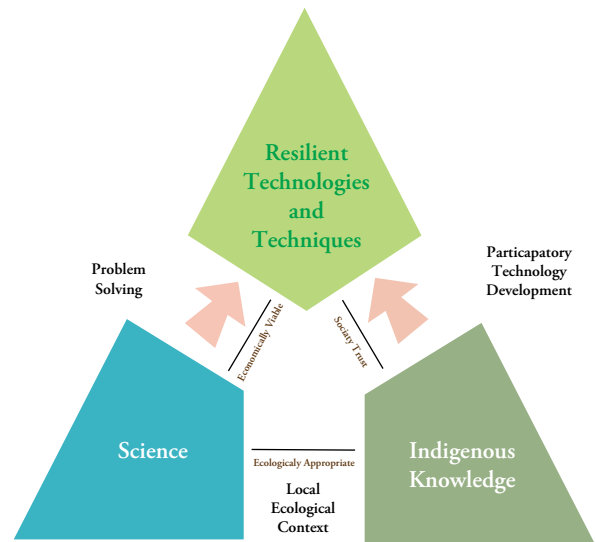
Collaboration of farmers groups with local resource institutions like KVKs, universities, departments, etc. can be very helpful in this direction.

Production and use of bio insect repellent as IPM strategy (slide 16)

Climate change has induced the incidence of pest attack, boosted their appetite, and most important changing their migration pattern. All this phenomenon has posed a greater threat to small and marginal farmers and their crop production. Though under the integrated pest management strategy, there are several methods of pest control like chemical, cultural, and biological and physical methods and have their own properties and drawbacks.

At present, the chemical method of pest control is quite popular because it works very instantly but on the other side, while controlling the attack of enemy pests it also kills friendly pest and deteriorates soil quality. All these cumulatively affect the farming ecosystems. As human being is using the pesticide he also gets exposed with these chemical-based toxic pesticides and in long run get impacted and suffers from different chronic diseases. The excessive use of chemical-based pesticide also imposed a monetary impact on the farmers to depend upon the market and increases the input cost in agriculture.

Figure 29. Evolving participatory resilient technologies



Source: Gorakhpur Environmental Action Group and Department of Science and Technology, Govt of India presentation at UNCCD-COP 14, 2019

Figure 30. Production and use of bio insect



Source: GEAG

³Press Information Bureau (pib.gov.in)

The practice of bio insect repellent production is a successful product and technique of citizen's science of pest control using local resources at nominal price. It is being widely adopted by small and marginal farmers of flood and waterlogged areas of eastern Uttar Pradesh and northern Bihar³. By the virtue of its name, it is apparent that the product is non-chemical based and it is being prepared by using the appropriate amount of medicinal leaves with Cow urine. Unlike chemical pesticides it does not kill the pest rather it works as a repellent and very effective in controlling shoot borer, Fruit borer, Fruit fly, Aphids, Grasshopper and Gondi Bug. If it is properly used as per prescribed norms and sprayed at the interval of 7 days its efficacy to control pest attack increased by 75- 80 %. Besides it, being a property of antifungal and anti-microbial substances, it acts against soil-borne pathogens and improves soil health and crop production.

Multi-layered vegetable farming with appropriate crop combinations (slide 17)

The multi-layered vegetable growing practice with appropriate crop combinations are the unique example of the time and space management approach of farming and situation-based solution to the small and marginal farmers in flood prone areas. This farming technique helps small and marginal farmers to harvest two to three crops in the same piece of land simultaneously and have immense scope to increase the net profit of farmers. It also helps farmers to save crops from complete failure from flood and waterlogging and earn a stable income around the year.

Each vegetable family crop has unique features of root zones, maturity period, demand for solar energy (sunlight) and plant height. The table shows different crop features and tolerance level to waterlogging (see table below).

Crop	Ph	Depth of root zones (in feet)	Required Sunlight (in hours)	Nature of crops	Water tolerance day
Bitter Gourd	6.0-6.5	4-5	7-8	Creepers and climber	8-10
Potato	6.5-7.0	1.2-2.0	5.6	Tuber	0
Ivy Gourd	7.0-7.5	3-4	7-8	Creepers and climber	15-18
Elephant ear	6.5-7.0	2-2.5	4-5	Tuber	2-3
Bottle gourd	6.5-7.0	4	7-8	Creepers and climber	5-6
Cabbage	7.0-7.5	1.5	4-5	leafy	0
Coriander	7.0-7.5	0.5-1.0	4-5	leafy	0

The practice of multi-layered vegetable growing has considered all the features of the life cycle (time management) of the plants i.e time of sowing, transplanting, maturity of the crops, the ph level of soil, property of root zone depth of the crops, availability and duration of solar energy (sunlight), nature/ property of crop, its survivability in water logging condition with appropriate crop combinations (space management.) The successful crop combinations like bitter gourd – potato, ivy gourd- elephant ear, bottle- cabbage etc have evolved (see images).

This practice of vegetable growing with appropriate crop combinations is most appropriate to all the small and marginal farmers of Indo-Gangetic Brahmaputra plains who have the limited scope of farm mechanisation, their farms get flooded and clogged with water for few weeks during Kharif season and sometimes, the farming activities of Rabi season also get affected. GEAG with the support of the Department of Science and Technology (DST), New Delhi, and vegetable growers have scaled this practice in Gorakhpur, Uttar Pradesh and West Champaran of Bihar to resolve the issue of crop losses during the Kharif

Figure 31. A farmer's field with time and space management



SOURCE: GEAG

Figure 32. Mix cultures



SOURCE: GEAG

season, utilisation of those low-lying farms which remains inundated during the monsoon period, opened up avenues for farmers to reduce input cost and increase the profit margin to the extent of more than double. The practice helped thousands of small and marginal farmers by reducing inputs costs (fertilizers, pesticides, irrigation, labour) and increase profit by optimization of resources, and reduced losses (33%) due to floods/inundation.

Diversifying farming with medicinal and aromatic plants (slide 18)

The Bundelkhand region of Uttar Pradesh is usually marked by drought-stricken areas, barren lands, where farming is dependent on monsoon. But despite of all these, nature has blessed the placed with abundant indigenous medicinal plants and herbs which are produced even in shortage of water. Bundelkhand possess huge potential for medicinal and aromatic farming and there is an urgent need to tap this potential with effective linkages and marketing strategies.

Diversifying food and vegetable crops with medicinal and aromatic plant cultivation comes with a range of benefits for the small and marginal farmers. The medicinal crops provide better returns than traditional crops and have very high domestic and export demand. It fetches better prices in the market and can be stored for a long time, and sold at a time when better prices prevail in the market. Being largely drought tolerant, the medicinal plants are not easily grazed by animals and hence, when planted on farm bunds, it gives the needed protection to other crops. Medicinal plants also have low incidence of pest attacks and diseases. When grown as inter-crops, along with traditional crops, the competition for water and other nutrients is fairly less, allowing all crops to grow together in a healthy manner. The medicinal plants require minimum resources and therefore, the cost of cultivation is low as compared to the traditional crops. Growing medicinal and aromatic plants is less labour-intensive and hence, an added benefit for the woman farmers who can grow in their backyard kitchen gardens.

Experiences have shown that many medicinal and aromatic crops do not require intensive agri-inputs and grow well under natural stress conditions, may it be water, light, nutrients or salts. A number of aromatic grasses such as Lemongrass, Palmarosa, Vetiver and plants like Chamomile are the potential crops suited for salt affected soils in Bundelkhand region providing substantial profits to the poor farmers. These crops have great possibilities to be grown on large chunks of land where food/vegetable crops cannot be grown profitably.

Many varieties of plants like Ashwagandha, Senna, Kalmegh, Basil, Lemongrass and Palmarosa have been developed and demonstrated to grow well under rain-fed/dry land conditions providing good profits within a short crop period. Further, these medicinal and aromatic plants can be successfully cultivated in areas prone to destruction of crops by wild animals.

The Government of India with the help of Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow and State government with the help of their agricultural departments, agricultural universities and other institutions have taken the initiative for the all-round development of promising plants and has developed technology packages for cultivation of important medicinal and aromatic crops including genotypes producing quality nucleus material acceptable in world market. For instance, CIMAP has developed the high yielding variety of Khus which can sustain floods and can also prosper in less water conditions. Thus, for every one hectare of land, a farmer can earn over Rs. 1.5 lakhs in a span of about one year by producing 25-30 kg oil per hectare. some medicinal and aromatic plant varieties that are sustainable in dry conditions. The developed agrotechnologies by CIMAP have been beneficial for the farmers, especially small-marginal, as well as industries.

While the medicinal and aromatic plant varieties are best suited for Bundelkhand regions, there are several varieties that can be grown/promoted in water-abundant regions of UP as well.



Step 2. Best practices on ecosystem services

Input presentation

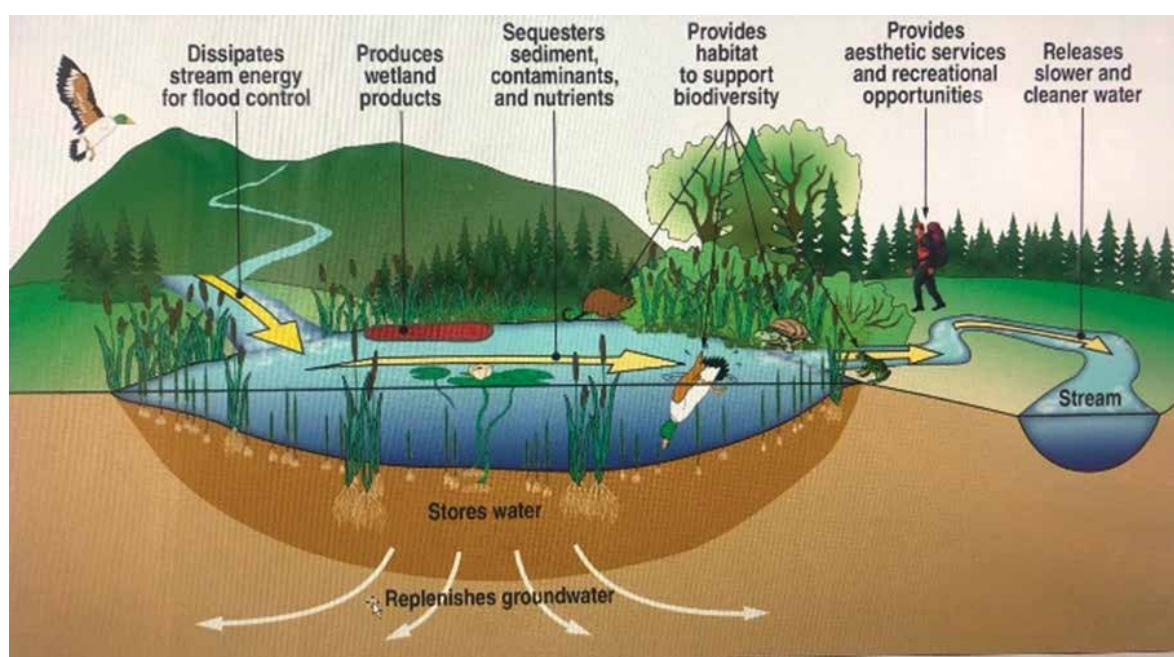
- Present slides 19-20 (presentation 4.1: Best practices for climate adaptation) to the participants.

Natural ecosystems for resilient farming (slide 20)

Natural Ecosystems play a very important role in farming- especially for the small land holding farmers. The Farm System mainly comprising of agriculture field, livestock, kitchen garden, farmers house, aquaculture and other such farm sub systems are inter-connected and contribute to each other's needs. The farm is surrounded with a land scape which comprises of various natural ecosystems and this space contributes to farm activities in various ways – directly and indirectly.

The needs of farm system are also fulfilled through nearby natural ecosystem, like Waterbodies (ponds, water streams), orchards, grassy and green land, open spaces and so on. It is therefore important that ecosystems around farming areas are well considered and protected for their efficient ecosystem services benefitting farmers. This is particularly important for ecologically stressed situations of droughts, floods etc.

Figure 33. Examples of ecosystem services provided by wetlands



Source: Amelia Rozelle, A. (2019). *Water Purification as Defined by Nature*. Adapted from www.exponent.com

Ecosystem services: How it helps in resilient farming

Natural systems have been referred as humanity's "life-support system" providing essential "ecosystem services" for existence and socio-economic well-being (The Millennium Ecosystem Assessment, 2005). Ecosystem services are the benefits that people and communities obtain from ecosystems. These include "regulating services" such as regulation of floods, drought, land degradation and disease, along with "provisioning services" such as food and water, "supporting services" such as soil formation and nutrient cycling, and "cultural services" such as recreational, spiritual, religious and other non-material benefits.

The Natural Ecosystems, around the farms, largely as common property resources provide a number of services needed for the farm production including livestock rearing and commodities for human

consumption. At the same time these various services also significantly contribute in building the resilience of farms and its production in the situations of shocks and stresses. Following are some of the examples of these ecosystem services which helps the farm production and strengthening resilience in the situation of climate change impacts and induced disasters.

Table 9. Ecosystem services

Provisioning	Regulating	Supporting	Cultural
Dependable access nutritious food (fruits, Food generated in water), Irrigation Water, Forest produce, Grasses and fodder, Fuel Wood, Materials for home, cattle shed and farm	Buffers for excess water and drainage in flood affected areas. Water conservation and ground water recharge in drought prone areas. Waste Recycling/ treatment, Wind breaks, Checks soil erosion	Preservation and creation of green spaces helps in augmentation and sequestration of carbon, Soil Formation, Pollination,	Creates space for cultural activities and entertainment

These Natural Ecosystems are needed to be identified, protected and conserved for the wellbeing of communities and resilient farming. Various government schemes are also helpful in this direction.

Step 3. Best practices on resilient extension

Input presentation

- Present slides 21-24 (presentation 4.1: Best practices) to the participants for exemplifying different best practices on resilient extension.

Farmer field schools – a participatory extension approach (slide 22)

Farmer Field Schools (FFS) is a unique way to educate farmers and is an effective platform for sharing of experiences and collectively solving agriculture related problems, more so in the wake of changing climate and its adverse impacts on agriculture. The first FFS were designed and managed by the UN Food and Agriculture Organization in Indonesia in 1989. Since then more than two million farmers across Asia have participated in this type of learning. During the 1970s it became increasingly apparent that pest resistance and resurgence caused by the indiscriminate use of insecticides posed an immediate threat to the gains of the Green Revolution. At the same time, new researches demonstrated the viability of biological control of major rice pests.

However, gaps still existed between the scientific knowledge generated in research institutions and common farmer practices, conditioned by years of aggressive promotion of pesticide use. Over the ensuing years, a number of approaches were tried to bring integrated pest management (IPM) to small marginal farmers. By the end of the 1980s, a new approach to farmer training emerged in Indonesia called the ‘Farmer Field School’ (FFS). These field schools were designed basically to address the problem of lack of knowledge among farmers relating to agro ecology, particularly the relationship between insect pests and beneficial insects.

The Farmer Field School brings together concepts and methods from agro ecology, experiential education and community development. These FFS were initiated based on two premises. Firstly, although farming itself is done mainly on individual farms, the rural community plays an essential role in farmer’s strategies for survival and development. Farmers like to get together to share information and other forms of mutual support with others whom they trust. Secondly, farmers have a tradition of developing and applying technologies and refining it through experiences. They learn tacitly–learning by doing.



The FFS approach is built around these two premises. It responds directly to the information needs of the small marginal woman farmers who have been largely neglected in conventional extension systems. The FFS offers farmers the opportunity to learn by sharing, by being involved in experimentation, discussion and decision-making. This strengthens the sense of ownership of rural communities in technological packages and evolving new knowledge and skills.

The Gorakhpur Environmental Action Group (GEAG) has an extensive experience in conducting FFS in various districts of Uttar Pradesh and Bihar, wherein, village meetings are conducted and a seasonal action plan is prepared at the beginning of the year. A fortnight before the FFS day, problem cards are distributed to the farmers wherein they enter the problems encountered by them in their fields. The problem cards are collected and distributed to the Master Trainers, who are specialists in their fields, for providing remedial solutions to the problem and for identifying appropriate resource persons. Functioning with a problem-solving approach, the FFS farmers co-evolve resilient measures to the impacts of climate change in their crops with the available local resources and share each other's experiences in solving problems. Very often, farmers also invite resource persons and experts from agriculture universities, government departments, etc. to provide valuable inputs and remedial solutions to problems. The FFS is also linked with resource institutions such as Krishi Vigyan Kendra (KVK), Agricultural Universities, Extension Departments and so on.

Strengthening extension system in farming: Weather advisories (slide 23)

The strengthening of extension system in farming- by leveraging the usage of technology is of proven benefits as it empowers the farmer with the skill of decision making, by establishing linkage with experts for receiving updated information on farming activities. In wake of the non-availability of accurate weather forecast at the village/block level, the small and marginal farmers suffer from huge losses due to the impacts of extreme weather events like flooding & waterlogging, dry spell, pest attack & crop diseases.

The below mentioned practice for enhancing the extension system in farm is operational in parts of Gorakhpur and Mahoba districts of Uttar Pradesh and West Champaran district of Bihar⁴.

Technology

In light of microclimate pattern of a region, the mechanism involves collaborating with regional center of IMD and installing the rain gauge coupled Automatic Weather Station (AWS) in the intervention area. Macro level data of weather forecast provided by regional center of IMD is downscaled to block level followed by synchronization of the downscaled data with

Figure 34. Technology of issuing and disseminating agro-weather advisories among communities



Source: GEAG

³Singh, B. K., Singh, A., & Srivastava, A. (2020, August 21). *Bringing digital technology to farmers' door steps*. LEISA INDIA. <https://leisaindia.org/bringing-digital-technology-to-farmers-door-steps>

data obtained from AWS. Then, the expert of weather monitoring organization analyzes the data and issue the accurate weather forecast for the intervention area.

The agro advisories are issued by collating two sets of information. One set consists of smart climate advisory module developed at the level of weather monitoring organization- for issuing advisories for crops to be grown in various changing seasons. The second set consists of value addition for promotion of low external input sustainable agriculture on basis of ecological principles.

Process of dissemination of agro-weather advisory

The single message consisting of weather advisories clubbed with agro advisories are sent directly to the mobile phones of farmers at an interval of 6 days each (five times in a month) At village level, the messages are also announced through public address system.

Benefits of the agro-weather advisory

The farmers capacitated with advisory are empowered to pre-pone or post-pone the farming activity and select an appropriate farming operation. As per the feedback of farmers, this technological intervention has got an accuracy of 90% - 95% in terms of weather forecast and the practice is crucial in farm irrigation management, reducing the agriculture input cost, rationalizing the usage of fertilizer and pesticides, etc. This experience indicates significant benefits to farmers in increasing the adaptive capacity.

Step 4. Understanding mal-adaptation practices in developmental activities

Sometime considering the urgency or even in normal time, people and even the government or department at local level adopt the practices without understanding its prospects and consequences. This creates problems instead of minimising the risk of climate change impacts. Here in the following paragraph few examples of mal-adaptation practices like in MGNREGA, cropping systems at fam level by farmers, eco-system services, water conservation etc. are captured in developmental activities:

1. In the village developmental activities, MGNREGA resources are largely used for earthwork in activities like khadanja (brick road) development, link roads, bund construction, etc. In such earthworks, drainage considerations are mostly missed out causing disruptions in flow of water according to the natural gradient. In flood and waterlogging affected regions, the rainwater flow is disrupted because of these earthwork constructions enhancing the waterlogging – both in terms of enhanced time period as well as increased covered area.
2. In conservation of waterbodies for beautification and due to ignorance, embankments are constructed from all sides of the waterbody thereby disrupting the rainwater flow into the village ponds and hence, adversely affecting the recharge of the waterbodies.
3. In villages, small marginal farmers avail number of inputs in the form of fuel, fodder and food for their farming system, which are from the nearby ecosystems like green areas, open spaces, orchards, waterbodies. Ignoring the contribution of ecosystem services in the farming system, these common property resources are being encroached because of the land pressure thereby adversely affecting the ecosystem services and the resilience capacities of the farming system.
4. Promotion of monoculture in programmes and schemes affects the robustness of farm systems and hence enhances vulnerability of the farms in the extreme events like erratic rainfall, droughts, etc.

Apart from the above-mentioned mal adaptation practices, the facilitator should also ask the participants to recall the mal adaptation practices being practiced in their local area. This will help to increase the efficacy of the activities and its impact.



Useful literature and databases

- Adaptation knowledge portal by UNFCCC: Case studies, reports, publications, policy briefs, etc. Available at: <https://www4.unfccc.int/sites/nwpsstaging/Pages/Home.aspx>
- European Climate Adaptation Platform Climate-ADAPT: Adaptation options. Available at: <https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures>
- Asia Pacific Adaptation Network (APAN): Adaptation Technology Database. Available at: http://www.asiapacificadapt.net/adaptation_technolog/
- Technology Needs Assessment Database: Reports and Factsheets on various climate adaptation options. Available at: <https://tech-action.unepdtu.org/tna-database/>

Key take-aways

- Participants will learn about varied adaptation measures and best practices related to Farm System resilience, ecosystem services and resilient extension mechanisms that have been tried and tested in the field and can be adopted
- Knowledge on resilient seeds and their benefits.
- Learn how soil moistening is done by different techniques and applicable in your place. Transfer of indigenous traditional knowledge to today application is provided.
- Understanding that water management is directly related to agricultural development and food security, especially in a climatically stressed scenario with highly erratic monsoons.
- Rainwater storage can help replenish local aquifers, reduce urban flooding and, most importantly, ensure water availability in water-scarce areas.
- Participants will also learn about the mal-adaptation practices which are being adopted in development which hinders the course of climate adaptation

Debriefing questions

- What are your important take-away messages from this session?
- What best practices presented do you find most relevant for your work?

Session 4.2 Identifying, assessing and prioritising adaptation measures

Learning objective	To identify, assess and prioritise adaptation measures to selected CCA needs.	
Prerequisites / prior knowledge for successful participation	CCA needs are identified	
Steps (duration)	Step 1. Understanding and identifying CCA measure options	30 min
	Step 2. Assessing adaptation options according to different criteria	60 min
	Step 3. Selecting CCA measure(s) to be implemented	30 min
Total duration	2 h	
Methods/Exercises	Input presentation, identify suitable adaptation options using databases and a CCA matrix, scoring of the options according to different criteria	
Material	PowerPoint presentation 4.2, Handout 4.2, Laptop, LCD projector, desirable: internet access	
Preparation of the material	You may adapt the examples provided to facilitate the exercises in this session to the participants' context.	

Step-by-step approach

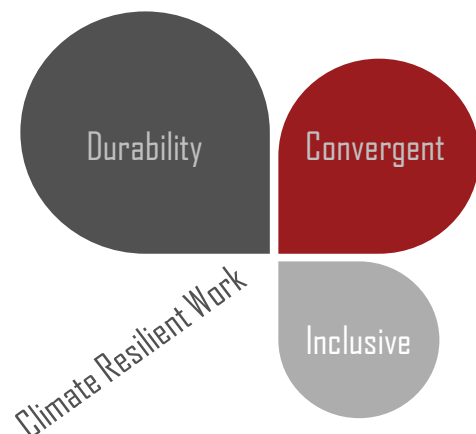
- This module provides inspiration and tools for identifying, assessing and prioritising suitable CCA measures for adapting to the most pressing climate risks that were identified in Module 2 and prioritized in Module 3.
- In **Step 1**, participants will identify suitable CCA measure options to address their prioritised CC risks and CCA needs. Knowledge material will introduce the participants to different categories of adaptation measures and will provide inspiration including local case studies. Participants are also invited to share known measures from their working environment.
- In **Step 2** participants assess the measure options identified under considering different criteria including level of risk reduction, technical feasibility, internal feasibility, costs and benefits, social and environmental impacts and acceptance of and support for the measure.
- Finally, in **Step 3** the identified measure options are compared and ranked according to the scores that they received in Step 2 for the different criteria. The best ranked measure options will be selected for implementation.

Step 1. Understanding and identifying adaptation options

Input presentation

- Present slides 3-7 to the participants to provide them with some general background information on adaptation/climate resilient measures

To achieve climate resilience new assets should be prioritized, planned, designed, built and operated to account for the climate changes that may occur over their lifetimes. Existing infrastructure may need to be retrofitted, or managed differently, given climate change. Lastly, additional infrastructure, need to be constructed to address the physical impacts of climate change. This additional infrastructure can include traditional infrastructure, such as hard defenses and other engineered solutions, as well as skill and capacities to operate and maintain such infrastructures.



Key elements of climate resilient work are:

Durability: They should have the ability to endure climate change related stress during their lifetime. There should be tweaking of its design/retrofitting to achieve that. (e.g. LBCD structure can be tweaked considering the future rainfall intensity)

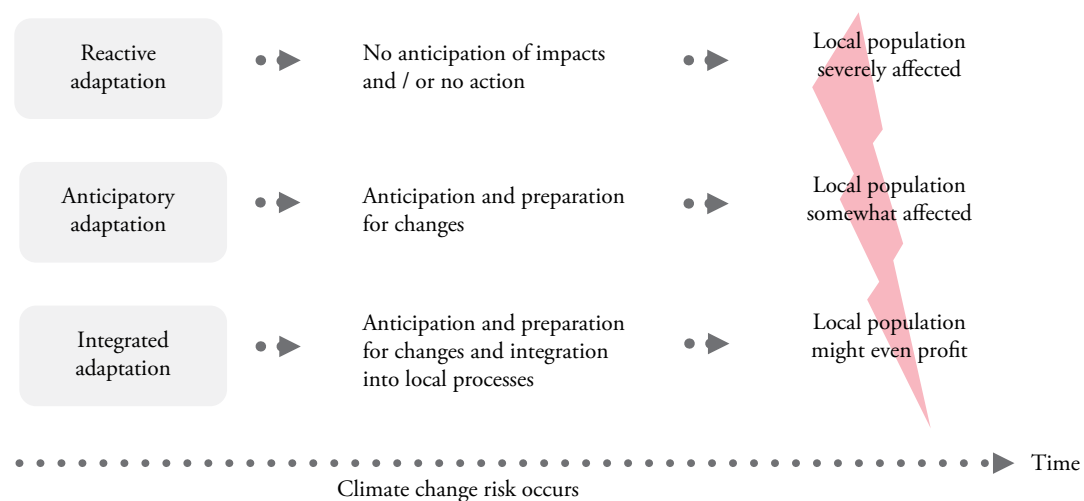
Convergent: A climate resilient outcome can only be achieved through participation of many sectoral departments/agencies and stakeholders. Therefore, the planning for such works should have desired flexibility and complementarity for resource and technology leverage (e.g. a farm pond in a cascade should take into the crop-water budgeting and cropping system change required under climate contingencies).

Inclusive: The infrastructure must provide equal opportunity to reduce climate stress for men and women and other disadvantaged social groups.



Timing and integration of adaptation options (slide 4)

Figure 35. Timing and integration of adaptation options



(Source: adelphi)

Table 10. Timing and integration of adaptation options

	Reactive adaptation	Anticipatory/proactive adaptation	Integrated adaptation
Definition	Adaption that takes place AFTER impacts of climate change have been observed (IPCC TAR, 2001)	Adaption that takes place BEFORE impacts of climate change are observed (IPCC TAR, 2001)	Adaption that takes place BEFORE impacts of climate change are observed and has been INTEGRATED into local planning processes allowing the community to effectively manage risks, make use of synergies between measures, seize benefits and use opportunities from adaptation.
Example	e.g. dikes were strengthened after the village was flooded several times.	e.g. preventive installation of rainwater harvesting systems as a proactive response to the forecast of decreasing rainfall for the coming year.	E.g. climate change indicators are included in existing monitoring concepts, irrigation schedules and/or crop harvesting schedules.
Effect	Local population severly affected	Local population somewhat affected	Local population not affected or might even profit

Depending on the timing and integration of adaptation measures, the impacts of climate change at the local level (village, farm, etc.) can be very different. Both anticipatory and integrated adaptation enable proactive adaptation before damage occurs.

Reactive adaptation: takes place after impacts of climate change have been observed (IPCC TAR, 2001) e.g. dikes were strengthened after the village was flooded several times.

Anticipatory/proactive adaptation: takes place before impacts of climate change are observed (IPCC TAR, 2001) e.g. preventive installation of rainwater harvesting systems as a proactive response to the forecast of decreasing rainfall for the coming year.

Integrated adaptation: takes place before impacts of climate change are observed and that has been integrated into local planning processes allowing the community to effectively manage risks, make use of synergies between measures, seize benefits and use opportunities from adaptation. E.g. climate change indicators are included in existing monitoring concepts, irrigation schedules and/or crop harvesting schedules.

How to categorize adaptation measures? (slide 5-7)

Grey: Technical measures

- Examples: infiltration ponds for managed aquifer recharge, rainwater harvesting systems, solar-powered irrigation systems, etc.
- Immediate risk reduction, medium- and long-term pay-offs

Green: Measures that are based on ecosystems and their services

- Examples: renaturation of flood zones, biodiverse agro-forestry systems, use of adapted crops and varieties, etc.
- Green measures are often cheaper and more flexible than technical solutions
- Often provide additional co-benefits (e.g. water savings, energy savings, air quality improvement, carbon sequestration)

Soft: Managerial, knowledge- and capacity-based solutions

- Examples: trainings, formation of water user groups, climate risk insurance, etc.
- Often accompany grey or green measures as these may rely on particular internal/organisational capacity and ability, that are aimed at enhancing by the soft measures

- Select relevant case studies of best practices for your participants. If the examples given in the presentation slides are not relevant to your group of participants, replace these by other examples. Make sure to name a number of examples to make participants get an idea of the variety of adaptation measures.
- Discuss with the group what examples of adaptation measures they know.

Group work: Identify adaptation options for prioritized risks and needs (slide 8)

- Guide the participants in identifying adaptation measures for addressing the prioritised risks and needs. They can collect their results using worksheet 1 of handout 4.2.
- Ask the participants to take a few minutes, two close their eyes and to freely brainstorm potential measures to the climate risks and key adaptation needs their face in their area (e.g. drought/flood)
- For inspiration provide the participants with the CCA matrix (see handout 4.2). If suitable for the group, you may also use existing, international databases on CCA measures. You will find some database examples with brief descriptions in the table below.

Hints:

- In general, it is advisable to have a good mix of solutions from all three categories (grey, green and soft) as they each have different advantages and disadvantages and complement each other.
- Look for measures that address multiple risks at the same time
- Encourage participants to be inspired by best practices from neighbouring villages that are well known and may address similar risks

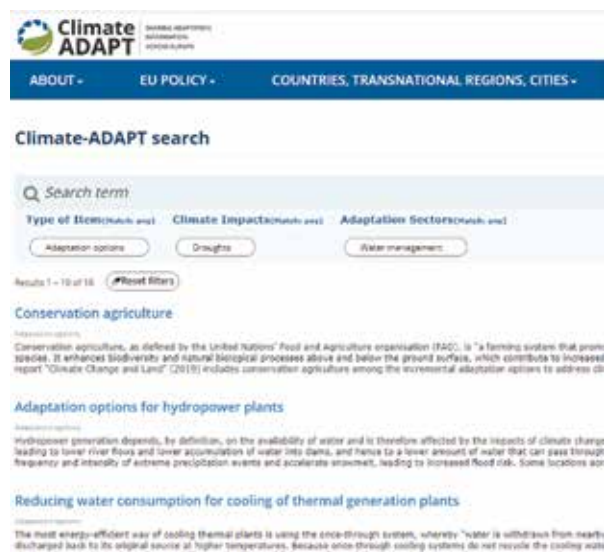


ID	Potential adaptation measures	Population affected																					
		IA1	IA2	IA	IA	IA5	IA6	IA7	IA	IA3	IA10	IA11	IA12	IA1	IA15	IA16	IA17	IA18	IB	IB1	IB	IB	
Livelihood MA Improve fishing livelihood																							
MA1	Fish processing technology units	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0
MA2	Drying systems for fish	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
MA21	Solar drying system for fish	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
MA3	Fish storage facilities	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	
MA31	Cold storage for fish (supported with solar energy)	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	0	
MA3	Community fish storage room	0	0	0	1	0	1	1	0	1	1	1	0	1	0	0	0	1	0	0	0	0	
MA4	Storage facilities for nets and motors	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	
MA6	Fishing technologies for sustainable fishing	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	
Livelihood MB Improve agriculture (crops and practices)																							
MB1	Soil & moisture conservation measures	0	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0
MB2	Soil fertilization	0	0	0	0	1	0	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0
MB21	Utilisation of bio-fertilisers/vermi compost and pesticides	0	1	0	0	1	0	1	1	1	1	1	0	1	1	1	1	0	1	0	0	1	0
MB2	Applying tank silts for soil fertilization	0	0	0	1	0	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	
MB2	Black soil application	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
MB4	Improve irrigation technique or infrastructure / channels	0	0	0	0	1	1	0	1	1	0	1	1	1	1	1	0	1	0	0	1	0	
MB41	Promote sprinkler irrigation system / efficient / micro water systems	0	0	0	0	0	1	0	0	1	1	1	0	1	1	1	0	1	0	0	1	0	
MB4	Promotion of micro irrigation/water efficient use technologies by using solar	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	0	0	0	
MB4	Strengthening of water irrigation channels	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	
MB4	System of rice intensification (SRI)	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	
MB4	drip irrigation	0	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0	1	0	0	1	0	
MB5	Promote drought/floods/saline/pest resistant crops and practices	1	0	0	0	1	0	1	1	0	1	1	0	1	1	1	0	1	0	0	0	0	

Databases for adaptation measures

- **CCA measure matrix:** The CCA action matrix assigns appropriate adaptation measures to over 45 climate change risks, including from improved agricultural practices, water resource management, flood protection, infrastructure improvements, improved energy supply, ecosystem protection, etc. See handout 4.2 Annex
- European Climate Adaptation Platform Climate-ADAPT: Climate-ADAPT aims to support in adapting to climate change helping users to access and share data and information on adaptation case studies and potential adaptation options. The platform includes a database that contains quality checked information on success and limiting factors, cost and benefits, legal aspects, needed stakeholder involvement, implementation time and life time of each measure.
 - Access database here: <https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures>

- **Adaptation Technology Database by Asia Pacific Adaptation Network (APAN):** APAN is a regional programme for managing and applying adaptation knowledge in the region, and supports governments and other organisations working on adaptation, with special emphases on the management of knowledge and capacity building. It provides an adaptation technology database comprising over 140 measures. For each measure information on the adaptation effect, needs addressed, costs, maintenance, technology performance etc. are provided.
 - Access database here: http://www.asiapacificadapt.net/adaptation_technology/



- Collect and cluster with the participants identified adaptation measures in the table provided with worksheet 1 of the handout 4.2 (see table below).

Table 11. Identified adaptation options

Risk	Need	Adaptation measure options
Scarcity of irrigation water due to droughts	Need for water efficient irrigation system	Drip irrigation system, Sprinkler irrigation system, etc.
.....

Step 2. Assessing adaptation options according to different criteria

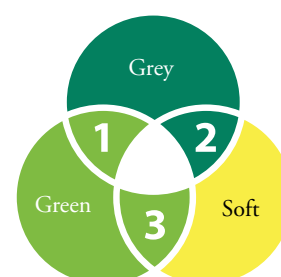
Participatory exercise

Qualitative assessment of adaptation measures (slide 10)

A measure analysis helps identify and prioritise

Assess measures considering their...


- Level of risk reduction
- Technical feasibility
- Internal feasibility (skills)
- Costs and Benefits
- Social and environmental impacts (gender aspects; emission of GHGs)
- Acceptance and support (funding e.g. with government scheme)



- Present the different criteria under which a measure can be assessed. Further descriptions of the different recommended criteria can be found below. The list of criteria can be shortened or extended according to the needs of the participants.
- Assess each identified measure option based on each criterion with the participants and award scores from 1-5 by using worksheets 2-7 of handout 4.2. In step 3, the scores are summed to a final score, by which the adaptation measures will be ranked and prioritised (worksheet 8).
- During assessment it is advisable to let the participants note down critical assumptions taken. These will help later when evaluating the measures during implementation or operation.

Criteria 1 - Assess level of risk reduction (slide 12)

Step 2. Assessing adaptation options

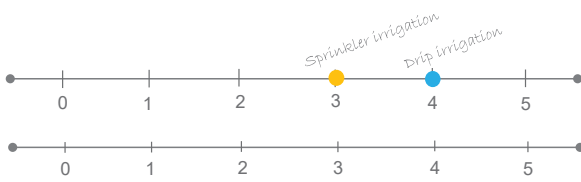


10 min, worksheet 2

Criteria 1. Assess level of risk reduction


- Analyse and discuss in group work how effectively the identified measure options reduce risks
Example: Drip irrigation has been shown to be more efficient in water use than sprinkler irrigation due to reduced evaporation and water runoff with additional benefits in plant disease control.
- 💡 Have in mind, combined measures are usually more effective than single measures.
- Insert your results in worksheet 2 and note down critical assumptions taken for the assessment. These will help later when evaluating the measures during implementation or operation.

Risk 1: scarcity of irrigation water due to droughts



Assumption: clogging of irrigation emitters of the drip irrigation system can be controlled ...

Risk 2: ...



Assumption: ...

0 = no effect for reducing risk 3 = medium effect
 1 = very limited effect 4 = high effect
 2 = limited effect 5 = very high effect

The assessment of the level of risk reduction focusses on the outcomes and effectiveness of adaptation in relation to the identified risk.


Guiding questions:

- How effective would you rate the measure in reducing the identified risks?
- What would be the outcome of the measure (short term, long term)?
- How does the adaptation measure strengthen the resilience and adaptive capacity of the community?

- Analyse with the participants how effectively the identified adaptation measure options reduce risks by using worksheet 2 of handout 4.2

Criteria 2 - Assess technical feasibility (slide 13)

Step 2. Assessing adaptation options



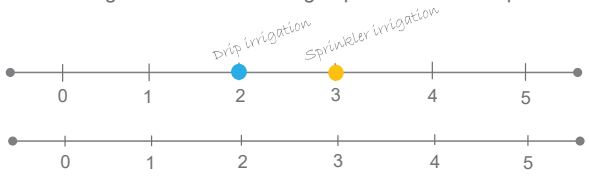
10 min, worksheet 3

Criteria 2. Assess technical feasibility

- Analyse and discuss in group work how easy or difficult the implementation and operation of an adaptation measure will be regarding technical aspects (see helpful guiding questions in the handout)

Example: Drip irrigation systems may clog more easily than sprinkler systems, depending on the water quality. In addition, drip irrigation may not be the best option for all crops and soil types.
- If you have difficulties with the evaluation, search for case studies of the measure options in your area.
- Insert your results in worksheet 3 and note down critical assumptions taken for the assessment. These will help later when evaluating the measures during implementation or operation.

Risk 1: scarcity of irrigation water due to droughts



Assumption: Iron content of irrigation water is very high and thus poses a risk of clogging for the drip irrigation system

0 = not feasible
 1 = very limited technical feasibility
 2 = limited technical feasibility

3 = medium technical feasibility
 4 = high technical feasibility
 5 = very high technical feasibility

13

The assessment of the technical feasibility focusses on the feasibility of the measure regarding technical aspects during its operation and implementation.

Guiding questions:

- How complex is the technical implementation and operation of the measure?
- What technical requirements has the measure and the location?
- Is there a need for special tools and materials or existing infrastructure to implement or operate the measure?
- Is a suitable land available?
- How time-consuming is the implementation and operation process?

- Analyse with the participants how easy or difficult the implementation and operation of an adaptation measure will be regarding technical aspects by using worksheet 3 of handout 4.2. The easier it is to meet technical requirements, the higher is its feasibility.
- If the participants have difficulties with the evaluation, consider with them whether similar measures have been implemented before.

The assessment of criteria 4 focusses on the qualitative analysis of the costs and benefits of a measure considering:

Costs of adaptation include:

- Is it economically viable to implement? (Investment costs: e.g. purchasing, delivery, installation)
- Is it economically viable to operate and maintain? (Operating costs: e.g. required inputs (energy, labour), regular repairs)
- Is the measure reversible/flexible, e.g. are adjustments at a later point in time at low cost possible?

Benefits of adaptation include:

- Additional costs savings (e.g., energy/water efficiency, labour productivity)
- Additional livelihood generation (e.g., new crop)
- Is it a no- or low-regret measure (measure is beneficial even if the predicted climate impacts do not occur)?


■ Qualitatively analyse how high or low the costs and benefits of an adaptation measure are by using worksheet 5 of handout 4.2.

Criteria 5 - Assess social and environmental impacts (slide 16)

Step 2. Assessing adaptation options

Criteria 5. Assess social and environmental impacts

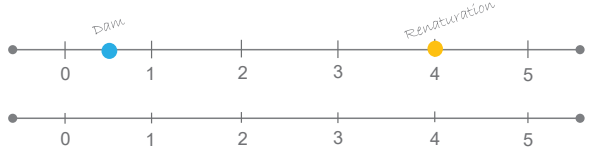
10 min, worksheet 6



➤ Analyse and discuss in group work the risks and associated impacts of an adaptation measure by determining the degree, duration, scale and probability of change in reference to the current status of the environment and stakeholders, e.g. local communities (see helpful guiding questions in the handout)
Example: Dams are associated with a high negative impact on river ecosystems as they fragment the ecosystem, create a drier ecology downstream etc. Negative impacts on social, cultural and economic structures complete this list. In comparison, renaturation is the more attractive measure in this respect.


➤ Insert your results in worksheet 6 and note down critical assumptions taken for the assessment. These will help later when evaluating the measures during implementation or operation.

Risk1: Flooding of village



Assumption: Reforested trees grow well and take root, ...

Risk2: ...



Assumption: ...

0 = very high impact 3 = limited impact
 1 = high impact 4 = little impact
 2 = medium impact 5 = very little impact

16

Environmental and social impact assessment identifies and evaluates the risks and associated negative and positive impacts of an adaptation measure on the current status of the environment and on stakeholders, such as local communities.

Guiding questions for assessing environmental impacts:

- What are potential impacts of the measure on ecosystems (e.g. terrestrial, forest, marine, freshwater), biodiversity, water quality and aquatic ecosystems, soil?
- How many greenhouse gases and other harmful pollutants are emitted during implementation and operation of the measure?
- Does the implementation of the measure cause disturbing noise for others?
- What resources/chemicals and energy are required in the implementation and operation of the measure and what impact does their production/procurement have on the environment and society?

Guiding questions for assessing social impacts:

- What are potential impacts of the implementation or operation of the measure on stakeholder groups? To better answer this question, ask yourself, who will be involved in, affected by and/or benefit of the measure? (How) does the measure help the most vulnerable and address gender issues, children, and elderly?
- What are potential impacts on socio-economic structures (e.g. employment, labour conditions, health systems, land ownership, cultural heritage)
- What are potential impacts on the existing infrastructure?


- Analyse and discuss with the participants the risks and associated impacts of the measure options by determining the degree, duration, scale and probability of change in reference to the current status of the environment and stakeholders, e.g. local communities (worksheet 6 of handout 4.2)

Hints:

- Make sure to consider both, negative and positive impacts.

Criteria 6 - Assess acceptance and support (slide 17)

Step 2. Assessing adaptation options



10 min, worksheet 7

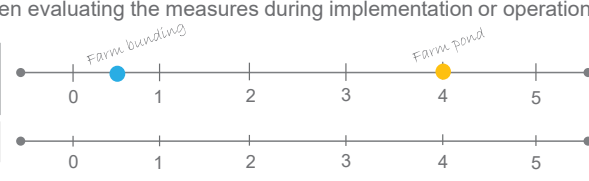
Criteria 6. Assess acceptance and support

- Analyse and discuss in group work how well the measure is accepted by the local community and whether there are support programmes that can be sourced (see helpful guiding questions in the handout)

Example: The construction of farm ponds is directly supported and promoted through the support scheme NREGA offered by the Ministry of Rural Development, this is not the case for measures such as drip irrigation.
- Insert your results in worksheet 7 and note down critical assumptions taken for the assessment. These will help later when evaluating the measures during implementation or operation.

Risk1: Scarcity of irrigation water due to droughts

Risk2: ...



Assumption: Less expensive

Assumption: ...

0 = not accepted and supported 3 = moderately accepted and supported
 1 = very limited accepted and supported 4 = highly accepted and supported
 2 = limited accepted and supported 5 = very highly accepted and supported

17

The selected measure needs acceptance by decision-makers and authorities and must comply with regulations and laws. Since it can only be realised if funds are available for its implementation, it is advisable to think about appropriate funding and support schemes as early as possible.

Guiding questions for assessing acceptability:

- Is the selected measure in line with environmental pollution laws?
- Is the measure culturally appropriate and supported by the community? (e.g. religious, social, political etc.)
- Is it compatible with the actual local / indigenous practice, e.g. with past coping activities or adaptation measures?
- What is the acceptance of the measure in your community?

Guiding questions for assessing supportive schemes:

- Do you have sufficient funds for implementing the measure?
- Are there any support schemes or programmes that could be sourced? For instance, is it likely that the Panchayat will support the implementation of the measure through MNREGA scheme and include operation and maintenance in the GPDP?



- Analyse with the participants the acceptability of and support for the measure options and collect your results using worksheet 7 of handout 4.2.
- Brainstorm with the participants on possible support schemes.

Step 3. Selecting CCA measure(s) to be implemented

- Ask the participants to insert the identified measure options from Step 1 and their scores from Step 2 in the table below (see worksheet 8 of handout 4.2).
- Determine with the participants a final score for each measure by summing the results for each criterion in order to compare and to rank the measure options
 - The measure with the highest final score represents the best-fitting measure for implementation

ID	Adaptation measure options	Criteria						Final score	Prio	Notes and comments
		Level of risk reduction	Technical feasibility	Internal feasibility	Costs and Benefits	Social and environmental impacts	Acceptance and support			
1	Rainwater harvesting for groundwater recharge through infiltration ponds	5	5	3	5	5	4	27	1	...
2	.....								

Useful literature and databases

- GIZ: Toolkit to develop climate adaptation strategies for small and medium-sized enterprises (SMEs): Climate Expert. Available at: <https://www.climate-expert.org/en/home/>
- Adaptation knowledge portal by UNFCCC: Case studies, reports, publications, policy briefs, etc. Available at: <https://www4.unfccc.int/sites/nw/staging/Pages/Home.aspx>
- European Climate Adaptation Platform Climate-ADAPT: Adaptation options. Available at: <https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures>
- Asia Pacific Adaptation Network (APAN): Adaptation Technology Database. Available at: http://www.asiapacificadapt.net/adaptation_technolog/
- Technology Needs Assessment Database: Reports and Factsheets on various climate adaptation options. Available at: <https://tech-action.unepdtu.org/tna-database/>

Key take-aways

- When choosing the appropriate climate adaptation measure, it is important to consider its feasibility and impact on the environment and society in order to select the measures that best fit the local context and that can be implemented with the available resources.

- A combination of different measures from all three categories (grey, green and soft) is more effective in reducing risks than a single measure, as they each have different advantages and disadvantages and complement each other.
- It is advisable to look for measures that address multiple risks at the same time.
- Local best practices serve very well for inspiration and often address risks that also concern my own working environment.

Debriefing questions

- What are your important take-aways/ messages from this case study?
- Did the session help you to select relevant CCA measures for your village/community?
- Which part of the exercise do you find most relevant for your work?

Module 5. Designing climate change adaptation projects

Learning objective	To design interventions at farm, ecosystem and extension level and link to relevant schemes and programmes and resource institutions
Duration	Shortest version: 35 min Complete version: 4 hours Potential complete version in a long duration program (NA)

Module planner

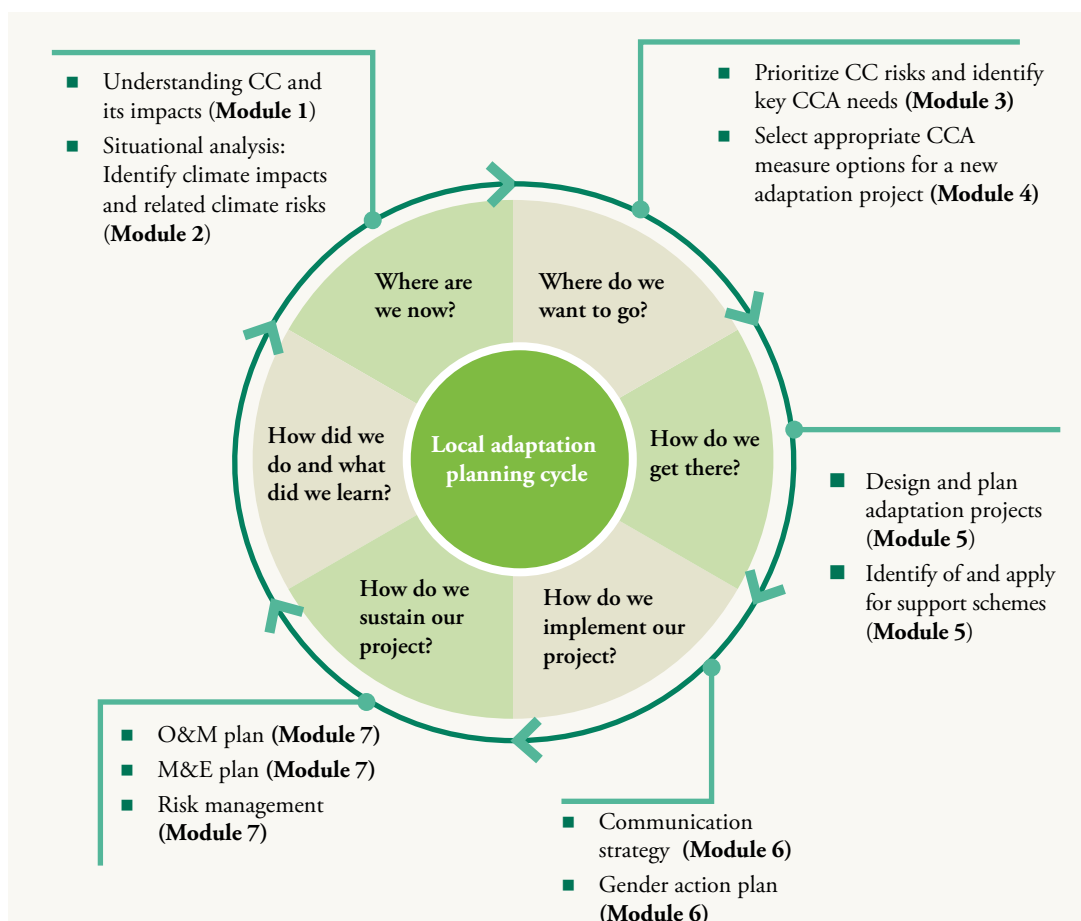
Duration	Sessions of module	Shortest version	Complete version
3 h 30 min	Session 5.1 Designing a project for selected adaptation measures		×
90 min	Session 5.2 Identification of schemes and institutions	Step 2 (35 min)	×
90 min	Session 5.3 Applying for the identified schemes and developing a project plan in a participative way in village setting		

Integration of Module 5 along the local adaptation planning cycle

The methodology used by the Capacity Building Package follows the logical processes of local adaptation planning. The right figure shows the arrangement of the modules of the CDP, their main steps and methods employed. The colour green indicates that you are in Module 5 and Step 5 of the Local Adaptation Planning cycle, which enables women farmers to design interventions at farm, ecosystem and extension levels and to link these to relevant schemes and programmes and resource institutions.

In the Excel tool you will find a tab in the same colours. Here you can document the results achieved by your group of participants in module 5.





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Session 5.1 Designing a project for selected adaptation measures

Learning objective	To design a need-based project on village level	
Prerequisites / prior knowledge for successful participation	Climate risks, CCA needs and measures are identified (Module 2, 3 and 4)	
Steps (duration)	Step 1. Review and outlook: project development cycle	30 min
	Step 2. Developing a basic project design for selected CCA measures (objectives, outcome, output)	60 min
	Step 3. Developing an action plan (tasks, timeline, roles, resources)	60 min
	Step 4. Stakeholder analyses	30 min
	This step is recommended to be conducted after support schemes have been identified in Session 5.2.	30 min
Step 5. Feasibility assessment: Finetuning the action plan		
Total duration	3 h 30 min	
3 h 30 min	Input presentation, reviewing prior key results, determining results chain, developing an action plan, stakeholder analysis based on the influence chart, examining the feasibility of the project design based on guiding questions	
Material	PowerPoint presentation 5.1, handout 5.1, Laptop, LCD projector, cards	
Preparation of the material	You may adapt the examples provided that facilitate the exercises in this session to the participants' context.	

Step-by-step approach

After identifying, assessing and prioritizing a climate risks, adaptation needs and concrete adaptation measures (Module 4), this module deals with the design of adaptation projects aimed at reducing the identified climate risks.

The project design presented in this session is a five-step process that helps the community create the “backbone” of their adaptation project, beginning with a brief review of previous modules and an outlook on upcoming ones (**Step 1**). In a review exercise, participants will reflect on their collected findings on climate impacts, risks, adaptation needs and selected adaptation measures and adjust them if necessary. The module continues with the development of a basic project design (**Step 2**). Here, an overarching goal or vision of how participants want to see their future in relation to the identified climate risk is identified, and a results chain is created. In **Step 3**, participants estimate necessary tasks, their phasing, and resources to achieve the defined goals and objectives. **Step 4** maps and analyzes relevant stakeholders. Finally, in Step 5, the participants conduct a feasibility check of the developed action plan.

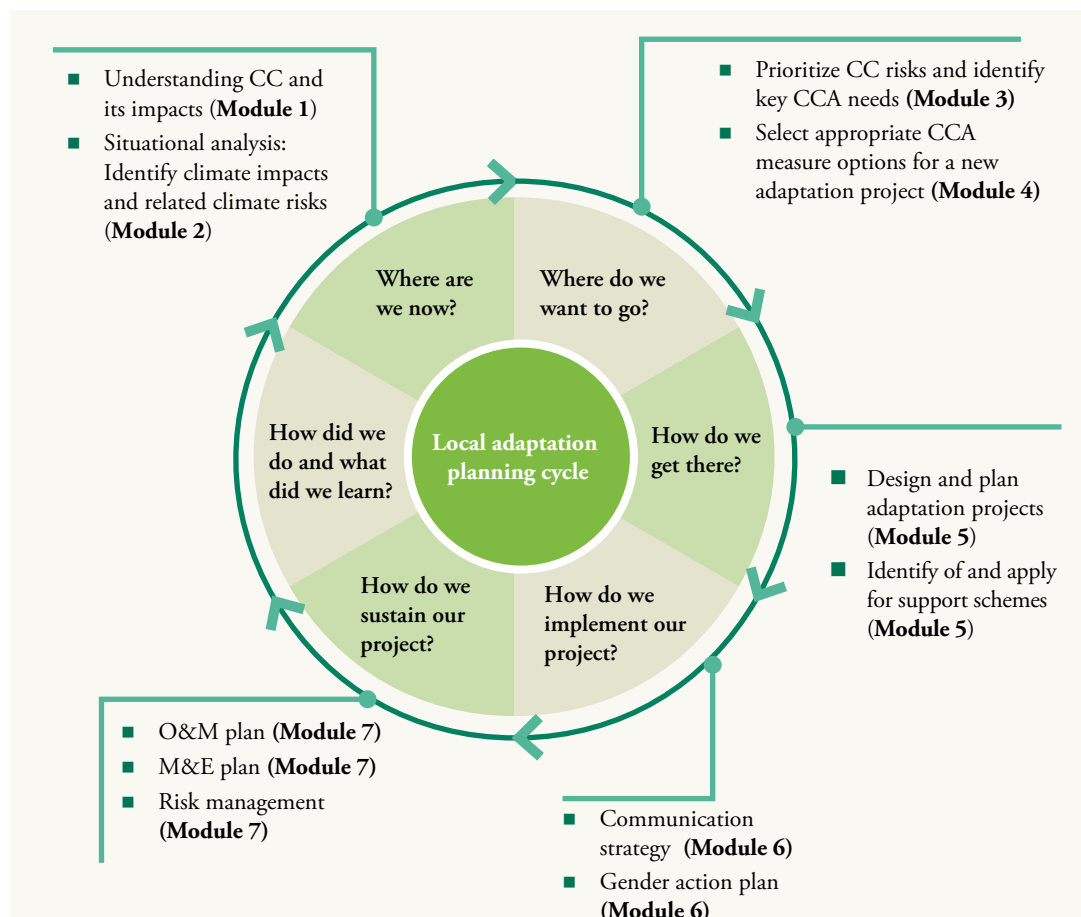
The concepts used in this session need not be new to participants. Defining goals, developing an action plan, and other aspects of project design may have already been learned in other contexts. However, in this session, participants will have the opportunity to clarify concepts, talk with each other purposefully, and work through the design process by practically planning an adaptation project for their community.

Step 1. Review and outlook: adaptation planning cycle

Input presentation

- Present slides 3-6 (presentation 5.1: designing a project for selected adaptation measures) to the participants.

Figure 36. Arrangement of the CDP’s modules along a local adaptation planning cycle



The cycle shown in Figure 1 illustrates the relationship of the different steps/phases in project development for climate adaptation, with one step neatly following another. In fact, a project rarely develops in such a pattern - steps can happen simultaneously and it may be necessary to take a step back to reconsider or redo something. The present capacity building package comprising several modules also follows these logical sequences of project planning.

You can present this overview to the participants to give them an understanding of project development/planning. The circle diagram also gives a very nice overview of what and what results have been achieved in previous modules, where the participants are currently in project development/planning (Module 5) and what they can expect from Module 5 and the next modules 6 and 7.

Review exercise: Review the climate impact – climate risks – CCA needs and CCA measures chain identified in prior modules

Time: 30 min

At the beginning of the session, discuss and evaluate with the participants the state of their results gained in the previous modules/sessions. For the exercises in this session to be successful, it is important that participants are aware of climate risks relevant to them and have concrete ideas for an adaptation project (adaptation needs are identified and measure options are assessed and selected). If participants are undecided about which CCA measure options they want to realize with a CCA project, you may repeat exercises from modules 2, 3 and 4 with the participants depending on their specific training needs.

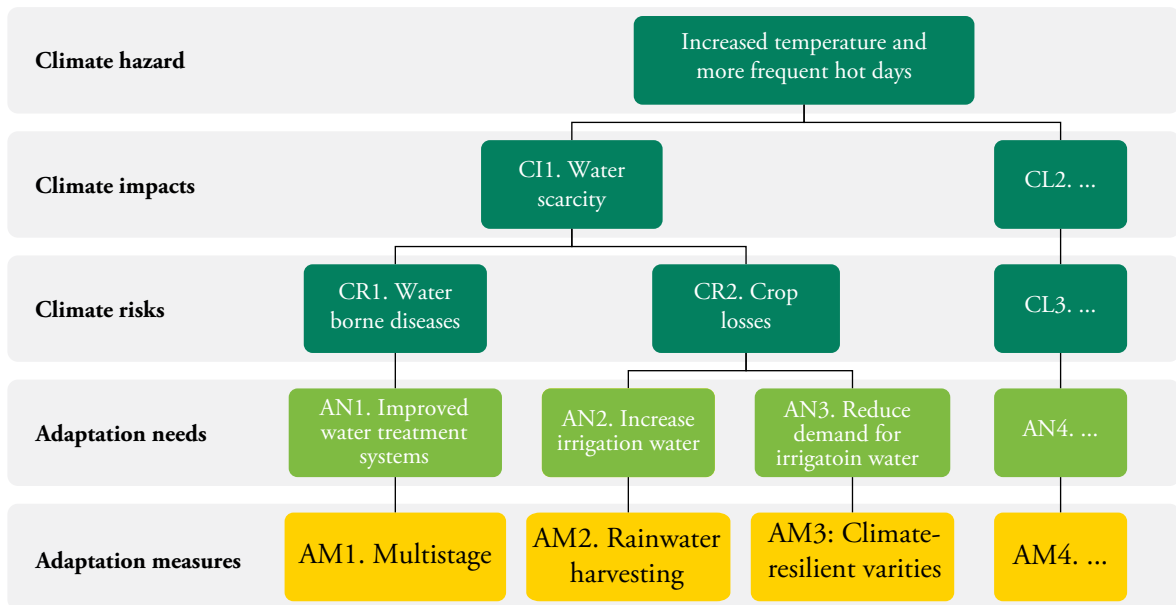
The group exercise below will help the participants remember and structure their results from prior modules.

- Ask the participants to reflect on the climate impacts and related risks identified in Module 2. Engage them to recreate their climate impact chain, similar to the one below by writing down climate impacts (remember, there are direct and indirect impacts) and prioritized risks (most relevant negative effects on the participants) on red cards.
- After the participants reflected on their climate impact chains ask them to write their key adaptation needs to minimize the identified climate risks on yellow cards and to add them to their climate impact chain. The adaptation needs result directly from the risks and describe broad solutions at this point. Help participants think “big picture” to define their needs.
- Finally, ask participants to write down specific adaptation options on green cards. These will also be added to the overall picture as shown in the visualization example below.
- To collect their results, participants can use worksheet 1 of handout 5.1.

Hint for the trainer

- The resulting overview is a perfect start for the development of a project design and will be very useful in the next steps.
- If participants get stuck, support them with simple questions.
- An adaptation project can comprise several measures. For simplicity, however, it is advisable to let the participants choose one identified measure for which they will carry out the next steps of this session (in the best case, this measure has scored best in the rough assessment in session 4.2). Afterwards, the session can be replicated for other measure options. There are measures that complement each other very well and required by many funding institutions to combine in one project, such as grey measures (e.g. managed aquifer recharge system) and soft measures (e.g. capacity building).





Step 2. Developing a basic project design for selected CCA measures (Objectives, Outcome, Output)

This step will guide the participants in defining specific objectives, outcomes and outputs for their selected adaptation measure in Module 4.

Input presentation: Results chain of an adaptation project

Present slides 8-9 (presentation 5.1: design a project for selected adaptation measures) to the participants.

A results chain shows the targeted short-, medium- and long-term results of an action in a series of causal statements. As shown in Figure 37, there are four basic components of a results chain:

Activity: how the project through proposed measures intends to achieve its objectives and goals.

Examples:

1. Rainwater harvesting
2. Climate resilient varieties

Output: the tangible and intangible products that result from project activities often described as direct results

Examples:

- 1.1 x m³ of rainwater harvested
- 1.2 x ha area additionally irrigated
- 2.1 x ha field is planted with climate resilient plants

Outcome: The short- and medium-term effects of an intervention's output. The outcome describes the **objectives** (what the project intends to accomplish).



Examples:

- To increase year-round access to food to 50% of the vulnerable households through climate resilient cropping practices and water management in three years.

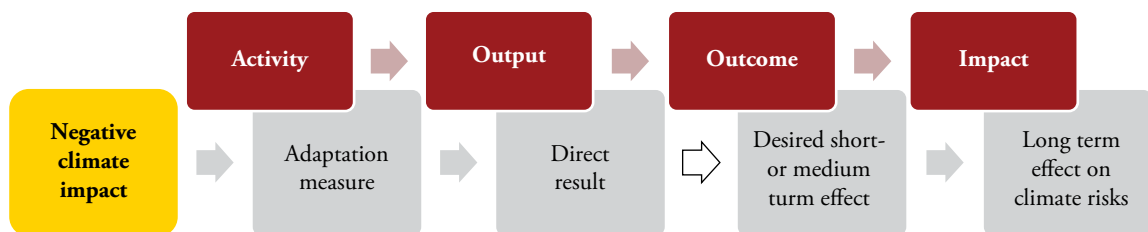
Impacts: Higher level strategic **goal** such as increased access to justice or improvements in public safety. The impact cannot be achieved directly, but only indirectly through the outcomes (objectives) of the project.

Example:

- Achievement of food security in our villages addressing climate change.

Results chains help to break down and refine your project idea and assumptions for achieving the objectives, and thus form the basis for developing the project action plan (Step 3) and the monitoring and evaluation plan (Session 7.2), that measures the effectiveness of your actions.

Figure 37. Results chain of an adaptation project



The SMART concept for defining project objectives and goal (slide 10)

When defining your results chain, make sure that the outputs, outcomes are SMART:

- **specific** – an objective should say exactly what will be achieved, with who, how, when and where;
- **measurable** – so you are able to tell exactly when the objective is achieved;
- **achievable** – it must be realistic given the prevailing circumstances and challenges that you are facing and resources available with you
- **relevant** – it must relate to the problem being addressed; and
- **time-bound** – it must be achieved by a certain date

Group exercise: Developing a basic project design (slide 11)

Time: 30 min

- Facilitate the participants in creating their project design. This will be done by continuing their climate impact chain (review exercise) with a result chain. The participants may follow the listed steps:
 - Start with your selected adaptation measure (green cards from review exercise)
 - Determine the tangible and intangible products / direct results that result from the adaptation measure, which will be the outputs of your project.
 - Determine the short- and medium-term effects / benefits of an intervention's output, which will be the outcome of your project. Guiding questions: What does the project intend to accomplish in short-/medium-term?
 - Determine the impact of your project / CCA intervention, which will be the goal. Guiding question: If I reduce the climate risks addressed with the selected adaptation measure(s), what are the long-term effects for your village

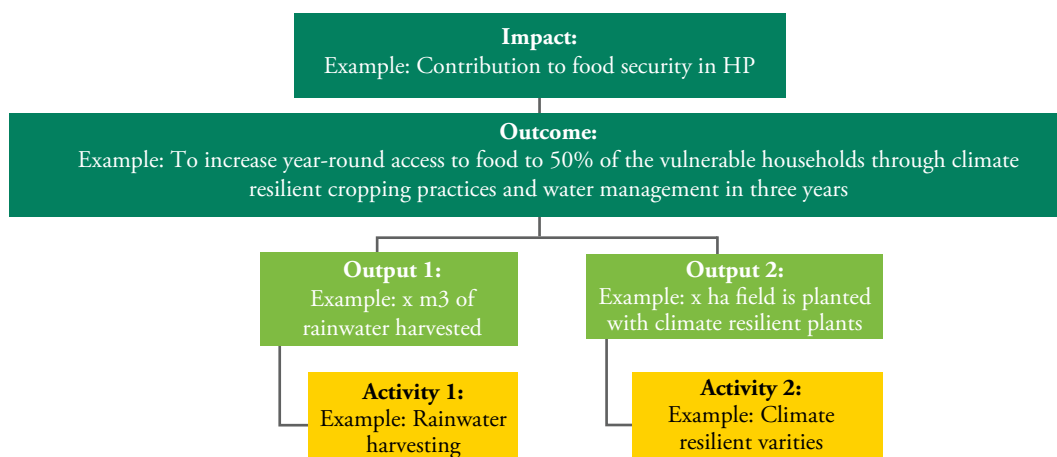
In case the participants have problems defining the overall goal of their projects, conduct the following visioning exercise with them:

- Ask participants to sit back in a comfortable position, relax, and imagine the following:

“It is now one or two years into the future. You and your community are having an enormous celebration to commemorate the project you have finished. The community has really moved forward and you are all beaming with pride about what you have accomplished. You feel excited about some of the obstacles and conflicts you were able to overcome, and you're all pleasantly surprised to have seen such strong commitment from so many people. You've even managed to get good support from outside the community. It's mid-afternoon and one of the community leaders' steps to a microphone to recount the major accomplishments and point out the results of your hard work. Listen closely...What do you hear the leader saying? Look around you...What do you see has happened as a result of this project?” (peace corps 2003)
- Engage the participants to write a brief statement or draw a picture with key words to represent their vision/goal they had in mind, when listening to you. Afterwards ask them to present in one minute what they have seen.
- To collect their results, participants can use worksheet 2 of handout 5.1

Hint for the trainer

- Advise the participants that the impact generally is really broad and a project just can contribute.
- One activity can have more than one output.
- To give the participants a better understanding of the exercise, it is advisable to present them with an example. You will find one example below in the visualization example, which may need to be adapted to the situation of the participants.



Step 3. Developing a generic action plan (tasks, roles, timeline, costs)

Step 3 will focus on the project activities and on their planning. Participants learn what an action plan is and its respective components: Tasks, schedule and costs. The learning is then applied to the participants' project ideas / **own examples**.

Input presentation

- Present slides 13-15 (presentation 5.1: design a project for selected adaptation measures).

Action plan

The action plan (sometimes also called project plan) is a logical series of tasks/activities with the aim of achieving the project objectives. **Guiding questions:** What activities are needed to set up a rainwater harvesting system in my village? (e.g. Are people of my village with required professional skills available? What infrastructure activities are necessary? etc.)

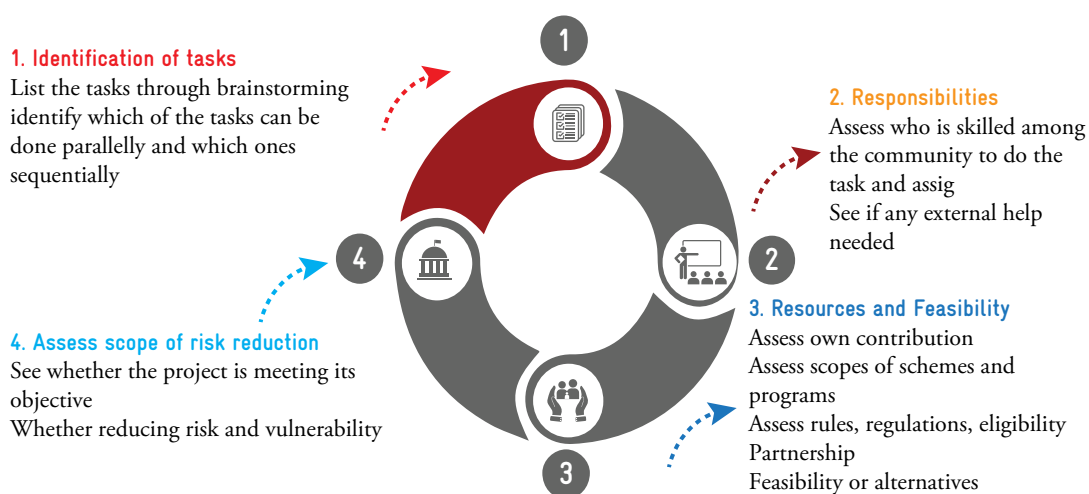
WHAT IS A PROJECT PLAN	WHY WE PLAN	HOW IT HELPS
<ul style="list-style-type: none"> • A series of steps arranged in specific sequences (one after another or parallel) to lead to an objective that helps in reducing risk or vulnerability of a community 	<ul style="list-style-type: none"> • It is based on issues and priorities • It clarifies goals and helps community develop a vision or an outcome • Assess various alternatives and their feasibility • Assign resources • Assess partnership/convergence • Check whether it is reducing risks/vulnerability 	<ul style="list-style-type: none"> • Eliminates poor planning • Tries to filter out very ambitious projects • Clarifies linkages of activities to address/issues and problems • Optimisation of resources • Better accountability • Leading to risk reduction

Steps in action planning

Figure 38 illustrates the sequence of steps towards the creation of an action plan, which will be carried out in the following exercise.

- The facilitator will explain the different steps of action planning by introducing the planning cycle (slide 15) to the participants.

Figure 38. Steps in action planning



Group exercise

Identification of sub-activities and their phasing (slide 16)

- After the participants have identified the climate impact chain and results chain of the envisaged adaptation measure, encourage them to:
 - Brainstorm about various sub-activities that address the prioritised climate risks and help in the achievement of the targeted outcomes.
 - Note them on cue cards and pin them on a timeline. Some in sequence and some parallel (above and below the line).
 - Collect key result on worksheet 3 of handout 5.1

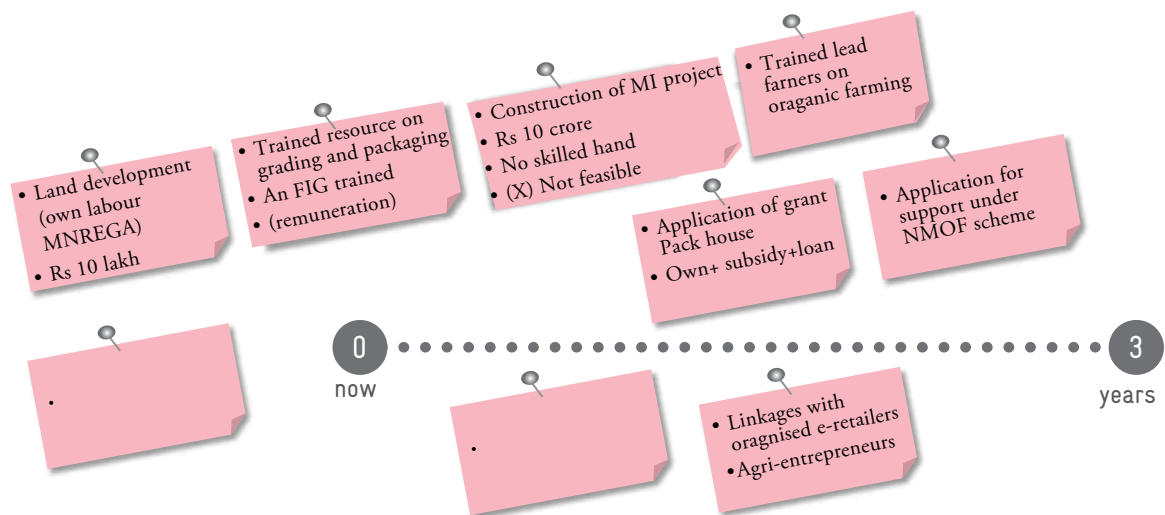
Examples of sub-activities:

- Land development
- Formation of Farmer Interest Groups
- Formation of FPO
- Training on Climate resilient farming practices
- Undertaking a MI project by all villagers
- Training on grading and packaging
- Linkages with organised e-retailers
- Application for Packhouse construction
- Training on Climate resilient farming practices



Estimate resources: Human resources and costs (slide 17)

- Now, engage the participants to estimate necessary resources for project implementation and operation. **Guiding questions:** Who can lead this activity? Do we have the necessary resources in our community or do we need to hire or partner (Human Resource)?
- Afterwards, ask the participants to have some rough estimate of cost for each activity. **Guiding questions:** How much of the estimated costs can be contributed by the community? How much budget could be obtained via schemes? What is the gap? What could be borrowed? If the costs are too high, they have to consider alternatives and/or drop the activity unless the objective is at risk.
- To collect their results, participants may use worksheet 4 of handout 5.1



Develop an action plan

The participants may also use the matrix below to collect their results from the Step 3 exercises and to create an action plan (worksheet 1 of handout 5.1).

- Note the potential activities which the participants identified and will get them to achieve the defined objectives in the left-hand column of the table below.
- Ask the participants to identify and to note:
 - Who should lead this initiative (can be individual alone, group, institution)
 - When the activity should be done (immediate: within 2-3 months; soon (in a years' time); later (within 1-2 years)).
- In the final step, ask the participants to note the estimated resources needed (They may not get to the number at this stage, let the participants only identify labour, material and indicative cost).

Activity		1. Land development	2. Farm pond	3. Drip irrigation
Who will do	Individual			×
	group	×	×	
	Institution	PRRD	PRRD	Horticulture
When	Immediate			
	Soon			
	Later			
Resources	Labour			
	Material			
	Financial			

Step 4. Stakeholder analyses

In this Step, participants will learn how to map relevant institutions and to assess their influence in projects. After a short input presentation, participants will apply what they have learned directly to their projects.

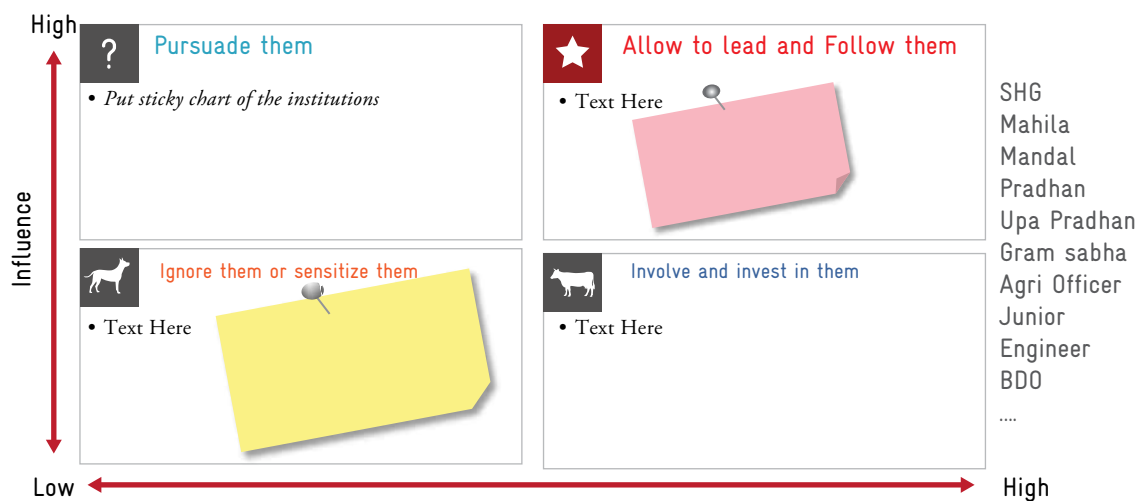
Institutions/key stakeholders play a key role in influencing a project. Its life cycle is clearly determined by support from various institutions. This could be gram sabhas (PRI general body) that identifies needs, beneficiaries, prioritizes various proposals and proposes to various government institutions. The technical sanction is given by government institutions/departments after examining the feasibilities. For example, the gram sabha can recommend a packhouse for horticultural products, but the norms, specifications, feasibility, etc., is checked by the departments. Once subsidy is approved other components are financed and sanctioned by the banks in the system.

All the institutions do not have equal degree of interest and influence. Those institutions that have no interests and no influence must be sensitised to the necessity/importance of the project, otherwise they may be ignored. The institutions having high influence and higher interest should be allowed to lead the process of execution. Institutions that have low interest but high influence need to be persuaded so that they are interested in and support the project. Those who have low influence but high interest, need to be involved.

Group exercise (slide 19)

Time: 20 min

- Ask participants to look at the completed action plan (worksheet 6 of handout 5.1) and to identify different institutions and key stakeholders
- Put a flip chart with a matrix as shown on slide 19: influence chart
- Ask the participants to think about potential institutions and their influence on the project. Encourage them to put their answers in the form of sticky posts with the names of the institutions in the appropriate places



Step 5. Feasibility assessment: Finetune the action plan

This step is recommended to be conducted after support schemes have been identified in Session 5.2.

At several points in a planning process, participants should pause and consider the feasibility of the project. By doing so, following questions should be considered: Is the project logical? Is it possible? In the next exercise, participants will assess the feasibility of the basic design created this session. The insights they gain from this assessment will help them determine whether the defined objectives, goals and developed action plan needs to be adjusted and finetuned.



Participatory exercise: Feasibility assessment (slide 21)

Time: 20 min

- Facilitate the feasibility assessment following the steps below with the participants. The participants can note down issues identified on worksheet 7 of handout 5.1. To solve the issues, it might be necessary to adjust the action plan (worksheet 5 of handout 5.1) and to re-formulate the results chain of the adaptation projects (worksheet 2 of handout 5.1). The participants can use their handouts or wall where all results of this session have been collected for a better evaluation.
- **Step 1. Estimated costs:** Ask the participants to reflect and check whether they have adequate sources of funding (contribution from community going beyond 10% may not be feasible). They should assess all the relevant schemes to see whether they can meet the cost of the proposed activities. They can explore borrowing at a concessional rate (as available in certain schemes). If the cost is too high alternate activities can be planned.
- **Step 2. Estimated human resources:** Ask the participants to discuss about the availability of skilled human resources to lead proposed activities and if they are not skilled from where they can get trained. Institutional partnerships can be discussed too.
- **Step 3. Discuss if the project complies with rules and policies:** If any activity violates any existing law or policy alternatives can be discussed
- Ensure that, despite changes to the action plan and results chain, the participants' projects are still able to reduce the climate risks and that the objectives are SMART.

Hint for the trainer:

- Some additional slides on technical aspects can be used by facilitator to explain participants on benefits of organic farming and Zero Budget Natural Farming.

Issue	Prio	Solution
Example: sub-activity is not eligible under the identified support scheme	High	The sub-activity will be removed from the activity plan
.....		
.....		

Useful literature

- Peace Corps (2003): The New Project Design and Management Workshop Training Manual. Available at: <https://pclive.peacecorps.gov/pclive/index.php/pclive-resources/resource-library/363-t0107-new-project-design-and-management-training-manual/file>

Related Schemes and programs for UP:

- AGRI Farming: Agricultural Subsidies and Schemes in India. Available at: <https://www.agrifarming.in/agriculture-subsidies-and-schemes-in->
- Sarkariyोजना: Yogi Adityanath Schemes 2021 List – Complete List of Sarkari Yojana of Uttar Pradesh Government. Available at: <https://sarkariyोजना.com/yogi-adityanath-schemes-list-up-government-yोजना/>

Additional slides on technical issues related to case study

Table 12. Cost and benefits of Mono cropping and Diversified farming in one acre

Description	Mono Cropping (Sugarcane)	Diversified cropping (Sugarcane, Bringle and Reddish)
Yield (in Quintal)	135	155
Input cost (in Rs)	11392.00	12492.00
Total Income (in Rs)	49275.00	93000.00
Net Profit (in Rs)	37883.00	80508.00
Cost-Benefits Ratio	1: 4.32	1: 7.44

Source: LEISA Sept 2020.CDR (leisaindia.org)

Table 13. Comparative analysis of properties of Integration and Diversified farming and Mono culture farming

Properties	Approach of Farming	
	Integration and diversified farming	Monofarming
Bio-physical properties		
Demand of irrigation	Increase	Decrease
Diversity (crop, livestock and horticulture)	Increase	Decrease
Social and economic properties		
Labor of family members	Increase	Decrease
Off farm income	Increase	Decrease
Profit		
Productivity	Increase	Decrease
Soil fertility	Increase	Decrease
Total profit	Increase	Decrease
Sustainability	Increase	Decrease
Impacts of climate change		
Risk	Decrease	Increase
Capacity to response to climate change impacts	Increase	Decrease
Risk of pest attack	Decrease	Increase

Source: Singh, A.K, (2016) Integrated farming strategy in small land holding to mitigate climate change impacts, International Journal of Advanced Educational Research ISSN: 2455-6157; Volume 1; Issue 6; November 2016; Page No. 26-32

Key take-aways

- Project planning cycle helps to assess various alternatives in fine-tuning project plans and keep track of progress made in dealing with climate change issues as identified in the project context.
- The tool (in the case-study) encourages participants in thinking through various actions that can help them achieve an adaptation goal emanating from a given climate context.
- The tool encourages participants to fine tune action plans by assessing alternatives.
- When choosing the appropriate climate adaptation measure estimate the budget and see whether any scheme or group of schemes can cover maximum cost.
- Focus on addressing how the benefits can accrue to community and individuals both in short run and long run.

Debriefing questions

- What are your important take-aways/ messages from this case study?
- Which part of the exercise do you find most relevant for your work?
- Do you know how to apply the key concepts to your work?
- Did the session help you to better write and apply your project?



Session 5.2 Identifying relevant support schemes for adaptation projects

Learning objective	To identify support schemes to design adaptation projects in impact areas of agriculture, livelihood, water and sanitation sectors	
Prerequisites / prior knowledge for successful participation	Understanding on climate risks. Adaptation project objective and activities to address climate risks and objective are identified	
Steps (duration)	Step 1. Identified risks and adaptation options	10 min
	Step 2. Understanding the objectives and components of relevant support schemes	20 min
	Step 3. Matching support schemes with adaptation measure and risks addressed	30 min
Total duration	60 min (optional: only Step 2 can be trained in 20 min)	
Methods/Exercises	Input presentation, reviewing identified risks and adaptation options, matching support schemes with adaptation options based on scheme inventory	
Material	PowerPoint presentation 5.2, handout 5.2, Laptop, LCD projector	
Preparation of the material	Have a list of relevant schemes to be ready at hand. You may adapt the selection of support schemes mentioned in this session to the context of the participants.	

Step-by-step approach

This module provides inputs for identifying various scheme to select specific schemes in agriculture, water, eco-systems, livelihoods of for the village level plans benefiting the target groups (Women Self Help Groups).

In **Step 1**, participants list their prioritised climate risks, adaptation needs (Module 3) and selected adaptation options (Module 4), which are linked to appropriate support schemes in the next steps.

In **Step 2**, will provide participants with an overview of different support schemes available. The participants will learn more about the schemes' objectives and components as well as about relevant institutions providing the schemes. The step will close with a group discussion on key features of relevant schemes.

In **Step 3**, building on the new learnings, adaptation options will be linked to specific support schemes and institutions.

Step 1. Identified risks and adaptation options

Review exercise

- Encourage the participants to reflect on your learnings and identified climate risks, needs and adaptation options in modules 2-4
- Discuss with them:
 - What risk you feel need to be urgently addressed?
 - What adaptation needs result from the prioritised risks?
 - What are the adaptation measures you are considering (short term, long term)?
 - Will you be able to implement it on your own or as a community?
- Ask them to link these aspects to available opportunities for CCA project design using the worksheet 1 of handout 5.2

Example:

Climate risk	Adaptation need	Adaptation measure	Time Short term(ST)/ Long Term(LT)	Individual (I)/ Community (C) or both (B)	How it will address the risk
Soil moisture depletion	Increase soil moisture	Drip irrigation system	LT	C	Irrigation system that saves water by allowing water to drip slowly to the roots of plants
Crop loss due to droughts	Resilient crops	Salinity-tolerant crops	ST	I	In addition to allowing farmers to grow food in changing conditions, these varieties can relinquish more fresh water for drinking

Step 2. Understanding the objectives and components of relevant support schemes

Input presentation

- Present slides 6-13 (presentation 5.2: Identifying-relevant-support-schemes) to the participants.

There are two types of schemes, some are related to specific sectors and the others are holistic in nature. The development schemes in the villages apart from the sectoral development focus on area development in a convergence mode.

NRM and Livelihood: This has a strong bearing for Women farmers (Women SHGs under MKSP). Key related subjects include.

- Agriculture, including agricultural extension
- Land improvement, implementation of land reforms, land consolidation and soil conservation
- Minor irrigation, water management and watershed development
- Animal husbandry (diary, poultry, goatery, etc.) and fishery

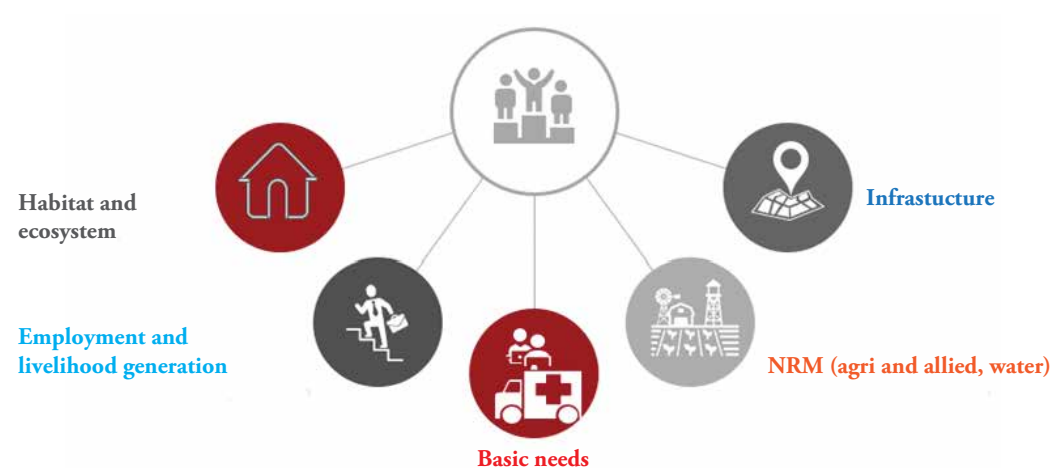
Departments of Agriculture, Horticulture and Rural development converge many of these schemes and missions i.e. RKVY, PMKSY, Mission on Agricultural Extension & Technology (NMAET) – Sub-Mission on Agricultural Extension (SAME), Paramparagat Krishi Vikas Yojna, National Mission on Oilseeds and Oil, Palm (NMOOP), Kusum Scheme, National Mission for Sustainable Agriculture (NMSA), Backyard Poultry Development Program under National Livestock Mission, National Horticulture Mission (NHM), Integrated Pest and Nutrient Management, Promotion of Agriculture Mechanization for in-situ Management of Crop Residue PMFBY, NFSM, Mahila Hat under WCD, etc.).

Similarly, Department of Environment, Forest and Climate Change covers several **eco-system development** schemes such as social forestry, Green belt development scheme, National afforestation program (NAP) and Sub mission on Agro forestry under the Department of Agriculture, Cooperation and Farmers Welfare. These schemes reduce climate sensitivity and enhance capacity, therefore reduce vulnerability.

MGNREGA has ample scope for ecosystem conservation/development, water re-charge measures, drainage improvement, raising of level of houses etc.



Figure 39. Key areas of Interest for stakeholders



Source: CTRAN

Infrastructure: This includes rural roads, land development, canals, drainage etc. It can also be storage and warehouses, etc. I&PH, PWD, MORD, agriculture converge various schemes for these activities. Infrastructures enhance capacity of the groups to address climate risks better.

Learning schemes' objective (slides 7-10)

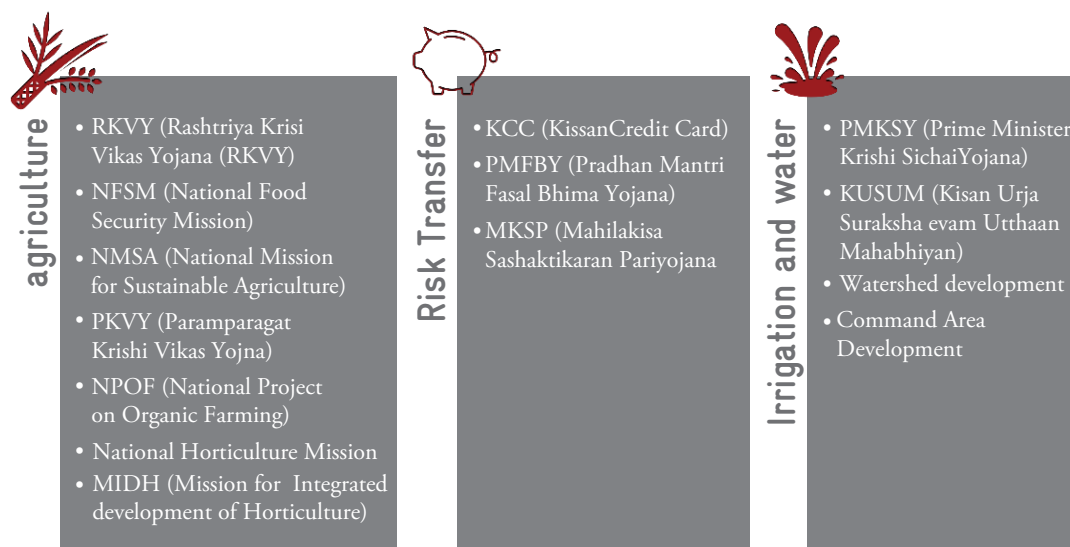
Scheme	Full Name	Objective
RKVY	Rashtriya Krishi Vikas Yojana	<ul style="list-style-type: none"> ■ To incentivize the states that increase their investment in Agriculture and allied sectors ■ To provide flexibility and autonomy to the States in planning and executing programmes for agriculture (promoting agri-entrepreneurs) ■ To ensure the preparation of Agriculture Plans for the districts and states ■ To achieve the goal of reducing the yield gaps in important crops ■ To maximize returns to the farmers ■ To address the agriculture and allied sectors in an integrated manner
NFSM	National Food Security Mission	Increasing production of rice, wheat, pulses and coarse cereals; Restoring soil fertility and productivity at the individual farm level; Enhancing farm level economy (i.e., farm profits)
NMSA	National Mission on Sustainable Agriculture	Making agriculture more productive, sustainable, remunerative and climate resilient by promoting location specific integrated /composite farming systems; soil and moisture conservation measures; comprehensive soil health management; efficient water management practices and mainstreaming rainfed technologies.
PKVY	Paramparagat Krishi Vikas Yojana	To produce agricultural products free from chemicals and pesticides residues by adopting eco- friendly, low- cost technologies
NPOF	National Project on Organic Farming	Promotion of organic farming in the country through technical capacity building of all the stakeholders including human resource development, transfer of technology, promotion and production of quality organic and biological inputs

NHM	National Horticulture Mission	NHM's key objective is to develop horticulture to the maximum potential available in the state and to augment production of all horticultural products (fruits, vegetables, flowers, coco, cashew nut, plantation crops, spices, medicinal aromatic plants) in the state.
MIDH	Mission for Integrated Development of Horticulture	<p>Promote holistic growth of horticulture sectors</p> <p>Encourage aggregation of farmers into farmer groups like FIGs/ FPOs</p> <p>Enhance horticulture production, augment farmers income and strengthen nutritional security</p> <p>Improve productivity by way of quality germplasm, planting material and water use efficiency through Micro Irrigation</p> <p>Support skill development and create employment generation opportunities for rural youth in horticulture and post-harvest management, especially in the cold chain sector</p>
KCC	Kisan Credit Card	To meet comprehensive credit requirements of the agriculture sector by giving financial support to farmers
PMBFY	Pradhan Mantri Fasal Bima Yojana	Ensuring flow of credit to the agriculture sector; which will contribute to food security, crop diversification and enhancing growth and competitiveness of agriculture sector besides protecting farmers from production risks
MKSP	Mahila Kisan Sashaktikaran Pariyojana	To empower women in agriculture by making systematic investments to enhance their participation and productivity, as also create and sustain agriculture-based livelihoods of rural women
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana	<ul style="list-style-type: none"> ■ To achieve convergence of investments in irrigation at the field level ■ To enhance the physical access of water on the farm ■ To expand cultivable area under assured irrigation (Har Khet ko pani) ■ To make best use of water through new technologies and practices ■ To reduce wastage and to increase water availability on-farm ■ To enhance the adoption of precision-irrigation (More crop per drop) ■ To enhance aquifers recharge and to introduce sustainable water conservation practices.
KUSUM	Kisan Urja Suraksha evam Utthaan Mahabhayan	<p>Increasing farmers' income, provide reliable source for irrigation and de- dieselise the farm sector. Under the scheme, farmers, cooperative societies, farmers-cooperative groups, and panchayats can apply to install solar pumps. The total cost incurred in implementing the project is so planned that the farmers' financial burden is negligible. The overall cost is divided into three categories:</p> <ul style="list-style-type: none"> ■ Government to provide a 60% subsidy directly to farmers ■ 30% will be provided through soft loans to farmers ■ 10% actual cost to be incurred by farmers
WDP	Watershed Development Programme	To improve water conservation, irrigation facility, and land use pattern leading to increased agricultural productivity



CADWM	Command Area Development and Water Management	To enhance utilization of irrigation potential created and improve agriculture productivity and production on a sustainable basis through integrated and coordinated approach involving multidisciplinary team
DAY-NRLM	Deendayal Antyodaya Yojana- National Rural Livelihoods Mission	To alleviate rural poverty and create sustainable livelihood opportunities for the rural poor
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DAY-NRLM	Deendayal Antyodaya Yojana- National Rural Livelihoods Mission	To alleviate rural poverty and create sustainable livelihood opportunities for the rural poor

Figure 40. Schemes and programs implemented by agriculture department which is of importance to target groups



The adaptation strategies here have been divided into three categories (a) the first basket has several schemes that will help target group in achieving higher yield, enhance their income and food security. The schemes also have provisions to address storage and post-harvest challenges arising out of local climate variations. However, this may not be sufficient due to enhanced risks due to climate change.

Risk transfer is an important adaptation option. Various insurance and savings products help in adaptation during climate stress. The farmers pay a small premium and are compensated when there is a crop failure. However, not all the crops are covered and sometimes the claim settlement takes long time. The features of other schemes are in the scheme inventory.

Third category are projects focussed on enhancing irrigation and water availability so that climate stress and risks arising out of rise in temperature and variability in monsoon can be addressed. These are beneficiary oriented schemes and most of these schemes are run by agriculture department. However minor and medium sized irrigation projects are designed and executed by I&PH department and these are not meant for individuals but for the community in the area.

Schemes and programs implemented by Panchayati Raj Department which is of importance to target groups (slide 13)

Most of these schemes are aimed at area development and holistic

- MGNREGA (Farm pond, levelling, fencing – labour, desilting, etc)
- GPDP (Gram Panchayati Development Plan)
- DPAP (Drought Prone Area Program)
- BRGF (Backward Regions Grant Fund)
- NRLM (National Rural Livelihoods Mission)
- RGSA (Rashtriya Gram Swaraj Abhiyan)
- SAGY (Saansad Adarsh Gram Yojana)

The schemes run by PRRD are mostly for the community as a whole and are covered in more detail in the modules aimed at PRIs.

Group discussion

- Discuss key features of relevant support schemes with the participants

Step 3. Matching support schemes with adaptation measure and risks addressed

Participatory exercise (slides 17-20)

- Present slide 17 (presentation 5.1) to the participants to introduce a case study based on which the next exercise is exemplarily demonstrated.
- You may use the presented case study example to demonstrate the participants how to link activities of adaptation projects to support schemes (slides 18 and 19).
- Provide the participants with scheme cards and the scheme inventory handout
- All the scheme cards will be (name generated from the scheme inventory handout) shuffled and given to participants.
- They will pin as per their understanding of the schemes.
- To collect their results, participants can use worksheet 2 of handout 5.2.

Further example: Crop-water budgeting and choice of crops to manage moisture stress. They can get individual drip irrigation sets under KUSUM, can have a community storage system for vegetables or fruits under RKVY and can get food assistance under NFSM.



Case study: Soil moisture conservation

1. What will change in your village if you undertake this?
Probable answer: It will improve water availability for us and livestock, soil moisture will improve in the long run
2. Who will be involved? (individual or community, which vulnerable groups should get a priority)
Probable answer: Groups rural poor under wage employment
3. Where the activity will take place?
Probable answer: If possible, they should identify a village under highly vulnerable map (facilitator can use a map, else they can just name a place and the facilitator can ask, why this place)
4. When you expect the project to be completed?
Probable answer: 1 year, 3 years (the facilitator can get response to see why there is variation)
5. How will we link available schemes to this project?



Here the focus is on rejuvenating a spring, where the labour and material components have been converged with food assistance from various schemes.

- Ask the participants to do the same for their adaptation projects. Read out key features of relevant schemes from scheme inventory and ask participants to pin the schemes and present their learning for their designed adaptation strategy.
- Ask the participants to list suitable schemes for the prioritized adaptation measures on worksheet 2 of handout 5.2.

Useful literature

- Government of India, Ministry of Rural Development (2009): Guidelines for Convergence of NREGS with Programmes of Ministry of Agriculture for enhancing productivity. Available at: https://nrega.nic.in/netnrega/writereaddata/Convergence/circulars/guideline_conver_MOA.pdf
- Government of India, Ministry of Rural Development (2021): The Mahatma Gandhi National Rural Employment Guarantee Act. Available at: https://nrega.nic.in/netnrega/circular_new.aspx
- RKVY Division, Ministry of agriculture and farmers welfare: Operational Guidelines for Innovation and Agri Entrepreneurship Cell under RKVY-RAFTAAR (2017-18 TO 2019-20). Available at: https://rkvy.nic.in/static/download/pdf/RKVY-RAFTAAR_Ent.pdf
- PMKSY Division, Ministry of agriculture and farmers welfare (2019): Guidelines. Available at: <http://pmkasy.gov.in/Guidelines.aspx>
- Please also check the scheme inventory handout with links to further schemes

Key take-aways

- When choosing the appropriate climate adaptation measure estimate the budget and see whether any scheme or group of schemes can cover maximum cost. See whether beneficiaries are willing to contribute.
- Focus on addressing how the benefits can accrue to community and individuals both in short run and long run.

Debriefing questions

- Have you already benefited from a support scheme?
- Do you consider any of the programmes mentioned useful for your adaptation project ideas/problems?
- Have you already discussed your project idea and the possibility of receiving support from support schemes with your community?

Hints for the trainer

- Since module 5 is heavy on content, the trainer must give examples and make it more interactive. He should beam the scheme inventory specific areas when such discussion is taking place.

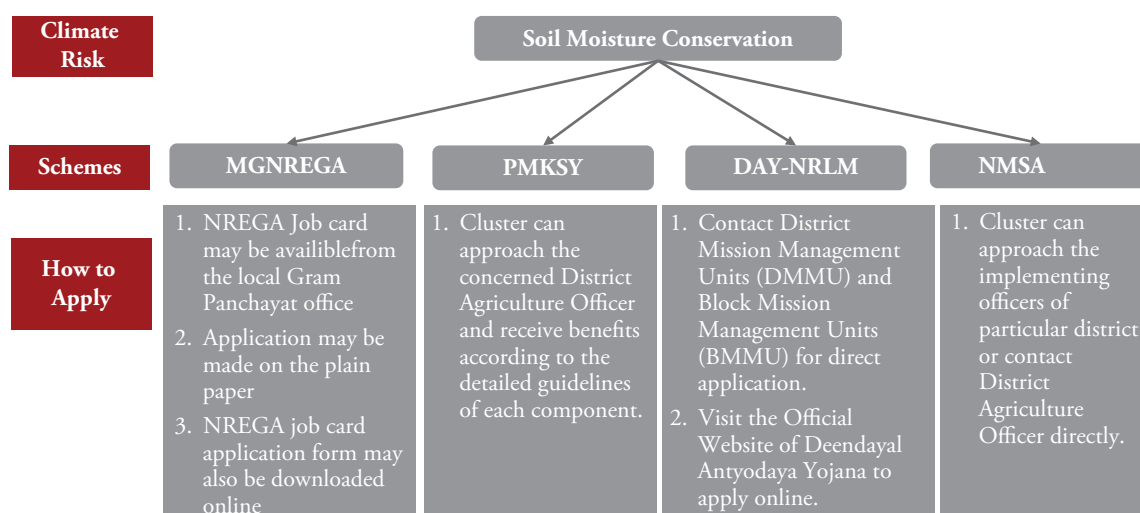
Session 5.3 Applying for support schemes

Learning objective	To apply the identified schemes and developing a project plan in a participative way in village setting	
Prerequisites / prior knowledge for successful participation	Prior knowledge of scheme objectives and components	
Steps (duration)	Step 1. Understanding the procedure to apply for support schemes	30 min
	Step 2. Role play on the application procedure	60 min
Total duration	90 min	
Methods/Exercises	Input presentation, Role play simulating an application case	
Material	PowerPoint presentation 5.3, handout 5.3, Laptop, LCD projector	
Preparation of the material	Focus on the application processes of support schemes identified by the participants in Session 5.2 and prepare appropriate materials for them, if needed.	

Step-by-step approach

This module familiarises participants with the application process for identified programmes that support the implementation and funding of adaptation projects at village level.

In **Step 1**, participants learn about the different application procedures of support schemes that are relevant for their adaptation projects.



In **Step 2**, the participants apply their newly learned knowledge in a role play and put themselves in the position of the applicant, the officials and the GP-level committee).

Step 1. Understanding the application procedure

Input presentation

- Present slide 3 (presentation 5.3: Applying for relevant schemes) to the participants.
- Ask participants to reflect on the selected adaptation strategies and support schemes identified in Session 5.2 after explaining the objectives of the session.
- List all identified support schemes by the participants on a flip chart and explain the application procedure. One example is shown below.

Step 2. Role play on the application procedure

Group exercise

Role play

- For the role play the participants will be divided into three groups (villagers, officials, and GP level committee).
- There will be one facilitator for each group who will help members identify the procedures and eligibilities from scheme inventory to apply for specific plans that need to be cleared by the committee and recommended for sanction
- Indicate the participants to use the role play worksheet 1 (villagers), worksheet 2 (officials) and worksheet 3 (GP level committee) of handout 5.3 and the scheme inventory
- The facilitator will explain the process and ask participants in plenary what are the challenges they face and how they can be better prepared in future.

Process of the role play:

- Group A (villagers): will assign support schemes to a prioritised adaptation measure. The facilitator will note down the selected schemes and pass them on to the second group (Group B: officials). Group A will complete the application form provided with the role-play handout for the adaptation measure and pass on their proposal to Group B for review.
- Group B (officials): will seek out the schemes from the scheme inventory and the eligibility norms according to the selected schemes by Group A. After group B has reviewed and discussed the proposal developed by Group A, they will make a presentation to group C to make their case.

Useful literature

- Government of India, Ministry of Rural Development (2009): Guidelines for Convergence of NREGS with Programmes of Ministry of Agriculture for enhancing productivity. Available at: https://nrega.nic.in/netnrega/writereaddata/Convergence/circulars/guideline_conver_MOA.pdf
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- PMKSY Division, Ministry of agriculture and farmers welfare (2019): Guidelines. Available at: <http://pmksy.gov.in/Guidelines.aspx>

Key take-aways

- Understand the application procedures of the relevant support schemes to pave the way for the integration of an adaptation strategy into the village plan.

Debriefing questions

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- How did the session and exercise support you in understanding the application process for relevant support schemes for adaptation projects?

Module 6. Implementing CCA projects

Learning objective	To learn key concepts that facilitate the implementation of adaptation projects
Duration	Shortest version: 1 h 30 min Complete version: 4 h

Module planner

Duration	Sessions of module	Shortest version	Complete version
2 h	Session 6.1 Developing a communication strategy	Step 2 (45 min)	×
2 h	Session 6.2 Gender action plan	Step 1 (45 min)	×

Integration of Module 6 along the local adaptation planning cycle

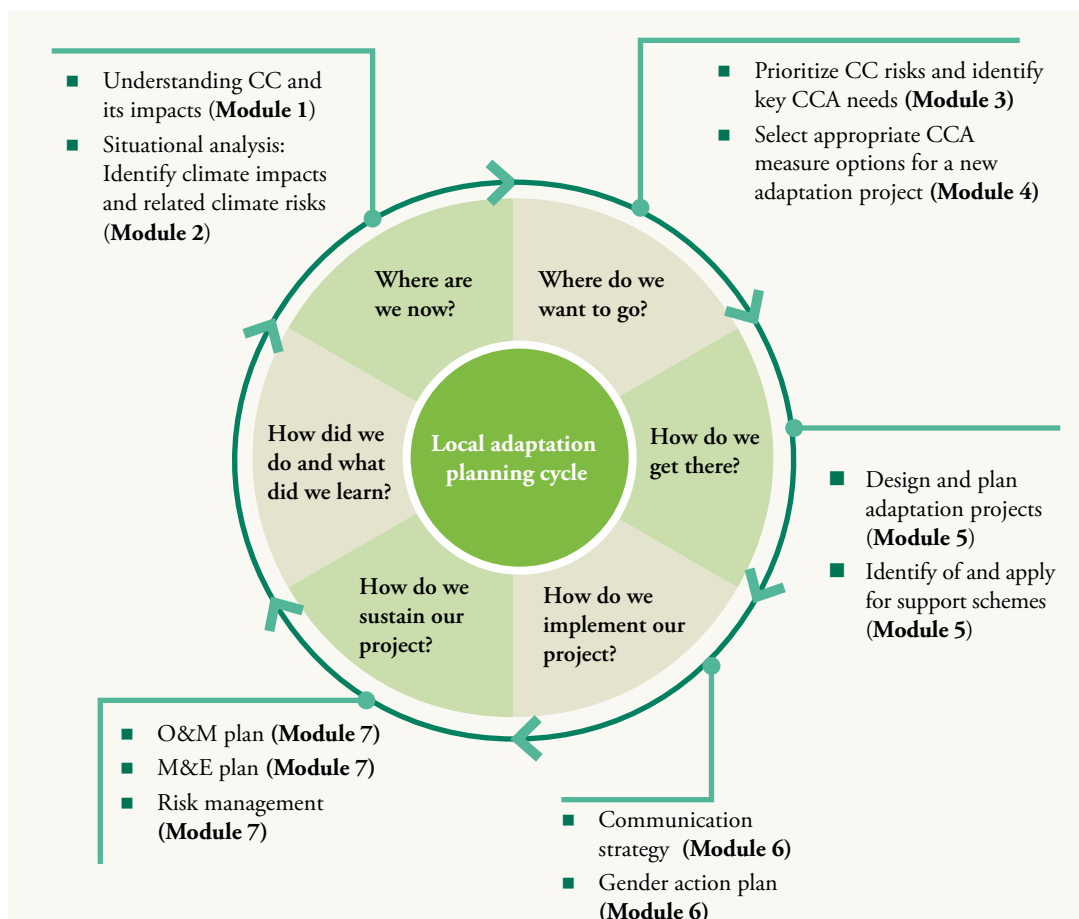
The methodology used by the Capacity Building Package follows the logical processes of local adaptation planning. The figure below shows the arrangement of the modules of the CDP, their main steps and methods employed. The colour blue indicates that you are in Module 6 and Step 6 of the Local Adaptation Planning cycle, which teaches key concepts to women farmers that facilitate the implementation of adaptation projects including the development of a communication strategy and a gender action plan. The strategies and concepts developed in this module add value to participants' adaptation projects and should be considered from the project start.

In the Excel tool you will find tabs in the same colours. Here you can document the results achieved by your group of participants in module 6.

Session 6.1 Developing a communication strategy

Learning objective	To improve acceptance and public visibility of adaptation projects by creating and applying an internal and external communication strategy	
Prerequisites / prior knowledge for successful participation	A rough design of a CCA project is developed	
Steps (duration)	Step 1. Developing an internal communication strategy	45 min
	Step 2. Developing an external communication strategy	45 min
	Step 3. Using social media	30 min
Total duration	2 h	





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Methods/Exercises	Input presentation, active listening as the heart of communication, developing an internal and external communication strategy, storytelling, posting on social media
Material	PowerPoint presentation 6.1, handout 6.1, Laptop, LCD projector, moderation material as cards and flipcharts, desirable: participants have internet access
Preparation of the material	You may adapt the examples provided to facilitate the exercises in this session to the context of the participants.

Step-by-step approach

This module provides inspiration and tools for identifying and creating internal and external communication strategies to the local context of the participants. Along the way, an understanding of how communication works, what tools exist and how to achieve visibility will be provided.

Step 1, provides the participants with general background knowledge on communication concepts and common barriers for effective communication. The participants will learn to adapt the knowledge on their own context and create an internal communication strategy. Participants are also invited to share experiences and difficulties in communication from their contexts.

In **Step 2** participants assess the means of external communication and importance of visibility. They will learn how to realise external communication by fast writing practise and create an external communication strategy for their own context.

Finally, in **Step 3** the external communication will focus on social media and their importance and challenges in praxis, as part of the external communication strategy.

Step 1. Developing an internal communication strategy

Entry exercise: Active listening as the heart of communication

The session starts with a warm-up exercise that sensitises participants to communication and its barriers. In this exercise, participants will analyse how differently communicated messages can be received and change when they are passed on.

Time: 15 min

- Ask the participants to form groups of 3 persons (Person A, B and C)
- Engage each group to do the following exercise:
 - Person A narrates a story in 3 minutes.
 - Person B re-narrates person A's story as accurately as he/she remembers not using more than 3 minutes.
 - Person C listens actively and at the end reflects together with person A and B on the differences in the same story told by two people.
- After the exercise, reflect with the group what happened and what could be the reason for what happened. To do this, choose about three people from different groups who had different roles to count their experiences.

Input presentation

- Present slides 3-5 (presentation 6.1: Develop a communication strategy) to the participants to provide them with some general background on communication and common barriers to effective communication

Hint for the trainer:

- Use examples of the group exercise for explaining the models and the different aspect.

When implementing a project or realising activities in communities, proper communication is crucial. To qualify internal communication, we need to understand how communication works and its barriers. This is aided by two commonly used models of communication, which are briefly presented below.

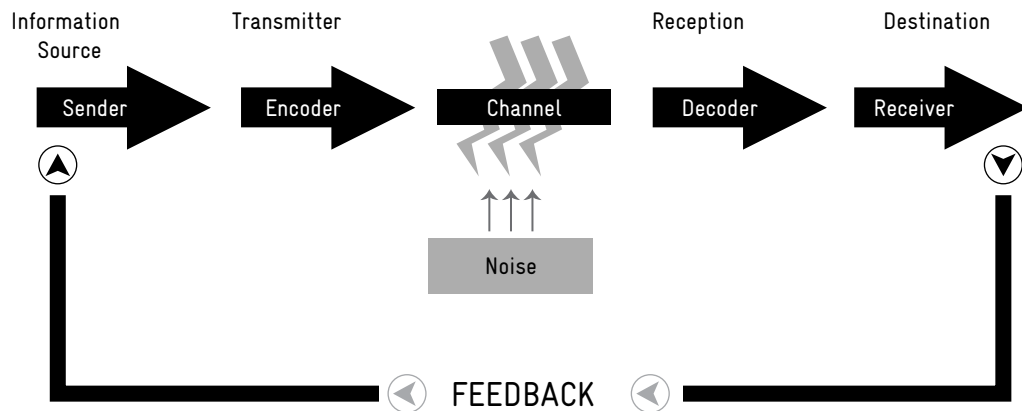
The sender-message-channel-receiver (SMCR) model of communication (slide 4)

The sender-message-channel-receiver (SMCR) model of communication provides an overview of the various components in the communication process and how they are interlinked with each other. By understanding the dependence of the different components, the participants will understand how communication works and what might disrupt the communication process. The model can be applied to different fields of communication including the general components (starting from the left):

- **Sender:** the originator of message (example: the women farmer A)
- **Encoder:** the transmitter which converts the message into signals (the way message is changed into signals, for example sound waves) (example: the voice of a women).
- **Channel:** the signal carrier or medium (example: voice carried through air).
- **Decoder:** the reception place of the signal which converts signals into message. Decoding is done by the receiver when he gets the message (example: a message gets to a second's woman's ear = listening)
- **Receiver:** the recipient of the message from the sender (example: a second women). She usually gives feedback to the sender in order to make sure that the message was properly received.

- **Noise** affects the communication process going through the channel and makes the message more difficult to understand by the receiver (example: thunder or crowd noise).
- **Feedback:** The receiver can get an inaccurate message. This is why feedback from the receiver is important in case the message is not properly received. Furthermore, the noise can also affect the decoding of the message by the receiver. (example: a smile of the second women to the first women or any verbal replication)

Figure 41. The sender-message-channel-receiver (SMCR) model of communication



Shannon-Weaver's Model of Communication

Source: <https://www.communicationtheory.org/shannon-and-weaver-model-of-communication/>

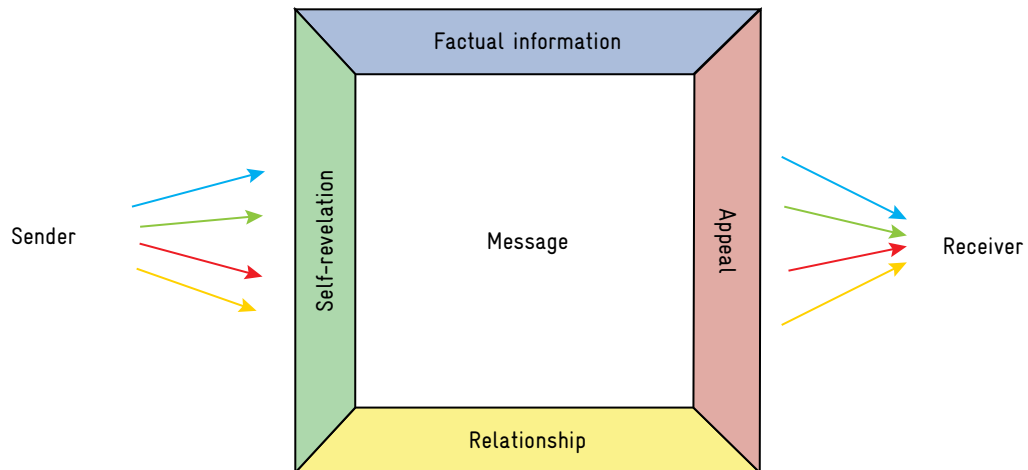
4 sides of communication model (Schulz von Thun) (slide 5)

A second important model of communication that helps participants to create a functioning communication strategy is the four-sides model of communication designed by the German Friedemann Schulz von Thun. It shows how the analysis of a message from a sender by a receiver (see model above) is influenced by different aspects, which can quickly lead to misunderstandings.

The model says that every message has four facets, though not the same emphasis might be put on each: the factual, self-revealing, relationship and appeal facet. A message (communication) can therefore be sent as well as received as one of the four sides of information. Therefore, it is important while coping with internal communication to consider this part of communication which also could be culturally influenced.

- The **Factual Level** contains statements which are matter of fact like data and facts, which are part of the news.
- In the **self-revealing** or self-disclosure, the speaker - conscious or not intended - tells something about himself, his motives, values, emotions etc.
- In the **Relationship**-layer is expressed resp. received, how the sender gets along with the receiver and what they think of them.
- The **Appeal** contains the desire, advice, instruction and effects that the speaker is seeking.

Figure 42. 4 sides of communication model (Schulz von Thun)



Source: <https://www.schulz-von-thun.de/>

Hint for the trainer:

- To better understand the model, present examples to the participants.

The most known example which Schulz von Thun gave, is the car situation. The front-seat passenger tells the driver: “Hey, the traffic lights are green”. The driver will understand the message, depending on the ear with which he will hear, and therefore will react differently.

- On the factual information facet, he will understand the “**fact**” “the traffic lights are green”,
- On the appeal facet he could also understand it as “Come on, drive! .”-“**command**”,
- On the “**relationship**” facet he could hear a help like “I want to help you,
- On the facet of self-revelation, he hears behind it: I am in a hurry the passenger reveals part of himself “**self-revelatory**”.)

The emphasis on the four facets of communication can be meant and understood differently. For example, the sender might intend to emphasise the attractiveness of the statement and the receiver might mainly receive the relationship part of the message.

Examples of barriers to effective communication (slide 6)

The four-sides model describes one of the main reasons for misunderstandings. There are many other reasons why interpersonal communications may fail. In many cases, such as described in the example explaining the 4-sides model, the message may not be received exactly the way the sender intended. It is therefore, recommended that the sender actively listens, reflects and checks whether its message has been understood and to be aware of common reasons for misleading communication.

Common barriers to effective communication (Drexel University 2018):

- **Dissatisfaction or disinterest with one’s job** – when there is dissatisfaction involved it is a big barrier to clear communication and creates likely conflict.
- **Inability to listen to others** – For a fluent communication it’s not only important to know how to communicate but also how to listen.
- **Lack of transparency and trust** – Without trust or transparency especially internal communication is very difficult.



- **Communication styles (when they differ)** - Everyone has their own communication style. Some people are very direct while others prefer a more indirect approach.
- **Conflicts in the Workplace** – when there is a conflict with a person, that difficult or impossible the communication, because it is influenced by a negative feeling.
- **Cultural differences & language** – Communications depends on one’s culture and language. A German person at greeting shakes hands, saying “hi”. An Indian person would close the hands in front of their breast and bow, saying “namaste”.

Group exercise: Developing an internal communication strategy (slide 7-9)

Time: 15 min.

After understanding how communication works and what barriers can be encountered, in this exercise participants will create an internal communication strategy. They will analyse what, how, why and with whom to communicate internally and discuss how to prevent possible risks. When communicating internally, we have to consider that communication is a very complex process keeping the different facets and barriers of communication in mind.

Examples:

Why (here: in the context of adaptation projects)	How (Channel)	What (Message)	Whom (Receiver of the message)
<ul style="list-style-type: none"> • to increase internal knowledge about CCA measures/strategy (awareness raising) • to improve internal work processes • to build capacity and ownership for implementation (support, engagement and participation) • to generate ideas for the development and improvement of CCA strategy 	<ul style="list-style-type: none"> • Written text (paper, email, note) • Phone call • Message on the cellphone • Email • Information night • Group discussion • ... 	<ul style="list-style-type: none"> • Internal processes • Assign to-dos • Ideas • Presenting recent results, processes of the CCA project • emotions • Desires • ... 	<ul style="list-style-type: none"> • Groupmembers • People of different hierarchy • Stakeholders (local/national level) • Different age and gender groups • ...

- Ask the participants to form groups and reflect about the communication that is happening within their organisations, groups or daily life. By doing so they should analyse the different levels of communication including social, technical and content aspects by using Worksheet 1 in handout 6.1 (you will find an example below)

Guiding questions:

- What do you communicate about?
- Who is involved in what kind of communication?
- How do you communicate and how you wish that communication works?
- Who is responsible?

- In the second step, engage the participants to analyse whether and what problems or difficulties they experienced in this communication and suggestions to improve it. To help participants brainstorm, remind them of the 4 sides model presented earlier and the examples of barriers to communication.

Hints for the trainer

- This exercise will build the basis for the next group work on creating an internal communication strategy.



Internal Communication Strategy						
Why do we communicate?	What do we communicate about? (Message)	Who is communicating (Sender of the message/ responsible person)	How do we communicate? (Channels)	To whom do we communicate? (Receiver of the message)	Experienced difficulties in communication	Suggestions to improving communication
Example: Work among farmers must be coordinated with each other	Example: defining daily routine	Example: One farmer woman	Example: phone call	Example: Close colleague	Example: at certain times there is no signal and the phone is dead	Example: Define fixed times for internal meetings where everyone is able to be in one place with reception and a charged phone.

Step 2. Developing an external communication strategy

In this Step, the participants will learn how external communication works, what to consider and how they can develop their own strategy for their groups and working teams.

Input presentation

- Present slides 10-12 (presentation 6.1: develop a communication strategy) to the participants.

External communication is the way you communicate your project activities to the public, stakeholder that are not part of your organisation/team such as: community, investors, political authorities and non-governmental organisations. Other people from the region could for instance be interested in replicating successful implemented CCA measures as they could face the same climate risks. In order to successfully communicate to external stakeholders, it is important to design the communication stakeholder-specific since different stakeholders do have different levels of knowledge, expectations and interests.

External communication aims at:

- Promoting the success of implementation efforts and acquire a pioneer status
- Increasing project's visibility
- Increasing the project's impact
- Improving external reputation towards diverse external stakeholders
- Triggering collaboration in adaptation efforts, e.g., on cluster level, in cooperation with communities, supporting programmes by governments, etc.

Storytelling - How to perform external communication (slide 10-12)

What: Storytelling is the recital of an event or a series of events which can be either true or fictitious. With storytelling you create a more vivid message which the reader can relate to, get involved and feel empathy with the topic. It is a good tool for your external communication. This tool can be especially effective in cultures that have a rich oral tradition.



Examples: The story of ...

- a woman whose life changes through the use of rainwater harvesting
- a little girl and her daily life that was changed by an CCA measure
- a women's self-help group that changed their way of agriculture, adapting it to an CC adapted agroforest system.

Group exercise (optional, if time allows)

- If you have time, you can choose one of forms for telling stories presented below and practise story telling with the group.

Forms of story-telling:

- **Sharing Stories:** Ask participants to reflect upon a specific topic, and share stories about that topic from their own personal experience. This may contribute to participants' motivation to deeply engage with a particular topic, as they will be grounded in their own experiences and memories.
- **Critical incidents:** Tell or read a story to the group, and then lead a discussion about the issues raised in the story. You might use an existing parable or local story, or create a story to illustrate the topic you want to address.
- **Finish the Story:** Begin a story, and ask participants to add a line or two. This works best in a smaller group, and can even be used as a quick and fun warm-up.

Group exercise: Channels used for external communication (slide 13)

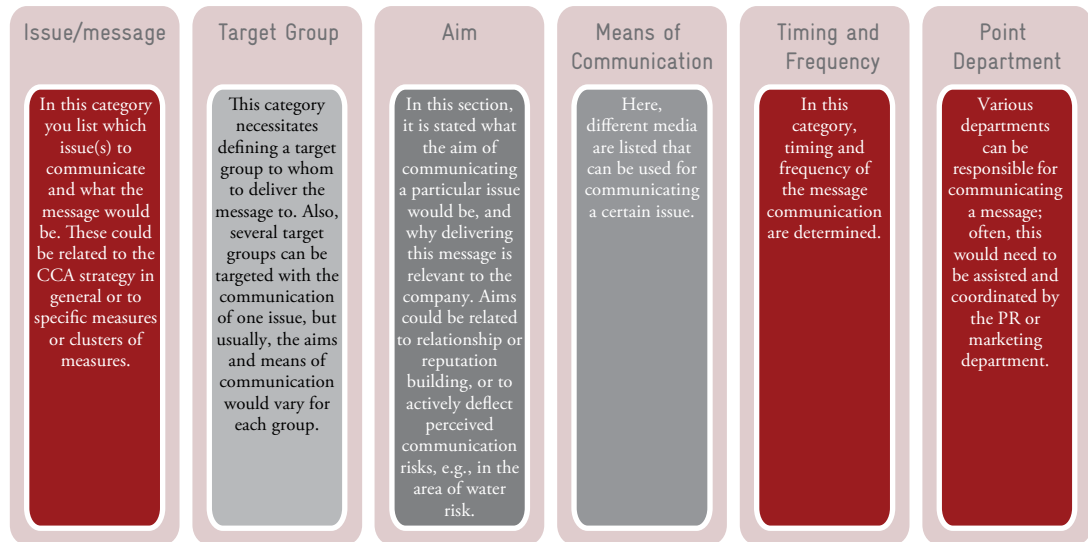
Time: 15 min.

- For this exercise you can use a flip chart to collect and present the results to the group or participants can work on the provided worksheet 2 in handout 6.1
- Ask the participants to think about strength and limitations of each item quoted in the table below
- Engage them to talk about their experiences with different communication channels and to present and discuss their own experiences

Communication channels	Strength	Limitations
Video	Example: The video shows a situation or project with images and voice, so it transmits very well what you want to show/communicate, no literacy necessary.	Example: Usually more work required for realisation (incl. technical equipment), requires a medium for transmission (television, internet, computer, telephone etc.)
Flyer	Examples from participants ...	
Painted pictures (walls)		
Audio spot or music		
Little manuals		
Article in the local newspaper		
Webpage		
Newsletter		

Let participants add further channels you know and which are relevant for your daily life and working context

Input: Channels used for external communication (slide 14)



Group work: Create your external communication strategy (slide 15)

Time: 30 min

- Use worksheet 3 in handout 6.1 and start to create an external communication strategy.
 - Find some at least three important messages of you CCA project that you want to communicate and fill in the table.
- Hints**
- Inform the participants that this exercise serves for their understanding and application of the learned, but that they can just start within this workshop on selected examples and should conclude afterwards.

External communication					
Issue / Message	Target group	Aim	Means of communication	Timing / frequency	Point department
Example: Rainwater harvesting can be a good method for every women farmer of the village	Women farmers of the village	Make the CCA measure more famous to improve farming conditions in the village	Create a little audio and pass it in the village radio	Once a day for 2 weeks	Responsible for communication and technician.
Ideas of participants ...					



Step 3. Using social media

In this step the participants reflect about the use of social media for external communication and practise on a simple example.

Input presentation

- Present slides 16-18 (presentation 6.1: develop a communication strategy) to the participants.

Social media is the fastest and newest way to communicate what you do. It is used a lot in private communication, but organisations, politicians and companies also use it. Social media is famous and people like to use it, mainly because it is easily accessible. But remember, not everyone has access to a mobile phone or a computer and the internet. Therefore, access is sometimes limited. A good analysis should be made to consider the way social media is used in each context.

Social media are easy to use, they are fast in transmitting information and they are cheap and have a great impact.

<ul style="list-style-type: none">■ Benefit: The benefit of the social media is that you can use a lot of pictures, little text and therefor achieve also people who are little literate. You don't need to be a good writer.	Examples of social media (slide 17) These are the most common social media used around the world.
<ul style="list-style-type: none">■ Limitation: Access to internet necessary, few information can be transmitted, needs continuous updates for not losing the interest of the followers.	<ul style="list-style-type: none">■ Facebook■ YouTube■ WhatsApp■ Instagram■ ...

Task for discussion and exchange: Ask what social media do the participants use and why? Ask them to share their experience. The trainer also should take some examples.

Final exercise: Post on social media about our session today (slide 18)

- Engage each participant to create a small post for a social media of their choice about what was learned today or about a great experience.
- If there are people who don't have a cell-phone, they should group up with others.
- If possible, everybody publishes the post and if wished get connected with the other participants.

Hints

- The participants should think about to whom they want to communicate.
- Explain why they use the medium you decided on.

Hint for the trainer:

- This task also provides insights into what the participants have learned from the session.

Useful literature and databases

- **GIZ:** Toolkit to develop climate adaptation strategies for small and medium-sized enterprises (SMEs): Climate Expert. Available at: <https://www.climate-expert.org/en/home/>
- Schulz von Thun Institut für Kommunikation. Communication models. Available at: <https://www.schulz-von-thun.de/die-modelle>

Key take-aways

- Understanding the importance and also the difficulties of communication
- Know what is internal and external communication
- Have the knowledge to create an internal and external communication strategy
- Be aware of the possibilities of social media in the context of CCA

Questions for the debriefing phase

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- Do you know how and do you plan to apply the key concepts provided by this session to your work?
- How did the tool support you in improving acceptance and public visibility of your project activities?

Session 6.2 Gender action plan

Learning objective	To learn how to strengthen the role of women and understand the importance of designing projects in a gender-sensitive way	
Prerequisites / prior knowledge for successful participation	A rough design of the adaptation project is available including main outcomes and outputs defined (Modul 5)	
Steps (duration)	Step 1. Understanding the concept of gender and women empowerment	45 min
	Step 2. Assessing the project's impacts on gender aspects	45 min
	Step 3. Developing a gender action plan to strengthen the role of women in climate change projects	30 min
Total duration	2 h (optional: only Step 1 can be trained in 45 min)	
Methods/Exercises	Input presentation, discussing gender inequality and women empowerment, gender assessment, developing a gender action plan	
Material	PowerPoint presentation 6.2, handout 6.2, Laptop, LCD projector, cards and flipcharts as moderation material	
Preparation of the material	You may adapt the examples provided to facilitate the exercises in this session to the context of the participants.	

Step-by-step approach

This session helps strengthen the understanding and gain an awareness of gender issues when it comes to implementing adaptation projects. It provides guidance on designing projects in a gender-sensitive and -strengthening way by means of a gender action plan. Mitigating gender inequality can play a key role in successful adaptation to the risks of climate change (Carbon Brief 2020).

Step 1, will provide a general understanding of gender aspects and women empowerment by focusing on gender inequality globally and in India. It will give the participants the possibility to access the status quo of gender, understand the difference between gender and sex, equality and equity. There will be a guidance to empowerment and strategic gender needs/interests.

In **Step 2**, the participants can put the new learnings into practise and are guided to assess the project's impacts on gender aspects, as the question of women in development, women in climate change projects and women impacted by climate change.

Finally, in **Step 3** the participants will design their own gender action plan, making their projects more gender sensitive through specific actions, indicators and targets.



Step 1. Understanding the concept of gender and women empowerment



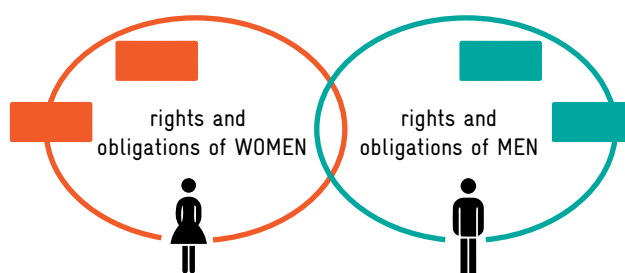
Energizer: Understand gender inequality (slide 4)

Time: 15 min

- Divide the participants into 2 groups
- Group 1 thinks about rights and obligations of women in their local context and writes each of a single card.
- Group 2 thinks about rights and obligations of men in their local context and writes each of a single card.
- Let the participants pin their cards on the wall, where you prepared one circle for women and one for men (see visualisation example below). Ask each group to explain their cards.
- To collect their results, participants may use worksheet 1 of handout 6.2

Hint for the trainer

- After the input presentation of Step 1, engage the participants to discuss in groups and reflect their answers on structural and social inequality against what they have newly learned.



Input presentation

- Present slides 5-10 (presentation 6.2: gender action plan) to the participants.

Why concerned with gender issues? (slide 5)

Every day, in every country in the world, women are confronted by discrimination and inequality at home, at work and in their wider communities. Gender inequality is one of the main causes of poverty and, as shown by recent studies, mitigating gender inequality could help societies adapt more quickly and easily to the impacts of a changing climate.

- Women form **49,58%** of the world's population and **48%** of India's population.
- **76.2%** of total hours of unpaid care work, more than three times as much as men. In Asia and the Pacific, this rises to **80%**.
- Women perform **2/3** of the world's work.
- Produce **50%** of the food
- Women earn **10%** of the world's income.
- Women earn less than **1%** of the world's property.
- Women constitute **70%** of the world's poor living on less than **\$1/per day**.
- Worldwide, **1 in 3** women and girls will experience violence or abuse in their lifetime.

Source: *Gender inequality in numbers* (International Labour Organisation 2019, www.ilo.org)

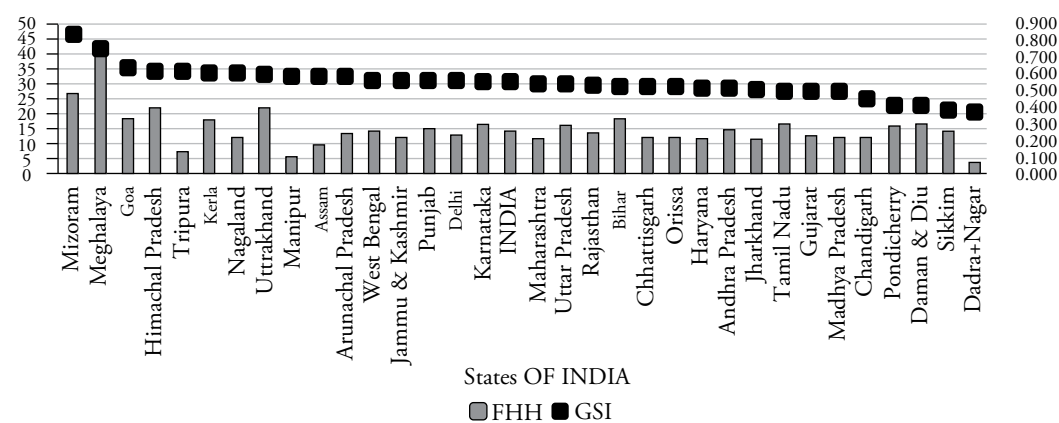
Gender in India

While India has launched the National Mission for Empowerment of Women (NMEW) in 2010 and promoted gender equality in education, the country is still behind in many sectors like labour force participation and maternal mortality rate requiring a further push in promoting gender considerations.

Example of Climate Change Impact on Women:	Gender Inequality Index (GII), 2019 of 162 countries:
<ul style="list-style-type: none"> Limited coping capacity with climate change impacts due to social, economic and political barriers. Significant increase in time needed for water collection in drought-affected areas. 	<ul style="list-style-type: none"> India: 122 China: 39 Sri Lanka: 86 Bhutan: 99 Myanmar: 106

Female headed household and gender sensitivity index

Figure 43. Female headed household and gender sensitivity index



Source: <https://doi.org/10.1007/s42379-020-00065-3>

Female workforce in Uttar Pradesh

Table 14. Female workforce in Uttar Pradesh

Year	TRU	Population (in Million)			Worker (in Million)		
		Persons	Males	Females	Persons	Males	Females
2001	Total	166.20	87.57	78.63	53.98	40.98	13.00
	Rural	131.66	69.16	62.50	44.68	32.77	11.91
	Urban	34.54	18.41	16.13	9.31	8.21	1.10
2011	Total	199.81	104.48	95.33	65.81	49.85	15.97
	Rural	155.32	80.99	74.32	51.95	38.35	13.60
	Urban	44.50	23.49	21.01	13.86	11.49	2.37
Exponential Growth Rate	Total	1.86	1.78	1.94	2.00	1.98	2.08
	Rural	1.67	1.59	1.75	1.52	1.59	1.34
	Urban	2.57	2.47	2.68	4.06	3.42	8.01

Source: https://www.indiastat.com/SOCIO_PDF/118/fulltext.pdf

The table above shows the workforce in Uttar Pradesh during 2001 and 2011, in rural as well as in urban areas. While the male population has grown at an annual rate of 1.78% over the last decade, and the female population at a rate of 1.94%, male labour force has grown at a rate of 1.98% surpassing the growth rate of the general population and the growth rate of female labour force, at 2.08% per annum. Again, the figures show that whereas in urban areas female labour force has grown at a faster rate than the urban female population, it is significantly lower in rural areas.

Wage Rate by Sex and Region (Rs. Per day)

Table 15. Wage Rate by Sex and Region (Rs. Per day)

Region	Sex	AG		Non-AG	
		Skilled	Unskilled	Skilled	Unskilled
Eastern	Male	78.10	59.60	178.00	88.30
	Female	61.33	39.60	125.50	74.06
Central	Male	80.26	74.71	219.42	103.71
	Female	63.12	65.70	225.00	96.12
Bundelkhand	Male	99.77	97.67	223.94	100.12
	Female	73.78	73.42	200.00	76.84
Western	Male	134.28	131.37	275.30	146.00
	Female	0.00	95.56	275.00	105.94
All District	Male	99.34	92.20	224.47	109.62
	Female	69.24	67.44	187.50	89.52

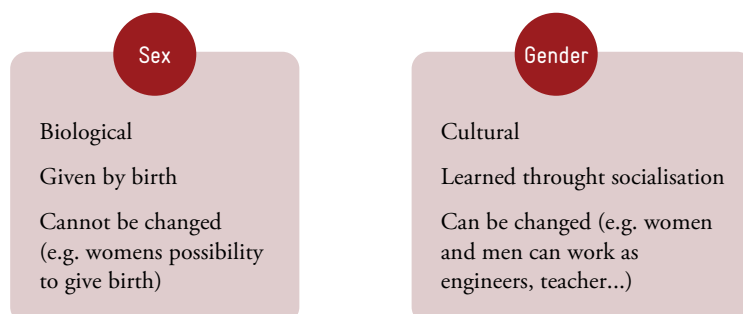
Source: <http://www.indianresearchjournals.com/pdf/IJSSIR/2013/August/6.pdf>

Definition of the gender concept (slide 6)

Hint for the trainer

- It's important to mention that there is also sex and gender that cannot be identified with the categories of women and men. For the reason of simplicity, the focus of this training will be on the understanding of the concepts of women and men.

Gender is constructed socially. There are socially constructed roles and responsibilities assigned to men and women by society. These roles are learned; they vary between cultures and they change over time. **Sex** are biological attributes of men and women; these attributes are universal and cannot be changed.



Understanding basic concepts of gender issues: Gender relations (slide 7)

The term Gender refers to how men and women relate to each other, resulting in manifestations of gender-based power. The Power arises from the roles men and women are expected to play and the impact of their interactions have on social life, especially on the everyday life at home, but also on general social interaction. Uneven power relations arise because the male has more power in making

legally influential decisions than the women, in almost all societies of the world, but especially in India. Roles, assumed attributes and social systems lead to the creation of blueprints for behaviour. If we do not conform to these roles we are seen to be deviant by society. Mostly we don't even reflect about that roles. Power relations always result in one party being worse off than the other and create social imbalances. In that case it is the women who suffers from this type of discrimination.

The family is a good example, as men assume the earner and leader roles and women assume the domestic and childcare roles.

Equality versus equity (slide 8)

Equality can be seen as a fundamental right for every person to be as equal as any other person independent of their social, gender or ethnical background. Equality refers to similarity of treatment as it is legally, constitutionally and divinely given. Society generally tries to make differences between the persons which also results in power relations. Our focus here is to provide an understanding that equality is not a favour but a fundamental right.

Equity refers to a fair sharing of resources, opportunities and benefits according to a given framework. Equity is measurable and manifested in parity. Experience illustrates that equity is used instead of equality within institutions. Is often undermines equality as women enter institutions on male terms without the equality process being fully explored and utilized. Equity is often viewed as a favour, whereas equality is a fundamental right.

Discussion: What means empowerment? (slide 9)

Time: 15 min

- Open a discussion with the participants about their understanding of empowerment and why it is a necessary mean.
 - How do the women need to be empowered?
 - What would be important to change in the participants life?
- After the discussion, explain the Women's Empowerment Principles to the participants (see figure below).
- To collect their results, participants may use worksheet 2 of handout 6.2

Empowerment

Empowerment can be seen as the process and end result of improvement in autonomy through various means such as access to knowledge, skills and training. The acquired improvement is then applied. The process and result of empowerment are a critical issue in development.

The principles in the graphic were developed by UN Global Women and provide guidance on how to promote gender equality in the workplace and society.



Source: UN Women and UN Global Compact Office (Weblink)



Strategic gender needs and interests (slide 10)

Strategic gender needs or interests are referring to socio-economic and political positions of women compared to men. It also relates to structures and systems, which are embedded and therefore more difficult to deal with. In looking at strategic needs, focus is placed on factors such as:

- **Marginalisation** - exclusion in processes such as decision-making. This results in women's inability to articulate their needs and interests.
- **Discrimination** - differential treatment based on factors over which an individual has no control, e.g. sex, tribe, nationality, race, etc.
- **Dispossession** - through patriarchal systems of property inheritance.
- **Value assignment** - determining a woman's value by the sex and number of children she bears.
- **Violence** - physical, mental and emotional abuse, which is culturally accepted as correcting a wife or harmful practices such as female genital mutilation to subdue female sexual urge.
- **Sub-ordination** - assignment of an inferior position e.g. treatment as second-class citizens.

Step 2. Assessing the project's impacts on gender aspects

Based on the new learnings, this session is now specifically about shaping the participants' projects towards a gender-sensitive design. A project can have different impacts on women and men that reinforce inequalities, even if the project does not have an explicit gender focus. This is especially true for climate change projects, as the impacts of climate change affect women and men differently (e.g. women are often more dependent on local natural resources for their livelihoods). Therefore, mainstreaming gender activities makes climate interventions more effective and efficient.

In Step 2, participants assess the status quo of gender aspects at the project site as well as the impact of the project on women and to what extent gender aspects are currently included in their project design. They will structure project activities according to social, economic, political and cultural aspects and determine how women and men can best participate in a gender equal way in an adaptation project.

Group exercise: Assess the status quo of gender aspects at the project's site (slide 12)

In preparation for the development of the Gender Action Plan, assess with the participants the status quo of gender issues in the project target region. Consider the baseline situation of women in the region of your project and how they are affected by climate change.

Time: 10 min

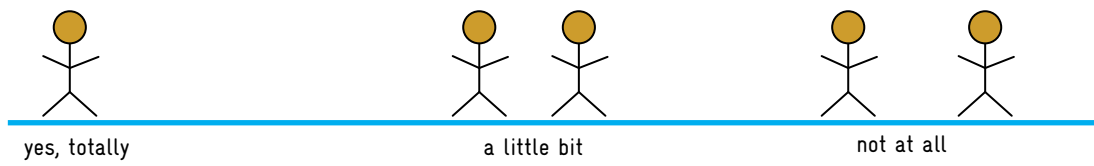
- There are three points in a line defined as "yes/totally" on the far left, "a little bit" in the middle and "not at all" on the far-right side.
- Ask the participants to respond to the following questions, positioning on the line, referring to their answers.
- When the participants have positioned themselves, chose three of them to explain their choice of position.

Recommended questions:

- Are you impacted by climate change?
- How sensitive is this to change?
- Are the women more impacted by the impacts of climate change?
- Are there any projects or measures that help especially the women to adapt to climate change?

Hint for the trainer:

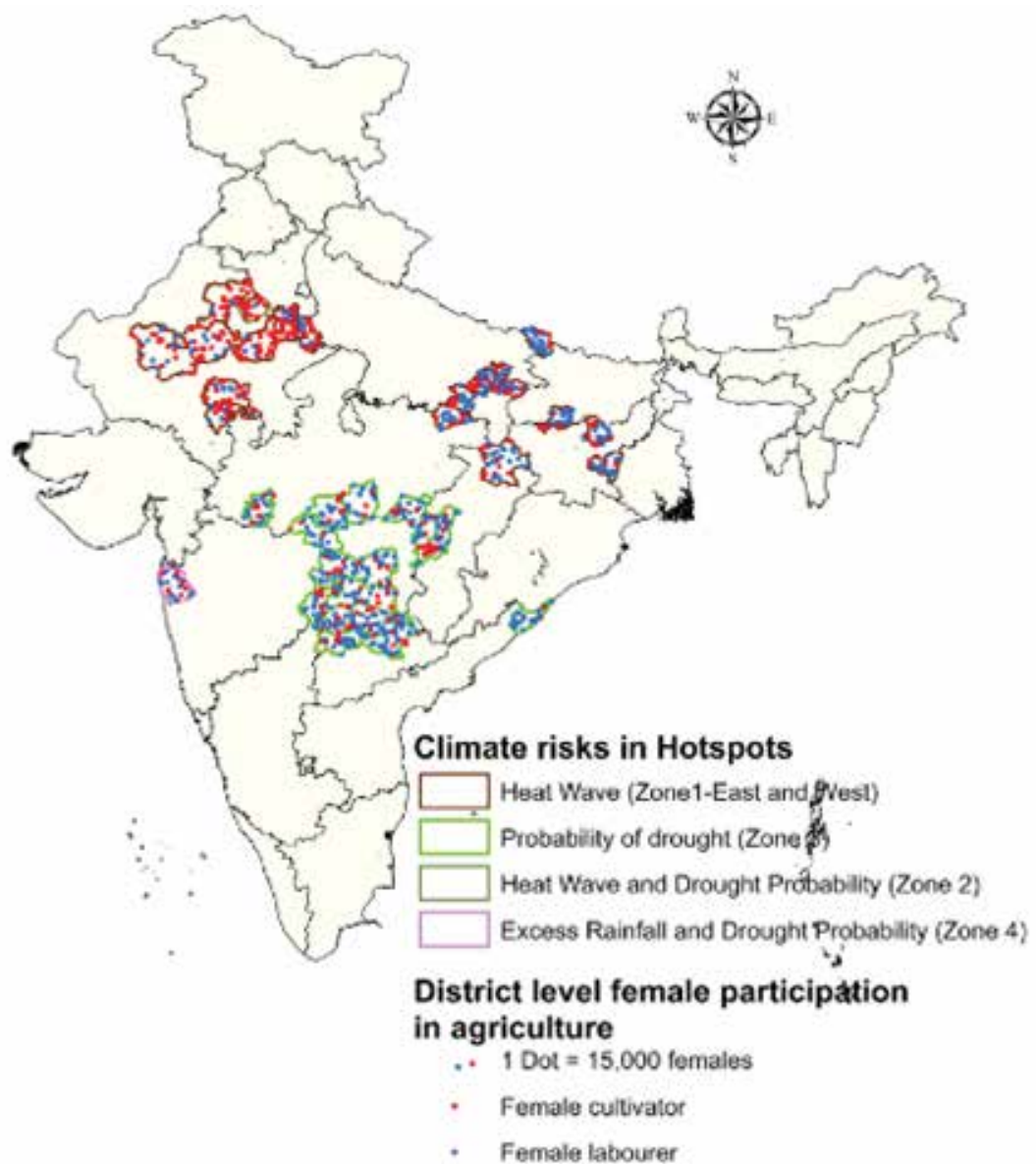
- You may support the exercise by showing maps and data of climate risks hotspots compared to female participation in agriculture for instance. One map example is provided below and on slide 13 of the ppt.



The map shows climate risk hotspots and female participation in agriculture in India.

- Ask the participants to search for their region on the map and reconsider their answers from the prior exercise.

Figure 44. Climate risk hotspots and female participation in agriculture



Source: Chanana-Nag, Aggarwal (2018)



Group exercise: Gender assessment (slide 14)

Informed about the status quo of gender aspects within the participants target region/sector etc., it is their turn to assess the project's impact on women and how far gender considerations are included into their project design. The gender assessment of their projects will build the bases for developing the gender action plan.

Time: 20 min

- Ask the participants to go through the following assessment questions and determine to what extent this is fulfilled in their adaptation projects using a scale of 0-5 (0= not fulfilled; 5= fully fulfilled) (worksheet 3 of handout 6.2)

Assessment questions

To what extent is this fulfilled? (Score) 0-5

1. Needs and roles

Does the project recognize differences in the needs and roles (influenced by norms and values) between women and men?

2. Productivity:

Will the project components improve the productivity of both women and men on an equal level?

3. Access to resources

Will the access to resources be improved for both women and men to an equal extent (or better, so the access will be more equal)?

4. Project benefits

Will both women and men share in the project benefits to an equal extent?

5. Participation in decision-making

Will participation in decision-making be strengthened for both women and men (but especially for women)?

6. Participation in project

Are factors which may inhibit women's full participation in the project addressed?

7. Women empowerment

Will the project empower women?

8. Gender needs

Is the project meeting practical or strategic gender needs?

Step 3. Developing a gender action plan to strengthen women, mitigate negative impacts and strengthen positive impacts

Input presentation

- Present slides 15-16 (presentation 6.2: gender action plan) to the participants.

The importance and objective of the gender action plan (slide 15)

- Climate change particularly impacts vulnerable communities and especially women.
- Climate project funds mostly consider important gender aspects and equality within funded projects.
- A Gender Action Plan (GAP) is a tool that ensures a particular reference to gender considerations within your project/program.
- Directly integrate gender concerns into your project or programme concept to mitigate negative impacts on gender equality.
- Strengthen positive impacts for women empowerment.
- you can transfer the developed gender-responsive objectives and project activities to your overall project objectives

Setting gender-sensitive indicators and targets (slide 16)

For developing a gender action plan, to define SMART indicators and target is essential to understand if change happened. Below some examples of indicators are provided:

- **Participation and increased acceptance** of women and men in **community decision-making**, on the same quantity and quality.
- **Access to and control** over inputs by men/women (Greater personal and **economic independence**)
- Ensure a strategy that has **no potential to exclude** stakeholders on the basis of gender
- More women in education and training programmes.
- A **decline in violence** against women and increased women's **control over their fertility**.
- **Reduced institutional discrimination** and bias against women or age.
- **Allocate budget lines** and resources for gender and training on gender issues.
- State gender equality as a **staffing policy** not just in the project but in your organisation.
- Include **gender responsive programming** in the terms of reference of all staff.
- Confirm that all **collaborative agencies** have gender on their agenda.

Group exercise: Develop a gender action plan (slide 17-18)

Time: 30 min

- Ask the participants to develop their own Gender Action Plan for their adaptation projects with gender specific objectives, activities and indicators by using worksheet 4 of handout 6.2.
- To define gender-responsive objectives, determine how the project can address the needs and interests of women and men in relation to the identified climate risks (Modules 2). Start with the aspects that scored lowest in the gender assessment. To complete the GAP, also consider the participation of people from different socio-economic and ethnic backgrounds in your objectives.
- To define activities and inputs the participants should think about what is required to achieve the changes established in the objectives of the project
- In order to define indicators and targets, ask the participants to look at the key objectives and ask what success, regarding to gender equality, would look like. For example, think about what can you measure to know that the situation has changed (also for women and different age groups) and can be differentiated by gender. A given example facilitates the development.



Hint for the trainer:

- **Objectives and outputs** should indicate anticipated improvements by age and gender.
- **Indicators** should be **gender-specific** and be developed in a **participatory** manner to reflect age and gender perspectives.
- **Actions** should be planned bearing in mind the **gender workload distribution** and potential contributions of different gender and age categories
- It is recommended to check prior to the training if the given example fits the participants context and to bring other better fitting examples if needed.

Adaptation measures	Actions to increase gender equality	Indicators and targets to ensure gender equality
Output example: Enhanced resilience of coastal and marine ecosystems and their services.		
Activity example: Conducting vulnerability assessment of the project region to inform planning of ecosystem- and community-based adaptation interventions	Women and other vulnerable groups participate in the assessment process and own the assessment. Ensuring participation of women and other vulnerable groups' members in climate vulnerability assessment to include their needs and concerns in the ecosystem-based interventions	<ul style="list-style-type: none">■ At least 50 % participants of the community vulnerability assessment process are women■ At least 12 % of participants of the community vulnerability assessment process are women from female headed households■ 100% of vulnerability assessment tools developed are gender sensitive
Output of your project: ...		
Activity 1.1 of your project: ...		
Activity 1.2 of your project: ...		

Useful literature

- African Women's Development and Communication Network: Gender training of trainers. Available at: http://ifig.unece.org/pdf_files/curriculumforthetrainingoftrainersingendermainstreaming.pdf
- Green Climate Fund/UN Women (2017): Mainstreaming Gender in Green Climate Fund Projects. Available at: https://www.greenclimate.fund/documents/20182/194568/Guidelines_-_GCF_Toolkit_Mainstreaming_Gender.pdf/860d1d03-877d-4c64-9a49-c0160c794ca7
- Asian Development Bank (2013): Tool Kit on Gender Equality Results and Indicators. Available at: <https://www.adb.org/sites/default/files/institutional-document/34063/files/tool-kit-gender-equality-results-indicators.pdf>
- European Commission: A guide to Gender Impact Assessment. Available at: <http://ec.europa.eu/social/BlobServlet?docId=4376>
- Oxfam (2014): Quick Guide to Gender-Sensitive Indicators. Available at: <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/312420/ml-quick-guide-to-gender-indicators-300114-en.pdf;jsessionid=31EEF8CBBD01C2461E59CA8DB324470A?sequence=1>
- UNDP: Gender Inequality Index. Available at: <http://hdr.undp.org/en/composite/GII>
- Chanana-Nag, Aggarwal (2018): Woman in agriculture, and climate risks: hotspots for development. Available at: <https://doi.org/10.1007/s10584-018-2233-z>
- WomenWatch: Directory of UN Resources on Gender Equality and Empowerment of Women: https://www.un.org/womenwatch/directory/gender_training_90.htm

Key take-aways

- Gender and sex are not the same.
- Equality and equity are different concepts. Equity is often viewed as a favour, whereas equality is a fundamental right.
- Women are less empowered than men in most situations. Therefore, we need to put a special focus on them.
- Climate change projects are often sensitive to gender aspects.
- A gender assessment and a gender action plan help to show the impact of project activities in terms of gender aspects, which can increase the overall impact of the project.

Questions for the debriefing phase

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- Do you know how to apply the key concepts to your work?
- How did the session support you in assessing and demonstrating the impact of the project in relation to gender aspects?

Module 7. O&M and sustainability measures

Learning objective	To learn key concepts that help sustain adaptation projects
Duration	Shortest version: 1 h 30 min Complete version: 4 h 30 min

Module planner

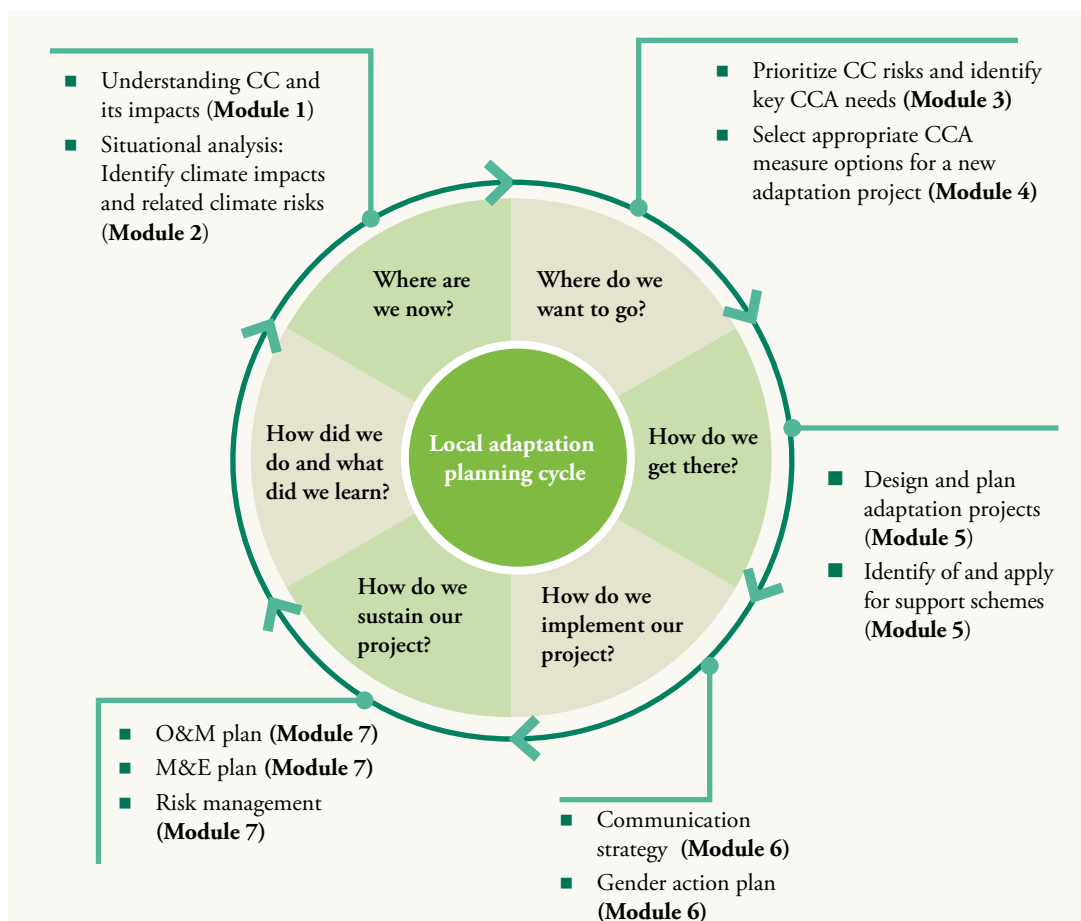
Duration	Sessions of module	Shortest version	Complete version
1 h 30 min	Session 7.1 Operation and maintenance (O&M) plan for environmental infrastructure measures	Step 1 (30 min)	×
1 h 30 min	Session 7.2 Monitoring and evaluation plan	Step 1 (30 min)	×
1 h 30 min	Session 7.3 Risk management	Step 1 (30 min)	×

Integration of Module 7 along the local adaptation planning cycle

The methodology used by the Capacity Building Package follows the logical processes of local adaptation planning. The figure below shows the arrangement of the modules of the CDP, their main steps and methods employed. The purple colour indicates that you are in Module 7 and Step 7 of the local adaptation planning cycle, which introduces key concepts to women farmers to increase the sustainability of the project.

In the Excel tool you will find tabs in the same colours. Here you can document the results achieved by your group of participants in module 7.





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Session 7.1 Operation and maintenance (O&M) plan for environmental infrastructure measures

Learning objective	To develop a long-term operation and maintenance strategy to ensure that the implemented adaptation measure is sustainable and remain effective.	
Prerequisites / prior knowledge for successful participation	CCA projects are designed and ready to be implemented. Note: This session is only applicable for environmental infrastructure measures for climate adaptation including grey and green adaptation measures	
Steps (duration)	Step 1. Understanding the concept of operation and maintenance	30 min
	Step 2. Developing an O&M plan	60 min
Total duration	1 h 30 min (optional: only Step 1 can be trained in 30 min)	
Methods/Exercises	Mind map of benefits and risks, developing an O&M plan including a finance plan based on guiding questions – revise your budget plan	
Material	PowerPoint presentation 7.1, handout 7.1, Laptop, LCD projector, cards and ability to pin the cards on a wall	
Preparation of the material	You may adapt the case study provided that facilitate the exercises in this session to the context of the participants.	

Step-by-step approach

The session will provide key important steps to develop an O&M plan for environmental infrastructure measures for climate adaptation.

Where **Step 1** gives a general understanding of operation and maintenance including basic concepts also on sustainability and advantages, in **Step 2**, the participants will put theory in practice

and are guided to develop their O&M plan for their adaptation projects. Guiding questions and an illustrative example will provide support. The O&M plan will consider various aspects, from the definition of activities, persons responsible, as well as the necessary budget for O&M implementation, which should be considered in the project's budget plan from the very beginning.

Entry exercise (slide 4, 10 min)

- Ask participants to note operation and maintenance activities they know from their daily work on cards (they can also collect their results for later usage on worksheet 1)
- Collect the cards and pin them on a wall.
- Engage each participant to present and shortly explain one activity they noted.

This entry exercise will serve as an energiser. Furthermore, the activities collected will give you an insight in the existing knowledge of the participants on O&M.

Step 1. Understanding the concept of operation and maintenance

Input presentation

- Present slides 5-7 (presentation 7.1: Operation and maintenance (O&M) plan) to the participants.

What is O&M?

“... both a technical activity and a service provision aimed at keeping resource infrastructure at a desired performance capacity or to restoring it to a particular capacity. It is a service supplied to the providers of the infrastructure and/or to those who deliver certain goods by means of this infrastructure.”

Source: MAINTAIN Programme of GTZ

Operation refers to the activities that keep a system running smoothly in order to generate certain outcomes.

Maintenance refers to the activities required to sustain the adaptation measure in a proper working condition. This not only includes to high system reliability and extended equipment life, but also various non-technical factors must be considered, such as the involvement of stakeholders in the maintenance process, management of the financial resources required for the improvement efforts, etc.

Maintenance approaches:

- **Preventive maintenance (ideal scenario)** - Work that is planned and carried out on a regular basis to maintain and keep the system in good condition
- **Corrective maintenance** - Replacing or repairing something that was done incorrectly or that needs to be changed as it can be foreseen that without correction the system will not work efficiently or even stop working; an example is the exchange of a leaking pipe or replacement of a wrongly dimensioned pump
- **Reactive maintenance** – emergency responses to unplanned breakdowns

O&M plans are primarily developed and especially relevant for grey adaptation measures (technologies).



Why is O&M important for your project?

Developing an operation and maintenance (O&M) plan is one pillar to ensure sustainability and long-term effectivity of your adaptation project and its objectives. Even the best and most suitable technology can only work if it is operated properly and maintained according to specifications. Many projects have nice ideas, good investments and a successful first implementation phase, but then fail after the financier and the implementing company have left. A common reason for this is a lack of O&M of the implemented measure.

A system is said to have achieved sustainability when:

- functioning and being used
- able to deliver an appropriate level of benefits (related to quality, quantity, comfort, continuity, affordability)
- continues over a prolonged period of time (beyond the life cycle of the equipment)
- Institutionally managed
- O&M costs are reliably covered (e.g. through user fees)
- mainly operated and maintained at local level
- no negative effect on the environment

Advantages

- O&M activities ensure that the project is sustainable in a long-term
- O&M allow for the correct provision of services and benefit of end-users
- O&M prevent the systems to collapse creating environmental and health hazards
- O&M in time with little costs prevent high costs for bigger repairs or replacements
- Community can be involved in O&M

Group task: Mindmap of benefits and risks (slide 8)

Time: 10 min

- Divide the participants into 2 groups
- Ask the first group to brainstorm about what are the benefits of an O&M plan
- Ask the second group to brainstorm about possible risks of a project (without O&M plan) for their adaptation projects
- Realize a mindmap of the two aspects and analyse the results with the participants. You will observe that some risks of the project can be benefits of the O&M Plan.
- To collect their results, participants may use worksheet 2 of handout 7.1.

Step 2. Developing an O&M plan

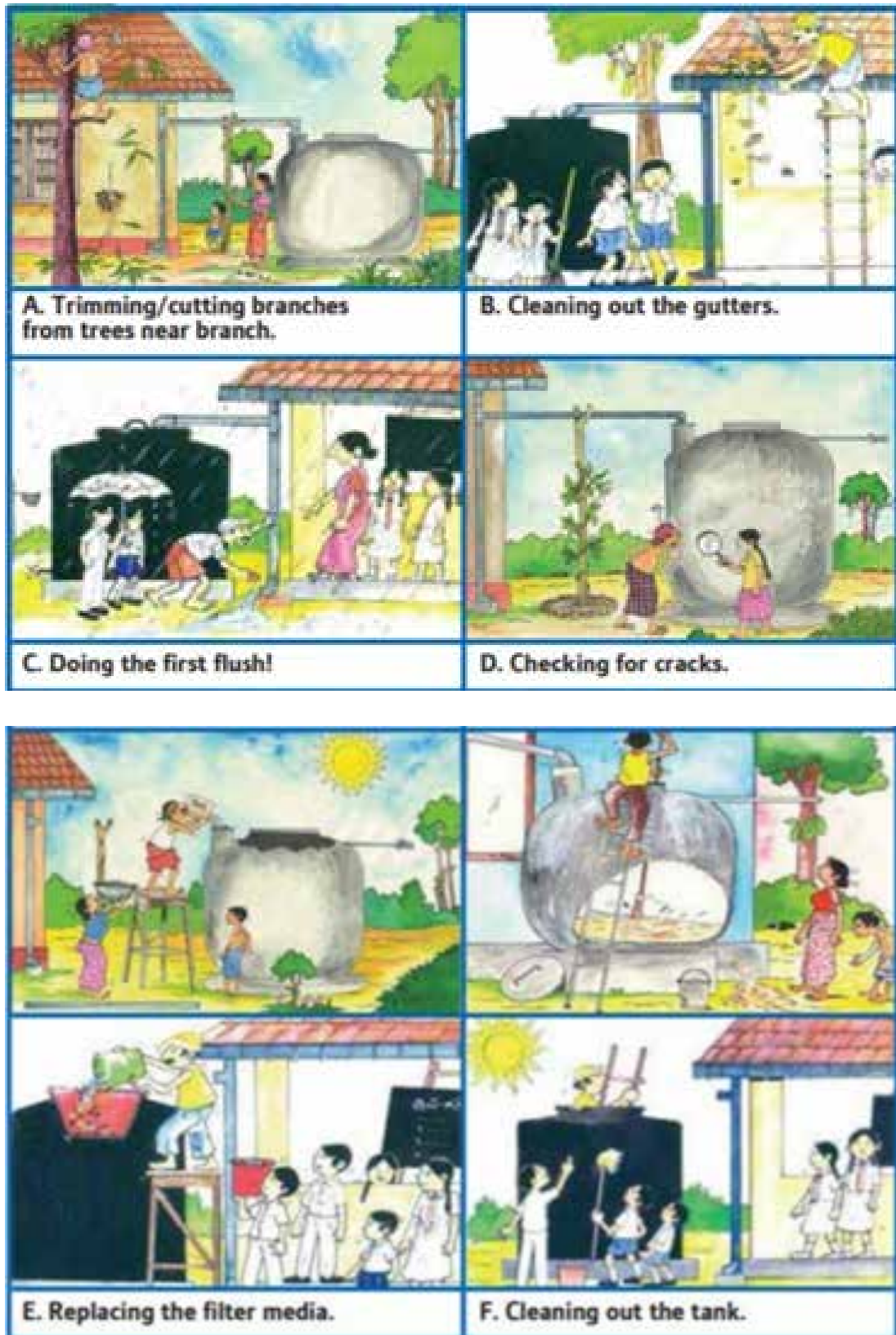
Case study: Examples of O&M plans (slides 10-11)

Roof rainwater harvesting has high potential in areas that receive higher rainfall and have a longer rainy season and dry periods which need to be overcome with the collected water. Roof top water harvesting is the simplest, less expensive and obvious choice to collect water, where there are several and large roof structures. Rainwater harvesting is useful for many purposes, e.g. in areas where water clean resources are scarce, groundwater is either difficult to extract or has become unusable due to poor groundwater quality, e.g. due to salinity problems, or in areas where only contaminated surface water is available. In order to operate rooftop rainwater harvesting sustainably and efficiently, operation and maintenance activities are crucial. These include for example: Regular inspection and cleaning of catchment, gutters, filters and tanks in order to reduce the likelihood of water contamination. Furthermore, water from other sources should not be mixed with that in the tank.

Hint for the trainer:

- The following illustrations are useful to help participants understand important O&M activities for rainwater harvesting rooftop systems.

Figure 45. Exemplary operation and maintenance measures for a rainwater harvesting system



(Source: Pacific Community 2020: <http://ccprojects.gsd.spc.int/wp-content/uploads/2020/09/OPERATION-AND-MAINTENANCE-OF-RAINWATER-HARVESTING-SYSTEMS.pdf>)



The table below shows an exemplary O&M plan for rainwater harvesting including important O&M activities for different infrastructure components, as well as information on how often and by whom these activities are carried out.

Hint for the trainer:

- Use this exemplary O&M plan to prepare the participants for the next exercise, where they will develop an O&M plan for their adaptation projects.

Exemplary operation and maintenance (O&M) plan for rainwater harvesting systems			
Component	O&M activities	Frequency	Person responsible
Roof	Remove all over hanging branches above the catchment surface When required. Replacement of catchments (roofing iron) when holes and rust are visible on it. Cleaning of the catchments (roofing iron) of leaves, moss, bird debris, bird droppings or abandoned nests. If using water, divert runoff by opening the first flush device.	When required, at least 3 times a year, prior to every wet season	Care Taker
Gutters/ Leaf eaters	Cleaning of the gutters and Leaf Eaters of the debris carried by the water from the rooftop (catchment) like leaves and other material possibly clogging the gutters. If using water, divert runoff by opening the first flush device.	At least 3 times a year, prior to every wet season	Care Taker
First Flush Device	Remove plug manually to drain first flush water and replace it securely.	After each rain event	Care Taker
Flap Valve	Make sure the mozzie stoppa flap valve (overflow outlet) is closed properly to avoid insect entering into the storage tank.	After each rain event	Care Taker
Storage Tank	The tank access hole must be covered properly and all light excluded to prevent growth of algae and other organisms in the tank. Clean tank by going inside the tank and clean any silt/sediment.	After each rain event and strong wind, prior to every wet season At least 2 to 3 times a year, Repair leaks at elbow/joints when required	Care Taker

Participatory exercise: Develop an O&M plan for your adaptation project (slide 12)

Time: 40 min

- Ask the participants to analyse their adaptation measure using worksheet 3 of handout 7.1 (see also table below) and to design an operation and maintenance plan by using a four-step approach:
- **First step:** Define the components: Of what components is your measure composed of?
- **Second step:** Analyse and define what O&M activities are necessary to operate and maintain the infrastructure measure

- Third step: Define the timetable: when is the action to be realised or may it be a returning activity and on what frequency it must be implemented?
- Fourth step: Who is responsible for each identified O&M activity? Should there perhaps be a person employed just for that task?
- The next exercise will look at the costs of defined O&M activities.

Hints for the trainer:

- Advise the group to be very specific in their answers and to use the guiding questions given below.

Operation and maintenance plan for _____			
Component	O&M activities	Frequency	Person responsible

Guiding questions for identifying components and O&M activities:

- What are the environmental infrastructural facilities provided?
- What will be the basic operation mechanism?
- What are the Do's & Don'ts for successful operation of the facility?
- What risks do you see in its failure and how can this be prevented?
- What is the maintenance regime to be followed?
- What material/financial means as well as technical expertise are necessary for O&M activities?

Guiding questions for identifying persons responsible for O&M activities:

- Who is owning the infrastructure?
- Who knows best how the infrastructure works?
- Who is going to monitor the functioning of the pilot?
- Who will/can carry out which task/activity?
- When, how and by whom should a relevant person/agency be approached for O&M?
- What difficulties might arise from hiring a particular person or agency?
- What kind of decision-making bodies should be involved in this process to avoid misappropriation of resources?
- What roles should be assigned for monitoring of construction, record maintenance, user charges, book keeping, punishments, regular cleaning and maintenance.

Exercise: Determine how the defined O&M activities can be financed - Revise your budget plan! (slide 13)

Time: 15 min

- Projects often fail to operate sustainably because the financing of O&M activities was not considered in the budget planning. With the aim of preventing this mistake, this exercise asks participants to identify any additional O&M costs that may arise and to include these in their budget plan.

- Ask the participants to identify any additional O&M costs that may arise (e.g. How much energy is necessary (costs)? Is there an additional salary? Do you need additional material for O&M? Do you need additional installations? (you find more guiding questions which should be answered by the participants below))
- The participants can use worksheet 4 of handout 7.1 to collect their results.
- Ask the participants to go back to the budget plan of their adaptation projects and to include the identified additional costs.



Guiding Questions for O&M financing:

- Should new bodies be established in addition to the Panchayats, SHG, VDCs?
- Should there be non-beneficiaries in this committee to restrain the behaviour of the beneficiaries?
- Are there government schemes providing funds for O&M? Can you decide on user fees for financing O&M? Is the community willing to pay the amount allocated?
- What aspects of the O&M process has costs, how often occur these costs?

Useful literature

- Central Public Health & Environment Engineering Organisation:
 - Manual on Operation and Maintenance of Water Supply System (2005). Available at: <http://cpheeo.gov.in/cms/manual-on-operation--and-maintenance-of-water-supply-system-2005.php>
 - Manual on Storm Water Drainage Systems (2019). Available at: <http://cpheeo.gov.in/cms/manual-on-storm-water-drainage-systems---2019.php>
- Ministry of Urban Development, Water Supply and Drainage (2015): Manual for Operation and Maintenance of Rainwater Harvesting System in Schools in Sri Lanka. Available at: http://nwsdbrws.org/downloads/RWS_in_Schools_Eng.pdf

Key take-aways

- Preventive Maintenance is better than responsive maintenance.
- Have capacities in place who know how to operate and maintain the infrastructure.
- Agree to and document clear responsibilities for O&M.
- Raise awareness and train your staff on potential O&M problems and solutions.
- Integrate local population benefiting or being affected by your measures through all project phases and give them certain responsibilities to increase ownership.
- Develop your O&M plan before the project starts.
- Updated your O&M plan continuously and adapted to changing external conditions (climate change, etc.).
- Include time and money for conducting O&M activities when planning finances for your project.

Questions for the debriefing phase

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- Do you know how to apply the key concepts to your work?



Session 7.2 Monitoring and evaluation plan

Learning objective	To understand and develop a monitoring and evaluation plan for the climate change adaptation projects of women farmers. The plan will help to verify whether objectives are being achieved and to support early adjustments in the implementation whenever necessary.	
Prerequisites / prior knowledge for successful participation	A first design for the adaptation project has been created (Modul 5)	
Steps (duration)	Step 1. Understanding the concept of Monitoring and Evaluation	30 min
	Step 2. Defining the results chain and indicators	30 min
	Step 3. Defining means of verification	30 min
Total duration	1 h 30 min (optional: only Step 1 can be trained in 30 min)	
Methods/Exercises	Input presentation, determining prior knowledge of the group, puzzle the results chain, define monitoring indicators and means of verification	
Material	PowerPoint presentation 7.2, handout 7.2, Laptop, LCD projector, moderation cards, wall to pin cards	
Preparation of the material	You may adapt the examples provided that facilitate the exercises in this session to the context of the participants.	

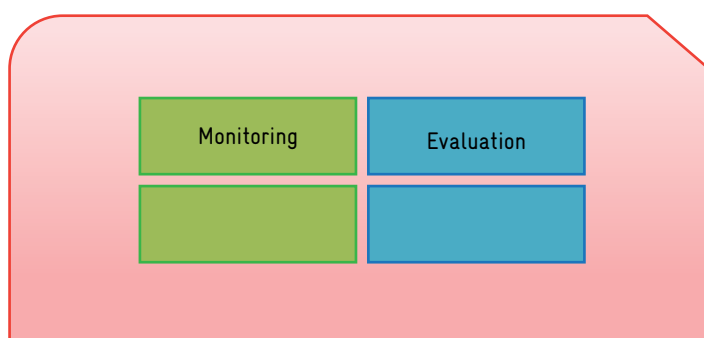
Step-by-step approach

This module guides women farmers step by step through the preparation of a monitoring and evaluation (M&E) plan. After learning more about the general concept of monitoring and evaluation in **Step 1**, participants will be guided in defining monitoring indicators (**Step 2**) and means of verification (**Step 3**) for their own adaptation project to put theory into practice. In each step, an example from a fictional case study will illustrate the concepts.

Step 1. Understanding the concept of monitoring and evaluation

Entry exercise: Determine the level of knowledge of the participants

[image to explain the task]



Input presentation

- Present slides 3-4 (presentation 7.2: Monitoring and evaluation) to the participants.



Monitoring and Evaluation in the Project Cycle - Monitoring and Evaluation are part of the cycle of your project. The graphic above shows this cycle and where what process is performed. You design your project and implement it. During implementation you realise the monitoring, at mid-term and the end of a project the evaluation takes place, using your monitoring as support. Based on the results of the evaluation you adapt your project.

Monitoring: it's a continuous process to analyse if you are on the right way with your activities. Monitoring is performed constantly (for example in monthly or semesterly session) and orientates you if you need to change or adapt actions or activities help achieving the desired output, outcome and impact. In projects of climate change adaptation, you monitor how and if exposed elements by climate change better adapts to the changes and risks.

“Monitoring is the systematic and continuous collection of information that enables stakeholders to check whether an intervention is on track or achieving set objectives.” (GIZ 2015)

Evaluation: it's performed on a defined moment analysing the state of the whole project at a given moment (in the middle or end of the project) and it's impact.

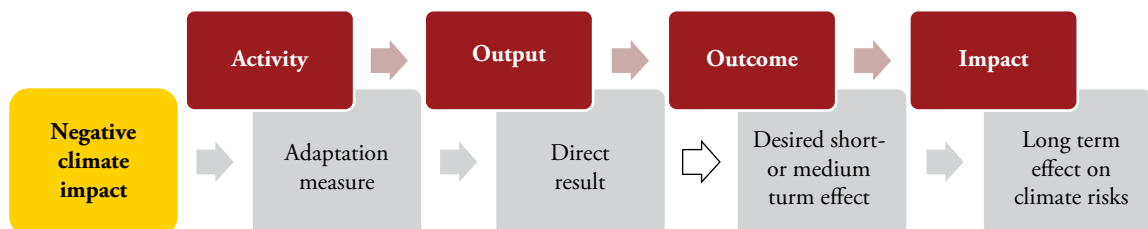
“Evaluation is a systematic assessment of the worth or utility of an intervention at a specific point in time, for example whether a policy has been effective in achieving set objectives.” (GIZ 2015)

Step 2. Defining the results chain and indicators

Note: Parts of this step have already been done in Session 5.1. If the participants have already defined their results chain for their adaptation project, they can proceed directly to the definition of the indicators.

Input presentation: Results chain

- Present slides 5-6 (presentation 7.2: Monitoring and evaluation) to the participants.



The results chain of a project consists of the following steps:

Activity: how the project through proposed measures intends to achieve the different results.

Output: what the activities aim to achieve is also called it's direct result

Outcome: the effect of an intervention's output, what the project intends to accomplish. In the logic of the result chain, the outcome is the actual goal of a project

Impact: the long-term effects produced by the intervention of CCA, what the outcome aims for, you cannot directly influence the impact, only indirectly

Energizer: Puzzle the results chain (slide 6)

Time: 10 min

An active exercise will help participants to better understand and memorise the results chain of a project.

- Divide the participants in groups of three persons
- Write the result chain and the descriptions below on eight cards as presented in slide 5 (Activity, Output, Outcome, Impact, Adaptation measure, Direct result, Desired short-or medium-term effects, Long-term effects) and hand them over to the participants (hidden)
- The trainer explains that the group has to form the results chain in the right way, on to the aspect and under it it's explanation, the objective is to be fastest.
- On a signal all the groups start and the first group that finishes should yell and present their result, sticking it to the wall.

Case study (slide 7)

Climate-Change-Related impacts on Agricultural Production and Food Security

CONTEXT	OBJECTIVE	MEASURES
An Increase of extreme rainfall events, interspersed with periods of drought, is causing erosion of arable soil and frequent flooding events. The temperature Increase also impacts agricultural productivity. Food insecurity and poverty are linked to production patters, Income, disaster exposure, education and other conditions, Water availability Is negatively associated with pover	The proposed measure targets rain-dependent farming families. The objective of the project is to secure community livelihoods and food security against climate-change-induced rainfall variability.	Develop household food securIt build resilient livelihoods and institutional capacity in local and regional service delivery to reduce risks through climate change. E.g.: <ul style="list-style-type: none"> • Rainwater harvesting system • Capacity building through traIning • Localy adapted agrolorestry systems

Present a local case study to help participants put the theory presented into practice. This case study will be used to illustrate the next steps. You can use the suggested example or choose one that better suits the actual group of participants.

Group exercise: Define your results chain (slide 8) (15 min)

- Present the result chain of the case study to the participants to support their understanding of the exercise
- Now ask the participants to define the results chain of their adaptation projects using worksheet 2 in the handout 7.2 and to discuss their results in small groups
- Facilitate the group's discussions and help formulating output, outcome and impact of the adaptation projects if needed

Input presentation: SMART Indicators (slide 9)

Indicators are used in your project concept and results chain to perform the monitoring and help you understand if you achieved the Output and Outcome intended and therefor the impact of your project. To formulate the indicators, you need to take into consideration that they have to represent in a way your result that you can measure it. To facilitate the formulation of the indicators we represent the concept of **SMART Indicators**.



S – Specific - A specific indicator will be narrowly defined, and will describe exactly what needs to be measured.

M – Measurable - A measurable indicator is one which can be aligned with a specific numeric or ranked value to show improvement over time, generally the value is given in countable numbers or percentage.

A – Achievable - Defining your indicators for milestones which are realistically achievable is important and also in ensuring that during the conceptualisation phases, the project exists within the realm of what is actually possible to achieve.

R – Reasonable Ensuring indicators are relevant provides for a consideration of the context in which the project is operating.

T – Timebound - Finally, time-bound is the aspect that include a date by which you expect to see the change, giving substance and life to the project as a whole.

Examples for adaption indicators:

Table 16. Example Outcome Indicators for EbA Interventions

Six Dimensions of Human Well-being	Example Outcome Indicators for EbA Interventions
Assets	Damage to infrastructure during extreme weather events including: <ul style="list-style-type: none"> ■ % of hospitals or schools damaged; ■ % of houses damaged; ■ % of km of roads damaged; ■ % of protected areas damaged; ■ % of ports damaged; ■ % of agricultural land damaged; and/or ■ Value from disruption of ecosystem services
Livelihoods	Income or value of production per household from livelihood activities under changing climate conditions or during extreme events, including from: <ul style="list-style-type: none"> ■ Sustainable crop and/or livestock production; ■ Sustainable freshwater fisheries and livestock ■ Tourism/Ecotourism
Food Security	<ul style="list-style-type: none"> ■ % of people undernourished under changing climate conditions or during extreme events ■ Prevalence of moderate or severe food insecurity in the populations, based on the Food Insecurity Experience Scale
Safety & Security	<ul style="list-style-type: none"> ■ % of population with access to reliable, safely managed, affordable drinking water under changing climate conditions or during extreme events ■ % of deaths in various demographic groups after extreme events in the affected area
Health	<ul style="list-style-type: none"> ■ Disability-adjusted life years from waterborne diseases after flooding events ■ Deaths of various demographic groups from waterborne diseases
Culture	<ul style="list-style-type: none"> ■ Value of damage to cultural sites and recreation areas under changing climate conditions or during extreme events

(Source: Conservation international (2017): Submission to SBSTAI from Conservation International regarding Indicators of Adaptation and Resilience. Available at: https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/911.pdf)

Group exercise: Defining monitoring indicators for your adaptation project (slide 10)

Time: 20 min

- Divide the participants in the same groups as before
- Advise them to use the same adaptation project as before and continue working with their results chain
- Use the worksheet 3 on the handout 7.2 and try to find **one indicator** for at least one Output and Outcome of your project, by applying the SMART-framework

Step 3. Defining means of verifications

Input presentation: Means of verification (slide 11)

The means of verification are documents where it is possible to find the data necessary for evaluating the project.

List of exemplary means of verification (not exhaustive):

- Project evaluations: semi-annual and annual reports, midterm and terminal (external) evaluation;
- Context section of current sectoral, regional, and/or national plans and strategies;

	Outcome 1	Indicator
Case Study	The quality of the soil moisture and agriculture in the community garden improved, offering more food stability in the village.	The village can harvest on a weekly bases xy kilo of food from the community field, that contributes 20% of the alimentation of the village.
	Outcome 1	Indicator
Case Study	Daily irrigation of the community field is guaranteed.	With the xy litres of rainwater collected on the school rooftop by the end of each week, the village can irrigate the whole community field on a daily bases for one week, so the plants grow due to their timetable.

- Monitoring programs, GIS data, aerial photos;
- Interviews with relevant officials;
- Information from experts and/or the public;
- Photographs of discussions and interventions;
- Surveys;
- Harvesting lists;
- Field monitoring reports;
- Meeting minutes.

Group work: Defining means of verification for your adaptation project (slide 12)

Time: 20 min

- Divide the participants in the same groups as before
- Advise them to use the same example as before and continue working with their results chain, using worksheet 4 in handout 7.2
- Use the model on the handout and try to find for each indicator of each Output and Outcome means of verification



Benefits of monitoring and evaluation

- Guarantee that you realize the project in the way you intended and wrote it
- Don't forget any necessary step
- Give feedback to the donor
- Stay in track of the line of your project
- Have a proof that you achieved your impacts
- Guarantee sustainability

Feedback round: What did the participants learn?

- Ask the participants to go back to the initial wall of understanding of monitoring and evaluation and look at the cards they wrote
- If they now see that their understanding changed, they should take the card and write on the back their new understanding
- To guide the feedback round, the debriefing questions at the end of this session will help you

	Outcome 1	Indicator	Means of verification
Case Study	The quality of the soil moisture and agriculture in the community garden improved, offering more food stability in the village.	The village can harvest on a weekly bases xy kilo of food from the community field, that contributes 20% of the alimentation of the village.	<ul style="list-style-type: none"> ■ Field monitoring reports; ■ Project evaluations ■ Harvesting lists;
Case Study	Daily irrigation of the community field is guaranteed.	With the xy litres of rainwater collected on the school rooftop by the end of each week, the village can irrigate the whole community field on a daily bases for one week, so the plants grow due to their timetable.	<ul style="list-style-type: none"> ■ Harvesting lists; ■ Field monitoring reports; ■ Photograph ■ Surveys;

Useful literature

- GIZ (2015): Developing national adaptation monitoring and evaluation systems: A guidebook. Available at: https://www.adaptationcommunity.net/?wpfb_dl=268
- Organisation for Economic Co-operation and Development (OECD) / Development Assistance Committee (DAC) (2002): Glossary of Key Terms in Evaluation and Results Based Management. Available at: <https://www.oecd.org/dac/evaluation/2754804.pdf>
- UNESCO: Sustainable Development. Available at: <https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd>
- Conservation international (2017): Submission to SBSTA1 from Conservation International regarding Indicators of Adaptation and Resilience. Available at: https://unfccc.int/files/parties_observers/submissions_from_observers/application/pdf/911.pdf
- Resin. Supporting decision-making for resilient cities. Monitoring and Evaluation. Available at: <http://wiki.resin.itti.com.pl/article/frequently-encountered-challenges/monitoring-and-evaluation/>

Key take-aways

- M&E Frameworks serve to assess projects and keep track of progress made in dealing with climate change.
- Based on the results chain, the tool applies a tabular format to illustrate the logic of the ensuing indicators and means of verification for the project or programme assessment.

- The tool is a first step in formulating indicators and means of verification to examine and follow the development of a project.
- The session should give the participants a base to work with M&E in daily project contexts of CCA.

Debriefing questions

- What are your important take-away messages from this tool?
- Which outcomes of the tool do you find most relevant for your work?
- Do you know how to apply the key concepts to your work?
- Did the session help you to better write and apply your project?
- How did the tool support you in establishing an M&E Framework?
- Would you be motivated to use M&E in your daily context to better the quality of your work?

Session 7.3 Risk Management

Learning objective	To identify, prioritize and minimize the likelihood of negative events for your adaptation project	
Prerequisites / prior knowledge for successful participation	A first design for the adaptation project has been created (Modul 5).	
Steps (duration)	Step 1. Risk identification	30 min
	Step 2. Risk evaluation	30 min
	Step 3. Risk management	30 min
Total duration	1 h 30 min (optional: only Step 1 can be trained in 30 min)	
Methods/Exercises	Input presentation, brainstorming of potential risk for adaptation projects, risk evaluation matrix, creating a risk management plan	
Material	PowerPoint presentation 7.3, handout 7.3, Laptop, LCD projector	
Preparation of the material	You may adapt the examples provided that facilitate the exercises in this session to the context of the participants.	

Step-by-step approach

When realizing a project, even if you already planned it carefully, there is always the possibility that unexpected problems occur. In this session will be treated the Risk management. Risk management is a very important aspect of the project planning and realization, as it is a continuous process of identifying, analyzing, prioritizing and mitigating risks that threaten a projects likelihood of success in terms of e.g. cost, schedule, quality, safety and technical performance. A well-thought-out plan for managing risks is often one prerequisite for applying for support programmes.

In **Step 1** of this session, the participants will be guided to identify potential risks their adaptation projects could face.

Step 2 focuses on assessing the risks using forms of prioritization.

Step 3 finally gives a base how to mitigate risks and provides guidance on developing risk mitigation strategies.

Step 1. Risk identification

In this step the focus will be on identifying the risk that can endanger the right implementation of a project. The risks therefor will be divided in the categories internal and external risk (that is one possible method for exploring potential risks).



In this way, it can be distinguished between external risks that stem from outside and internal risks. External risks do not depend on your project, but can influence it and its performance. These risks are negative events in the vaster environment of your project.

Internal risks can e.g. delay organisational processes, project implementation, production etc. and external risks can lead to security issues, increase of costs, public references and demands or block supply chains, etc.

Divided by categories, that could be possible risks:

Internal risks	External risks
<ul style="list-style-type: none"> ■ Team (e.g. conflict within the team, lack of trained staff) ■ Technical (this includes risks based on requirements, the technology being used, its performance and quality) ■ Management (this includes any risks that come up from planning, scheduling, estimating, or communication) ■ Organizational (this includes any project dependencies, logistics, resources, budget, etc.) ■ Knowledge (e.g. lack of knowledge) ■ Financial (e.g. corruption, inability to cover expenditures) ■ Operational (e.g. equipment failure) ■ ... 	<ul style="list-style-type: none"> ■ Political (e.g. change of government, political unrest) ■ Economic (e.g. economic crises, inflation) ■ Social (e.g. pressing social problems change public preferences) ■ Technological (e.g. energy breakdown) ■ Legal (e.g. change in legal frameworks, exposure to litigation) ■ Environmental (e.g. flooding blocks transportation) ■ Financial (e.g. change of exchange rate) ■ ...

Group exercise

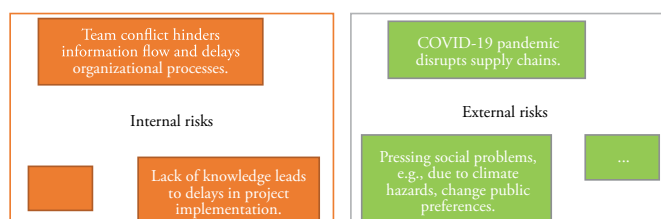
Time: 10 min

- Ask the participants to brainstorm potential risks that negatively affect the outcomes and outputs of their projects by using the categories above. All ideas of things that can go wrong are welcome at this stage.
- Ask the participants to write their risks on a card and to pin them on the wall you prepared (see visualisation example below).
- Engage the participants to present their cards by describing the risks and possible consequences for their adaptation projects.
- Participants may use the worksheet 1 on the handout 7.3 to collect their results.

The risks are assessed and prioritised in Step 2.

Hints for the trainer:

- If participants have difficulty identifying potential risks, they shall note down 5 of the most important processes/activities of their project and assign potential risks to them.



Step 2. Risk evaluation

In the second step of this session, after having identified potential risks, the participants will learn how to evaluate risks. Risk evaluation is about developing an understanding of which potential risks have the greatest possibility of occurring and can have the greatest negative impact on the project.

As not all risks are equal, there has to be made some differentiation in treating them in the prevention and management phase. Some risk events are more likely to happen than others, and have a higher negative impact on the project. Therefore, project teams should focus first on the risks which are more likely to happen and more severe.

Group exercise

Time: 20 min

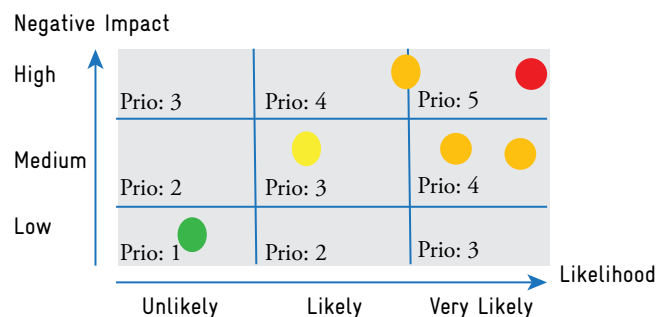
- Ask the participants to go through the list of identified risks and to prioritise them against their likelihood of occurring and magnitude of negative impact on the projects by using the matrix below (worksheet 2 of handout 7.3).
- Ask the participants to assign priority levels between 1-5 to the risks as shown in the matrix below.

Hints:

- Define criteria to determine high-impact risks to help focus on a few critical risks that require mitigation (e.g. a risk that increases the project costs by 10% of the initial project budget, is considered a high risk)

Guiding questions:

- Is the risk likely to happen?
- Did that kind of risk already happen and is likely to be repeated?
- Has that risk never occurred before?
- Could that risk change your project in a negative way?
- What would be the impact of that risk to your project?



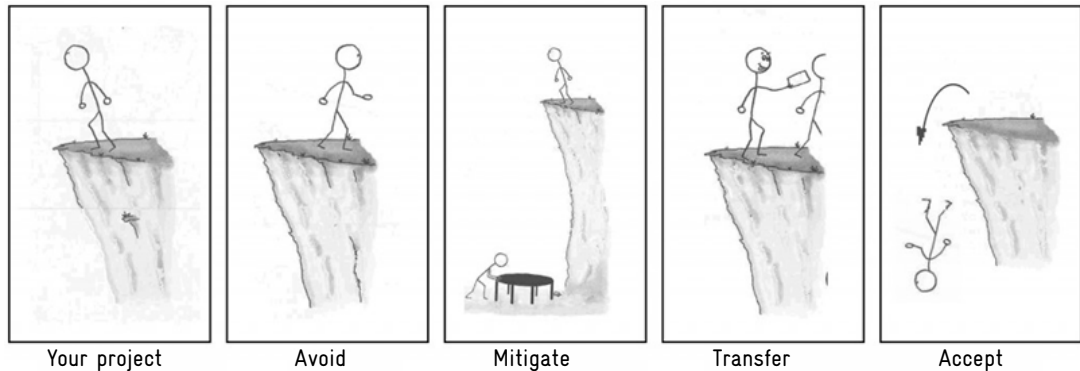
Step 3. Risk management

In this step participants will design strategies or put measures in place to deal with identified most critical risks in step 2 (very likely and high negative effect expected).

There are different ways to manage risk, also depending on what stage of the process the risk management is integrated. Within the most common ways which can be applied and considered already in the project planning phase is the mitigation. When you don't take the anticipated approaches for risk management there are still the approaches for risk immediate risk management, as avoiding, transferring or accepting the risk.

- **Avoid:** Change your plan to bypass the issue, for example remove the cause of the threat altogether.

- **Mitigate:** Taking preventative action to reduce the probability of risk occurrence or impact on the project - design the project's activities in a way that's already prepared to handle a risk
- **Transfer:** Outsource the risk (or a portion of it) to a different team or agency. Think of this as a typical "insurance" policy.
- **Accept:** Assume the chance of a negative impact or eventually budget in the cost of dealing with it.
- Preparation (In the event that you accept the possible consequences of a risk, you should know what to do if it actually occurs. In this case, developing an contingency plan is recommended. In that situation you are confronted with the question: "What do we do now?")



(Source: BCcampus Open Publishing: Risk Management Planning. Available at: <https://opentextbc.ca/projectmanagement/chapter/chapter-16-risk-management-planning-project-management/>)

Group exercise: Manage the risks (slide 10)

Time: 20 min

- Ask the participants to go through the list of key risks identified in Step 2 and to think about potential risk mitigation measures. In each case, they should ask themselves: "How can we minimise the likelihood of the risk occurring or, if it does occur, minimise its impact?"
- The participants can use the table below (worksheet 3 in handout 7.3) to collect their results, whereby the columns "risks" and "consequences" are filled with the results from Step 1 and the columns "probability" and "impact" and "priority" are filled with the results from Step 2.

	Risk	Consequences	Likeli-hood	Negative impact	Priority (1-5)	Risk management measure
Example 1	External risk: Change of government	Example: The government stops financing your project.	Unlikely	High	3	Accept: Accompany the political developments
Example 2	Internal risk: Conflict in the team	Workflow stops because internal communication is interrupted	Very likely	Medium	4	Prevention: realise regular team meetings with feedback rounds
Your project	.....	.....	.....	.....	.....	.....

Useful literature

- BCcampus Open Publishing: Risk Management Planning. Available at: <https://opentextbc.ca/projectmanagement/chapter/chapter-16-risk-management-planning-project-management/>

Key take-aways

- Risk can damage the project, when you don't consider that there are risks for your project.
- Risk management is an important tool of project design, planning and implementation.
- Risks can stem both from internal and external influences– make sure that participants consider both dimensions and are sanitized that each dimension requires different mitigation strategies.
- Risks vary in terms of severity depending on their level of impact and the likelihood of occurrence – make sure that participants focus on key risks with a high impact and high likelihood with effective mitigation measures, whereas for low impact and low likelihood risks, it can be enough to monitor the risks.

Debriefing questions

- What are your important take-away messages from this session?
- Which outcomes of the session do you find most relevant for your work?
- How did the session support you in understanding risks related to the project and developing strategies to mitigate these risks?



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