



Training Manual

Training of Trainers

Social Sector CRPs - around

Climate Change Adaptation/Resilience, CBDRM under NPGP

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ACRONYMS

This is an alphabetical list of acronyms, terms or words that are found in this report or related to the text of this report.

BISP	Benazir Income Support Program
CBDRM	Community Based Disaster Risk Management
CCA	Climate Change Adaptation
CERC	Crisis & Emergency Risk Communication
CIs	Community Institutes
COVID-19	Corona Virus Disease 2019
CRPs	Community Resource Persons
DRR	Disaster Risk Reduction
HH	House Hold
IEC	Information Education Communication
IFAD	International Fund for Agriculture Development
IFL	Interest Free Loan
M&E	Monitoring & Evaluation
NGO	Non-Governmental Organization
NPGP	National Poverty Graduation Program
PIM	Project Implementation Manual
PMU	Project Management Unit
POs	Partner Organizations
PPAF	Pakistan Poverty Alleviation Fund
SRSO	Sindh Rural Support Organization
ToT	Training of Trainers
ToRs	Terms of References
UC	Union Council

ABOUT THE TRAINING MANUAL:

This training manual is developed to cater specific training needs of the National Poverty Graduation Programme; this will be used for the capacity building of social sector CRPs as Master Trainers. These Master Trainers will be from 66 union councils of target districts, subsequently these master trainers will build capacity of communities through training of village disaster management committees and training of union disaster management committees in the project district Shikarpur and Kashmore. This also can be used for the capacity building of DRR field practitioners, including government and non-government agencies, to effectively implement natural disaster management and climate change adaptation/resilience programs/project with communities' participation. The possible trainees are community resource persons. Master trainers can acquire material from this training manual for the field level trainings according to the nature and requirement of the trainee needs at local level.

TRAINING OBJECTIVES:

After the TOT training course, the participants will be able to perform as a master trainer under NPGP Project for the capacity building of communities in two project districts of Sindh. The specific objectives of the course are;

- To increase knowledge and skills of target CRPs to train the target communities/households on key concepts of CBDRM and Community-Based Climate Change Resilience.
- To define COVID 19 SOPs for training and field.
- To equip CRPs with the required tools and techniques to cascade capacity-building sessions with the target communities/households on these key topics.
- To enable CRPs with knowledge and skills to facilitate target communities/households in developing their learning and best practices on key concepts of Community-Based Climate Change Resilience.
- To prepare target communities/households through these trainings, in climate resilient/adaptive livelihood strategies and public-private partnership on climate-smart agriculture, livestock management, and agro-forestry.
- To enhance knowledge of target communities about existing institutional frameworks and national policies on climate change adaptation/resilience and develop community linkages with government line departments.

Detailed training agenda along with session plan is attached as Annexure 01 (See Annex. 01).

RECOMMENDATIONS FOR TRAINERS:

- Please read the entire handbook thoroughly before conducting the training.
- Plan and prepare visual aids for the training.
- Arrange all required stationery/supplies for practice sessions.

- Use local resources for materials production.
- Activate each participant during group work.
- Given enough time for practice.
- Spend time for review during the training course.

TRAINING TECHNIQUES:

These training events will be combination of hall/class room training and practical demonstration. The entire training course should follow principles of adult learning or experiential learning. These trainings will enable CRPs with knowledge and skills to facilitate target communities/households in developing their learning and best practices on key concepts of Community-Based Climate Change Resilience. The most of the learning part is self-directed. It fills an immediate need and is highly participatory.

- Learning is experiential (i.e., participants and the trainer learn from one another).
- Time is allowed for reflection and corrective feedback.
- A mutually respectful environment is created between trainer and participants.
- A safe atmosphere and comfortable environment are provided.

Training techniques used in this manual include the following:

- i. Presentations - activities conducted by the facilitator or a resource specialist to convey information, theories, or principles.
- ii. Case Study Scenarios - written descriptions of real-life situations used for analysis and discussion.
- iii. Role-Plays - two or more individuals enacting parts in scenarios as related to a training topic.
- iv. Exposure Visit- enactments of real-life situations.
- v. Group Discussions - participants sharing experiences and ideas or solving a problem together.

TRAINING EVALUATION TECHNIQUE:

1. Workshop evaluation:

Daily review session will be conducted to assess participants learning and address any unclear sessions and issues by using different review tools and techniques. The training delivery will be assessed on *closed ended - Likert scale* questionnaire in each training event. The participants' feedback on training delivery, content, facilitation skills and learning environment will be described in percentages and analysis about each category will be presented in the form of Pie charts.

2. Individual's evaluation:

Comprehensive evaluation of each individual will be carried out on the basis of the following indicators:

- ✓ Participation
- ✓ Communication and presentation
- ✓ Situation handling and conflict management
- ✓ Time management
- ✓ Meaningful discussion
- ✓ Learning
- ✓ Group work

In each training event, **pre and post-test** will be conducted on developed **closed ended** questionnaires to evaluate the participants learning.

- The percentage improvement in participants' learning will be mentioned individually for each trainee in form of bar graphs.
- The separate training analysis reports for each training event will be shared with SRSO management on completion of trainings.
- Evaluation and grading of trainees will be conducted on the final day of training as per evaluation criteria and ranking of CRPs as A, B+, B, and C (descending order of performance, respectively).

REGISTRATION OF PARTICIPANTS:



Time: 30 minutes



Content:

- Registration activity is envisaged to prepare and maintain a detailed database of the participants.



Objectives:

- Get the information of participants during the process of implementation
- Summarize the participants according to their background and experience of any previous training.



Method:

- Registration & Attendance form filling by each participant with help of training team.
- The trainer, with the help of 2-3 volunteer's/staff members, will facilitate the registration of all the participants for the training.



Materials Required:

Trainee's registration forms, pens, writing pads, and participants name tags.



Outcome:

- All participants are registered before the start of training.

RECITATION FROM THE HOLY QURAN:



Time: 05 minutes



Content:

- Reference verses from Holy Quran provided in manual.



Objectives:

Sensitization of participants on DRM through a ready reference from religious perspective.



Method:

- One of the Participants is asked to recite few selected verses from the Holy Quran along with translation.



Materials Required:

Volunteer among the participants.



Outcome:

- With the name of Allah the training will be started and importance of DRM will be elaborated in light of Holy Quran and participants are ready to grab the knowledge.



References:

- The Holy Quran

REFERENCE VERSES OF HOLY QURAN:

Yusuf (Joseph) said: ‘You will cultivate as usual, consecutively for seven years. So whatever you reap, keep it (in storage), leaving the grains in their ears except a small quantity (to thresh) for your (yearly) consumption.

Then after this, there will come seven hard years (of drought) which will consume that (store) which you will have laid up for these years except a small quantity (which will fall surplus and) which you will keep in reserve.

Then, following this, will come a year during which people will be blessed with (plenty of) rain, and (the yield of fruits will be such as) they will press juices (of fruits that year). ([Yusuf](#), 12: 47- 49)

INTRODUCTION & NORMS SETTING:



Time: 30 minutes



Content:

- To Introduce at least three other participants to the rest of the group
- Norms & ground rules setting.
- Fear and expectation sharing.



Objectives:

- Make participants comfortable through the process of knowing each other.
- Maintaining the training hall decorum by following norms.



Method:

- The trainer will briefly share about norms setting and its importance.
- The participant's opinion about norms will be listed on a chart and displayed at a prominent place in the training venue.
- The trainer will distribute sticky notes among participants to write down their fear and expectation.



Materials Required:

Multimedia, Screen, Charts, Markers, Sticky Notes, Pen and Masking Tape.



Outcome:

- The trainer and participants get to know each other better through such ice breaking.
- Norms of training are set.
- Fears & Expectations noted..



References:

- Training Manual

NORMS/GROUND RULES:

- Only one person speak at a time
- Mobile phones on silent mode
- Timekeeping
- Confidentiality within the group
- Stay Attentive
- Let everyone participate
- Listen with an open mind
- Think before speaking

OBJECTIVES OF TRAINING & PROJECT ORIENTATION:



Time: 25 minutes



Content:

- Objectives of the ToT.
- Brief Project Orientation.



Objectives:

- Make the participants aware about Objectives of the ToT.
- Brief Project introduction.



Method:

- PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants on broad objectives of the project.
- The trainer will make sure that each participant has carried the same level of understanding about each component of the project.



Materials Required:

Multimedia, Screen, PPT presentation, Charts, Markers, Sticky Notes, Pen and Masking Tape.



Outcome:

- All the participants become aware of the role of master trainers and how it is essential for them to understand the Program goals, objectives, activities, interventions, expected results and outcomes through a session wise approach during the course of training.



References:

- Training Manual
- Project Document

Training of Trainer Objectives:

- To increase knowledge and skills of target CRPs to train the target communities/households on key concepts of CBDRM and Community-Based Climate Change Resilience.
- To define COVID 19 SOPs for training and field.
- To equip CRPs with the required tools and techniques to cascade capacity-building sessions with the target communities/households on these key topics.
- To enable CRPs with knowledge and skills to facilitate target communities/households in developing their learning and best practices on key concepts of Community-Based Climate Change Resilience.

- To prepare target communities/households through these trainings, in climate resilient/adaptive livelihood strategies and public-private partnership on climate-smart agriculture, livestock management, and agro-forestry.
- To enhance knowledge of target communities about existing institutional frameworks and national policies on climate change adaptation/resilience and develop community linkages with government line departments.

Project Brief:

This National Poverty Graduation Programme (NPGP) has been designed to graduate households out of poverty, building largely (but not exclusively) upon BISP beneficiaries and leveraging the Prime Minister's Interest Free Loan (IFL) scheme to build a smooth 'seamless service' where the poorest can move out of poverty through a blended program extending from consumption support to asset transfers to interest free loans to microcredit. The overall goal of the programme is to assist the ultra-poor and very poor in graduating out of poverty on sustainable basis; simultaneously improving their overall food security, nutritional status and resilience to climate change. In order to ensure sustainability of community institutions and continue project objectives and development work beyond the project life cycle, community active members have been identified as activists, volunteers and extended arm to carry forward development activities called community resource persons (CRPs). The capacity building programs for CRPs have been design around different themes, sectors, topics and institutional systems, to create a cadre of community resource persons who will serve as local hubs of technical expertise and information that can allow communities to access further expertise as needed by linking to government programs, environment and climate change adaptation, markets and private sector investment opportunities. Therefore, under NPGP, SRSO is providing active support to selected beneficiaries for provision of necessary services and assistance in business development, planning, marketing through linkage development. This requires intensive capacity building of selected beneficiaries in following fields.

There is a need to work with dedication and commitment to escort in a culture of safety and resilience to prevent, mitigate and reduce the risks of and prepare for any potential disaster. In this regard, public private partnerships and community-based approaches can play a vital role to make communities more disaster resilient. These community based DRM structures will collectively contribute to district priority actions to enhance the resilience of the communities in their respective UCs and villages.

PRE-TEST:



Time: 30 minutes



Content:

- Pre Test



Method:

- The trainer will facilitate in explain the pre-test purpose, and briefly explain how to attempt the pre-test.
- Trainer will make proper seating arrangement that minimize mutual support during taking Pre-Test.



Outcome:

- Existing knowledge of the participants regarding CBDRM and CCA has been assessed, this will further facilitate trainer to focus the weak areas and utilize their strengths in mutual learning process.



Objectives:

- Take part in assessment process.
- To gage the exiting knowledge of the participants on CBDRM and Climate Change adaptation.



Materials Required:

Printed pretest formats, Pen.



References:

- Training Manual

SESSION 1# COVID-19 OVERVIEW & SOPs:



Time: 60 minutes



Content:

- Overview of COVID-19
- COVID -19 SOPs for ToT
- COVID 19 SOPs for Community meetings, distribution, community training session.



Method:

- PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answer.



Outcome:

- Existing knowledge of the participants on COVID 19 will be enhanced.
- Participants will learn implementation of COVID19 SOPs.



Objectives:

- To enhance the knowledge of participants on COVID 19.
- Sensitization of participants on COVID-19 SOPs.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, and Handouts of COVID-19 messages.



References:

- [https:// covid.gov.pk](https://covid.gov.pk)

An Overview of COVID-19:

The COVID-19 pandemic in Pakistan is part of the ongoing pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On March 18, 2020, cases had been registered in all four provinces, the two autonomous territories (NA & AJK), and Islamabad Capital Territory, and by June 17, 2020, each district in Pakistan had recorded at least one confirmed case of COVID-19.

Pakistan so far has experienced three different waves of COVID-19. The nation's first wave of COVID-19 began in late May 2020 and ended in mid-July 2020. In early November 2020 the second wave was of low intensity, and mainly affected the southern region of **Sindh**, and peaked in mid-December 2020. The third wave of pandemic generally affected all the provinces but mainly affected Punjab and Khyber Pakhtunkhwa. This wave peaked in late April 2021, and since then, COVID-19 positivity rate, daily new confirmed cases, and daily death numbers have been falling.

How is the virus transmitted?

It's likely that the Coronavirus Disease (COVID-19) originated in an animal species, and then spread to humans. Person to person spread of the novel corona virus is reported, but it is not yet understood how easily this happens. Other human coronavirus strains are spread from person to person through contaminated droplets from a person who is sick with the illness (through coughing or sneezing) or contaminated hands.








Important Precautions:

To prevent the spread of COVID-19 follow these simple precautions to reduce your chances of contracting the new coronavirus:








- Clean your hands often. Use soap and water, or an alcohol-based hand sanitizer.
- Maintain a safe distance from anyone who is coughing or sneezing.
- Wear a mask when physical distancing is not possible.
- Don't touch your eyes, nose or mouth.
- Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.
- Monitor your health daily.
- Stay home if you feel unwell.
- If you have a fever, cough and difficulty breathing, seek medical attention.

Ways to prevent the disease

You should do

-  Stay at home
-  Wear mask
-  Always use tissues
-  Disinfect your home
-  Wash your hands
-  Frequent self-isolation
-  Frequent waterintake

You should avoid

-  Social distance
-  Avoid animals
-  Don't touch your face
-  Avoid handshaking
-  Avoid infected surfaces
-  Avoid droplets
-  Don't travel

- Clean and disinfect high touch surfaces daily.
- Avoid crowds and poorly ventilated spaces.

Latest situation of disease in Pakistan and Sindh as of June 27, 2021

Status for Pakistan		Status for Sindh	
Confirmed cases:	954,743	Confirmed cases:	335,555
Recovered:	900,291	Recovered:	311,005
Deaths:	22,211	Deaths:	5,410
Fatality rate:	2.32%	Fatality rate:	1.71%
Pakistan Total Vaccinations:		14,793,793	

Source: [https:// covid.gov.pk](https://covid.gov.pk)

Latest confirmed positive cases of COVID19 in target districts: Shikarpur 3298, Kashmore 2064

(<https://www.sindhhealth.gov.pk/Districtwise-Statistics-COVID-19>: June 4, 2021)

COVID-19 SOPs for ToT:

Before Training:	During Training:
<ul style="list-style-type: none"> • Read all COVID 19 SOPs • Ensure that you are healthy. • Ensure your PPE (Mask, Sanitizer, Gloves) • Strictly observe Corona prevention measures. • Be careful about food and water outside the hotel. • Avoid the crowded places during traveling. • In taxi open the windows. 	<ul style="list-style-type: none"> • Ensure that your temperature is normal • Follow corona prevention measures (Wear Mask, use Sanitizer) • No handshake or hugging • Don't visit each other rooms • Maintain social distance during refreshment breaks.

COVID-19 SOPs for Community Meetings, Distribution and Field Trainings:

SOPs for Field Activities:	During Field Training:
<ul style="list-style-type: none"> • Read all COVID 19 SOPs before field visit. • Ensure that you are healthy. • Ensure your PPE (Mask, Sanitizer, Alcohol wipes, Gloves, Disposal Bag) • Don't exchange your PPEs with others. • Sanitize your hands frequently. • Disinfect your necessary equipment with alcohol wipes. • Do not exchange your material with each other. • Strictly observe Corona prevention measures. • Be careful about food and water outside. • Avoid the crowded places during visit. • In vehicle open the windows. • Cover your face and nose with the mask during the travel • Maintain Social Distancing (3 – 6 feet) 	<ul style="list-style-type: none"> • Ensure that your temperature is normal. • Follow corona prevention measures (Wear mask, use Sanitizer) • No handshake or hugging • Use Soap if required. • Maintain social distance during refreshment breaks. • Request your' participants to follow the same.

General Instructions:

In case continuous wearing of mask causing discomfort, you may take a rest for a while and oxygenate well before continuity of the work in isolated place. However, do not remove the mask in close gathering.

SESSION 2# IMPACTS OF DISASTER & CERC:



Time: 75 minutes



Content:

- Psychosocial & Physical risks to health and safety.
- Crisis and emergency risk communication (CERC) principles and their application to COVID-19 messages.



Objectives:

- To enhance the knowledge of participants on impacts of disaster.
- Sensitization participants on risk communication.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answer.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



Outcome:

- Existing knowledge of the participants on impacts of disaster will be enhanced.
- Participants will learn principles of risk communication and its application on COVID-19 messages.



References:

- [https:// covid.gov.pk](https://covid.gov.pk)
- <https://www.ncbi.nlm.nih.gov/pmc/articles>
- <https://www.cdc.gov/coronavirus/2019-ncov/>
- CERC Website: [https://:emergency.cdc.gov/cerc](https://emergency.cdc.gov/cerc)

Impacts of disaster in form of psychosocial & physical risks to health and safety:

What is a Disaster?

The root of the word *disaster* (“bad star” in Greek) comes from an astrological idea that when the stars are in a bad position a bad event will happen. Disasters can be simply defined as violent encounters with nature, technology or humankind.

World Health Organisation's (WHO) defined disaster as ‘a severe disruption, ecological and psychosocial, which greatly exceeds the coping capacity of the affected community.

However, there are some common characteristics of disaster are:

- a. Sudden onset,
- b. Unpredictability,
- c. Uncontrollability,
- d. Huge magnitude of destruction,
- e. Human loss and suffering and
- f. Greatly exceed the coping capacity of the affected community.

In a disaster, people face the danger of death or physical injury. People may also lose their home, possessions, and community. Such stressors place people at risk for emotional and physical health problems. Stress reactions after a disaster look very much like the common reactions seen after any type of trauma.

Psychological impacts or Risks of disaster:

Emergencies and disasters typically affect entire communities, cause substantial losses and disruption, and result in a significant and persistent mental health burden. Depending on the type and extent of loss, individuals directly impacted by natural disasters may be feeling a strong sense of grief, panic, loss, fear, and sadness. Difficulties sleeping, anger, irritability, and guilt may also exist.

What are the different phases of disaster mental health?

Community's and individual's reactions to the disaster usually follow a predictable phase as shown in figure-1. They are heroic phase, honeymoon phase, disillusionment phase and restoration phase.

1. Heroic phase:

Immediately after the disaster, survivors in the community usually show altruistic behavior in the form of rescuing, sheltering, feeding, and supporting the fellow human beings. Hence, this phase is called as heroic phase. This phase usually lasts from a day to weeks depending upon the severity, duration of exposure and availability of the relief sources from various agencies.

2. Honeymoon phase:

Once the relief-agencies step in, survivors are relocated to safer places like relief camps. Media attention, free medical aid, free food and shelter, VIP visits to the camp, administrations' sympathy, compensation package, rehabilitation promises provides immense sense of relief and faith in survivors that their community will be restored in no time and their loss will be accounted through monetary benefits. Hence this phase is called honeymoon phase, which usually lasts for 2-4 weeks.

3. Disillusionment phase:

At the end of 2-4 weeks, relief materials and resources start weaning. VIPs and politicians visit stops. Media coverage reduces. Administration, relief agencies and NGO's involvement start fading. This brings the survivors to the ruthless world of post disaster life. The reality of complex process of rebuilding and rehabilitating appears a distant dream because of administration hurdles, bureaucratic red tapism, discrimination, injustice and corruption. This harsh reality of the disillusionment phase provides a fertile soil for breeding mental morbidity that lasts for 3-36 months before the community restores to harmony.

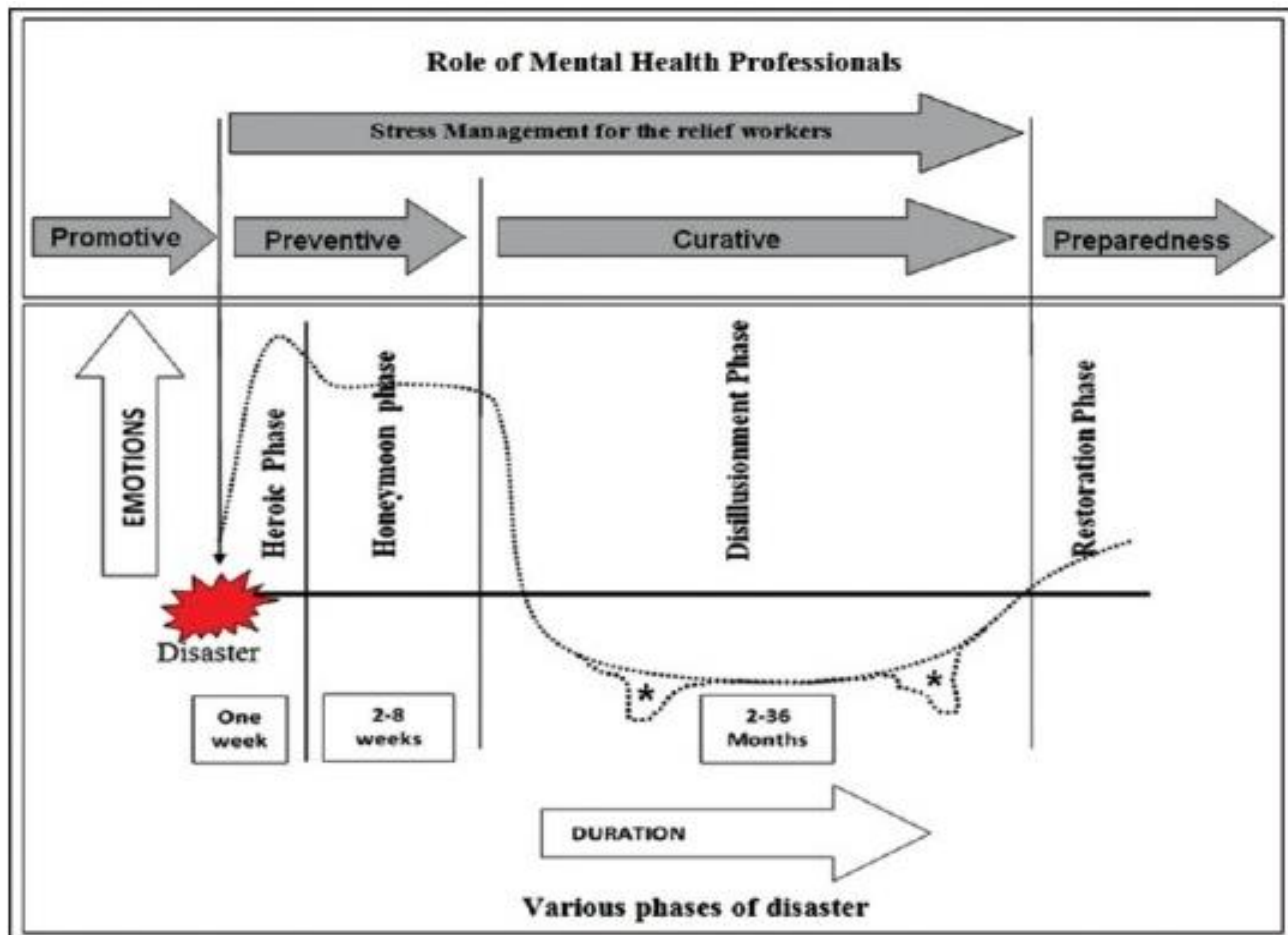


Figure-1

4. Restoration phase:

Community realizes the situation and the process of restoration starts and gradually preparedness and development activities proceeds. It is an ongoing process in which community learn and prepare for future emergencies.

Social Impacts or Risks of Disaster:

The Social Impact of Natural Disasters states that increased mental health issues, alcohol misuse, domestic violence, chronic disease and short-term unemployment have resulted from extreme weather events such as bushfires, severe storms, cyclones, floods and earthquakes. Displacement from their areas and separation from loved ones and community leave a great impact on social structure of a society. These social impacts can be observed in the form of both positive (helping each other, protecting, sacrifice etc.) and negative (fighting for resources, corruption and nepotism in relief and aid activities) activities in a community.

Disaster Impacts or Risks on Physical and Health Conditions:

Disasters directly affect the health of the population resulting in physical trauma, acute disease, and emotional trauma. In addition, disasters may increase the morbidity and mortality associated with chronic diseases and infectious diseases through the impact on the health care system.

We can also define the physical impact in terms of loss of community infrastructure that is essential for a normal routine life.

Understanding the Communication:

Communication is most important aspect before, during and after disaster, effective communication can play significant role in saving lives, assets, and livelihoods. Communication is an interactive process through which a person can convey his / her thoughts, views and feelings to others. Interaction means two-way communication in which a person does not only act but also expects a certain reaction. For the layman that would mean, whereby a person not only sends, but also receives and understands the message. Therefore communication always has a purpose, the aim is thus to achieve that purpose. Communication can be categorized into four types:

- I. Intra personal communication:** A type of communication where a person interacts with him/her self. Intra personal communication is thus, an intrinsic form of communication.
- II. Inter-personal communication:** A type of communication where the interaction is taking place one on one or amongst a small group of people. It is one of the most common and thus highly important forms of communication. It is used by organizations; success of management performance is largely dependent on an effective interpersonal communication.
- III. Inter -group communication:** This is where interaction takes place amongst different groups.
- IV. Mass communication:** This type of communication is where a large body of persons has to be addressed.

Types of Communication:

Communication can be broadly classified into two types, namely Verbal and Non-verbal communication:

1. Verbal Communication: These parts of communication words are used to convey the message to the receiver. Here the message is conveyed in the form of a language that can be in spoken or written form. The use of verbal communication alone is not sufficient where one wants to convey emotions and feelings, unless it is combined with non-verbal communication.

- | Non- Verbal Prompts |
|----------------------------------|
| ✓ Affirmative head nodding |
| ✓ Appropriate facial expressions |
| ✓ Use of silence |
| ✓ Open body posture |
| ✓ Face the person squarely |
| ✓ Uncross your arm and legs |
| ✓ Lean slightly forward |

2. Non-verbal communication: It is the form of communication that is often used in combination with verbal communication, but is ignored believing that it is of little consequence. Nonverbal communication includes a series of physical gestures such as facial expressions, sign and general gestures, body movements, use of colors eye contact, use of tone sound etc.

It is important to recognize the significance of nonverbal communications in a normal interpersonal communication; the share of verbal and nonverbal communication is about 5-10% verbal and remaining 90-95% is nonverbal.

Barriers to Communication:

A barrier stops all forms of communication. This is the worst situation that can arise amongst a team/ group of persons working together.

Factors causing communication barrier	
<ul style="list-style-type: none"> ✓ Unnecessary criticism ✓ Name-calling ✓ Diagnosing: Analyzing why a person is behaving that way ✓ Ordering/ Threatening ✓ Inappropriate questioning, like closed ended questions ✓ Absence of feedback ✓ Environment of the room /place 	<ul style="list-style-type: none"> ✓ Filters ✓ Advising where none has been sought ✓ Moralizing ✓ Patronizing ✓ Unconcerned attitude ✓ Diverting the issue ✓ Know all attitudes ✓ Judgmental attitude ✓ Surrounding atmosphere ✓ Weather

What is Crisis and Emergency Risk Communication (CERC)?

CERC is a way to talk to people, a set of principles that allow us, in the heat of a crisis when the unthinkable happens, to be able to get a message through the people in a way that they can actually understand it and act on it.

CERC involves experts who provide information allowing individuals or an entire community to make the best possible decisions about their well-being. Communicators must also help people accept the imperfect nature of choices during the crisis. CERC also differs from pure risk communication in that a decision must be made within a narrow time constraint. The decision may be irreversible, the outcome of the decision may be uncertain, and the decision may need to be made with imperfect or incomplete information.

Communicators must inform and persuade the public in the hope that they will plan for and respond appropriately to risks and threats. The work presented here shows that your organization should follow CERC principles when responding to a crisis. If you fail to use CERC, you may fail to communicate effectively key information that could save lives.

Principles of CERC:

Fully integrated CERC helps ensure that limited resources are managed well and can do the most good at every phase of an emergency.

- I. **Be First:** Crises are time-sensitive. Communicating information quickly is almost always important. For members of the public, the first source of information often becomes the preferred source.
- II. **Be Right:** Accuracy establishes credibility. Information can include what is known, what is not known, and what is being done to fill in the gaps.
- III. **Be Credible:** Honesty and truthfulness should not be compromised during crises.
- IV. **Express Empathy:** Crises create harm, and the suffering should be acknowledged in words. Addressing what people are feeling, and the challenges they face, builds trust and rapport.
- V. **Promote Action:** Giving people meaningful things to do calms anxiety, helps restore order, and promotes a restored sense of control.
- VI. **Show Respect:** Respectful communication is particularly important when people feel vulnerable. Respectful communication promotes cooperation and rapport. Well-planned and well-executed CERC, fully integrated into every stage of the crisis response, helps ensure that limited resources are managed well and can do the most good.



Application of CERC principles to COVID 19 messages:

- I. **Be First:**
 - If you have information, and it is your responsibility to provide it, do so as soon as possible.

- If you can't provide information, explain how you are working to get it.

II. Be Right:

- Promote credibility through accuracy.
- Give facts in brief messages. Stick to the main points.
- Tell people what you know, when you know it.
- Tell them what information is not available yet, and tell them what is being done to get the additional information.

III. Be Credible:

- Honesty should not be compromised.
- Uncertainty is worse than not knowing.
- Rumors are more damaging than hard truths.

IV. Express Empathy:

- Acknowledge feelings in words.
- Empathy can build trust.
- Being quarantined can be disruptive, frustrating, and feel scary. Especially when the reason for quarantine is exposure to a new disease, for which there may be limited information.

V. Promote Action:

- Taking action calms anxiety and can help restore a sense of control.
- In an infectious disease outbreak, public understanding of and action on disease prevention is key to stopping the spread.
- Keep action messages simple, short, and easy to remember, like “cover your cough.”

VI. Show Respect:

- Respectful communication promotes cooperation and rapport.
- Respectful communication is particularly important when people feel vulnerable.
- Always treat people the way you want to be treated – the way you want your loved ones to be treated – even when hard decisions must be communicated

The CERC Rhythm:



Psychology of a Crisis:

What do people feel during a disaster?

Psychological barriers:

- Denial
- Fear, anxiety, confusion, dread
- Hopelessness or helplessness

People seldom panic

Processing Information in a Crisis:

People tend to	So you should
Simplify messages	Use simple messages
Hold on to current beliefs	Hold on to current beliefs
Use credible sources	Use credible sources
Look for additional information and opinions	Look for additional information and opinions

How do we communicate about risk during an emergency?

Not all risks are accepted equally:

- Voluntary vs. involuntary
- Controlled personally vs. controlled by others
- Familiar vs. exotic
- Natural vs. manmade
- Reversible vs. permanent
- Statistical vs. anecdotal
- Fairly vs. unfairly distributed
- Affecting adults vs. affecting children.

Countering Psychological Barriers

- Acknowledge fear and uncertainty.
- Express wishes. (“I wish I had answers.”)
- Do not over-reassure.
- Explain the process in place to find answers.
- Promote action. Ask more of people.
- When the news is good, state continued concern before stating reassuring updates.

Develop and Tailor Messages:

1. **Use Plain Language:**

- a. Be brief.
 - b. Give positive action steps.
 - c. Use words your audience uses.
 - d. Use personal pronouns.
2. **Tailor Messages:**
 - a. Identify your audiences and groups within those audiences.
 - b. Continue to base your message on key messages.
 - c. Consider the role of culture in tailoring and sharing your message.
 3. **Work with Others to Share Messages:**
 - a. When possible, establish relationships before the emergency.
 - b. Seek and accept input from partners.
 4. **Promote Repetition and Consistent Messaging:**
 - a. Share the same message across multiple platforms.
 - b. Coordinate messaging with response partners.

More affective Practices for improving Communication:

1. **Affective Practices:**
 - a. Choose an effective spokesperson.
 - b. Facilitate positive relationships with media.
 - c. Listen and evaluate.
 - d. Avoid common mistakes
2. **Tips for Spokespersons:**
 - a. Avoid humor, speculation, and condescension.
 - b. Refute negative allegations without repeating them.
 - c. Use plain language.
 - d. Stick to the main points.
 - e. Remember that what you say is never “off the record.”
3. **Positive Relationships with Media:**
 - a. Establish relationships early.
 - b. Provide the same information to all outlets.
 - c. Provide options.
 - d. Give a time frame.
 - e. Make accommodations

4. Listen and Evaluate:

- a. Monitor media and social media.
- b. Ask for feedback.
- c. Use rapid message testing.
- d. Analyze available data (website metrics, public hotline information, etc.)

5. Five Communication Mistakes to Avoid:

- a. Mixed messages from multiple experts.
- b. Information released late.
- c. Paternalistic attitudes.
- d. Not countering rumors and myths in real-time.
- e. Public power struggles and confusion.

SESSION 3# DEFINING DRR AND TRENDS OF DISASTER AROUND THE GLOBE AND IN PAKISTAN:



Time: 45 minutes



Content:

- What are DRR, DRM, & CCA.
- DRM cycle.
- Types and history of climate-induced hazards and disasters in Pakistan.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answer.



Outcome:

- Knowledge of the participants on trend of disaster around the globe and in Pakistan will be enhanced.
- Participants will learn about DRM cycle and definitions of DRR, DRM and CCA.



Objectives:

- Defining the concept of DRR, DRM, and CCA.
- Enhance the knowledge of participants on DRM cycle.
- Explaining the trend of disaster around the globe and in Pakistan.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.

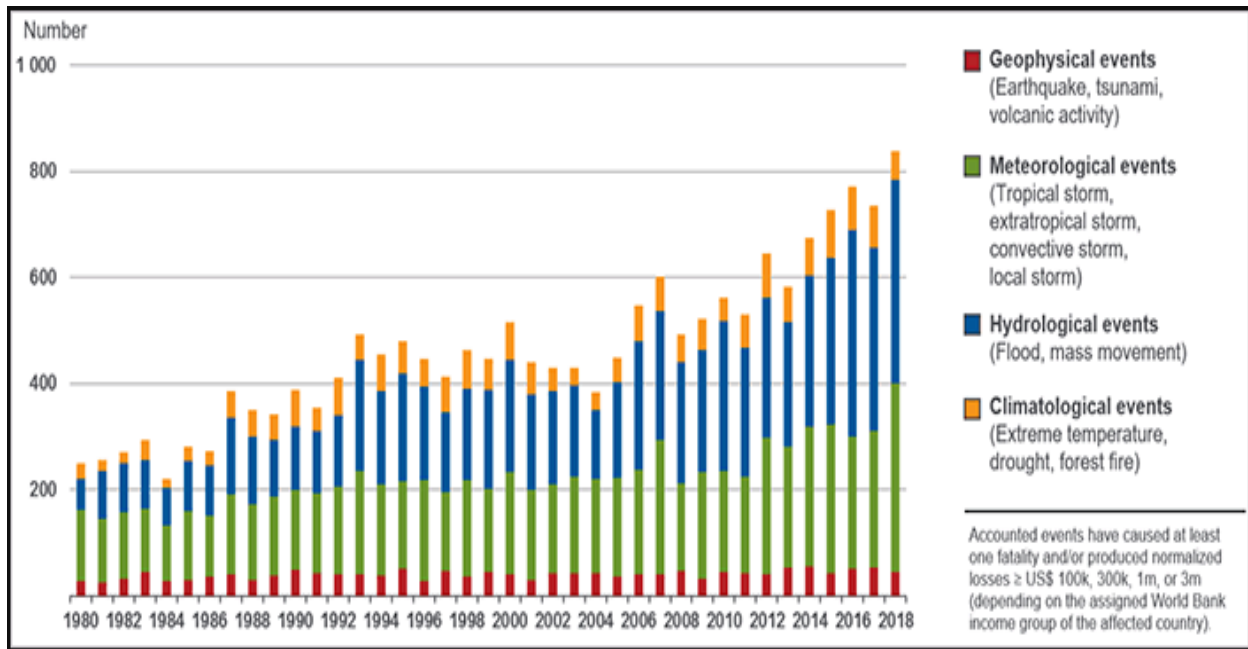


References:

- Mainstreaming DRR & CCA into Development Process at Local Level by ADPC (2015)
- Convergence of disaster Risk Reduction and CCA by Mitchell, T. and Van Aalst, M. (2008).
- Training Manual DRM for Pakistan by ADPC
- <http://doi.org/10.26480/esp.02.2019.14.17>
- <http://www.adpc.net/>
- USAID RSPN Tahafuz CBDRM Manual.

Defining DRR and Trends of Disaster around the Globe and in Pakistan:

Pakistan is considered as 36th largest nation by total area, having 796,095 km total land area. Due to varieties of physical and natural surroundings, Pakistan is facing different natural disasters such as floods, earthquakes, landslides and man-made disasters like road accidents, industrial accidents, fire and terrorism. The world history confirms that Pakistan is more exposed country to natural disasters.



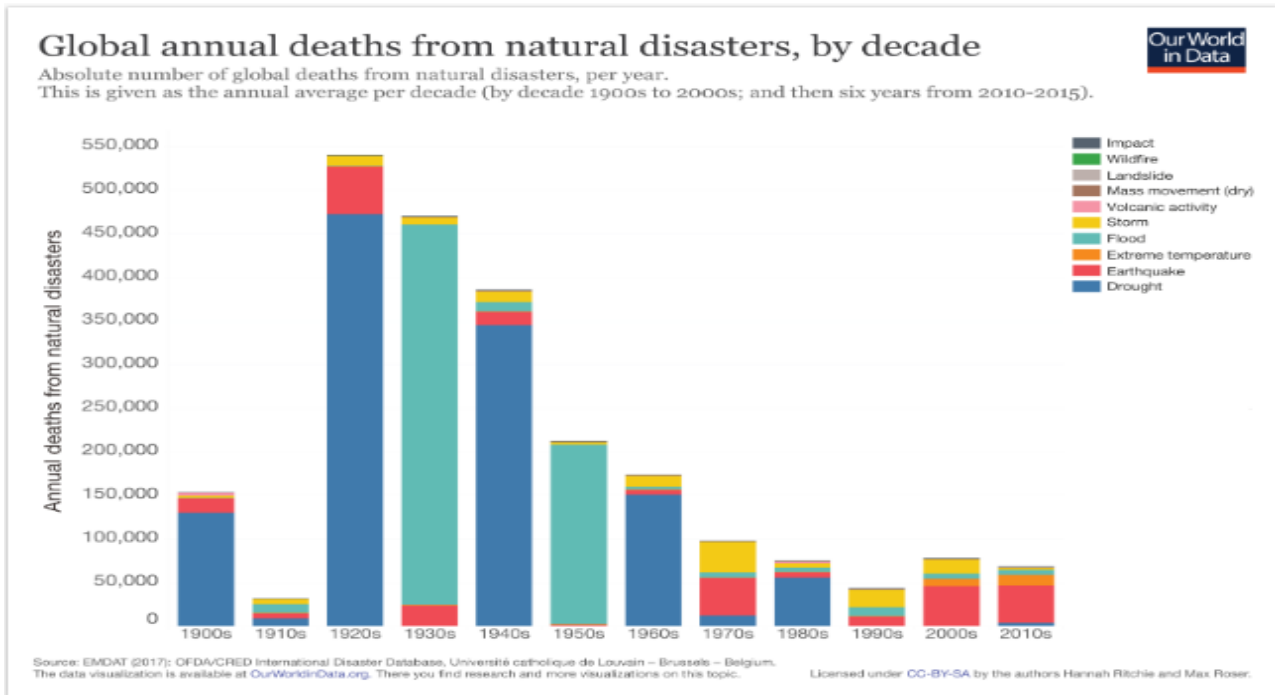
Global Trends in natural disaster:

Global trends in natural disasters for the last three decades show that both the number of disasters and the number of affected people are increasing, leading to major environmental and socio-economic costs.

Within Asia itself, the Hindu Kush-Himalayan region is one of the most complex, dynamic, and intensive risk hotspots with earthquakes, floods, flash floods, landslides and debris flows, droughts, and wild fires as the main hazards. This is due to the physical and socio-economic characteristics of the Himalayan region combined with the changing risk factors such as environmental and climate change, population growth, and economic globalization. This contributes to hold back the socio-economic development in the region and hampers the progress in poverty reduction. Those who are already the most vulnerable and will be the most affected.

In general, climate change is expected to increase the frequency and intensity of extreme events. The noticeable impacts of climate change include the rapid melting of many glaciers leading to immediate risks of glacial lake outburst floods (GLOF) with implications for downstream communities and infrastructures and the increase of irregular rainfall patterns with a higher frequency of floods and droughts. In the past the focus has been on post-disaster response only, which is no longer adequate and effective in dealing with disasters, therefore a shift is occurring

in the region, as well as worldwide, from response to prevention, preparedness and mitigation of disasters.



(Source: CRED Database on Disaster Management)

Top 12 at risk countries of the world

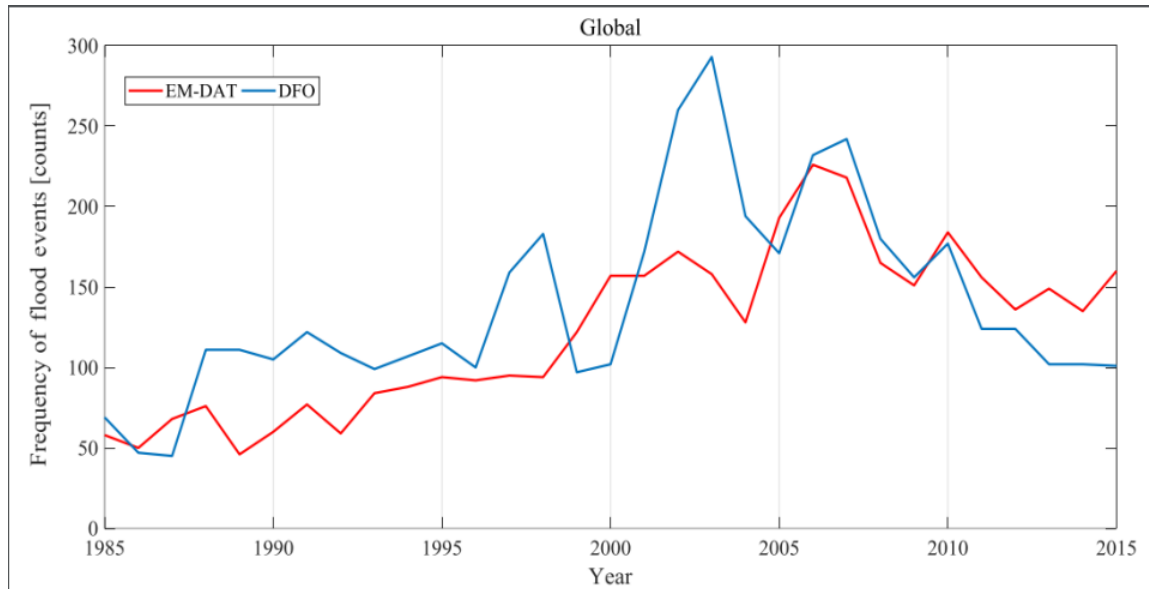
1. Bangladesh	4. Pakistan	7. Mozambique	10. Colombia
2. Indonesia	5. Ethiopia	8. Haiti	11. India
3. Iran	6. Sudan	9. Philippine	12. China

(Source; DRR Wikipedia)

Water related disaster trends:

Trends in natural disasters show they are continually increasing in most regions of the world. Among all observed natural and anthropogenic adversities, water-related disasters are more catastrophic. Earthquake 2005 and flood 2010, 2011, and 2012 in Pakistan Killed more than 100,000 peoples and effected more than 20 million peoples afflicting more than 1.5 billion people and inflicting more than US\$422 billion in damages. All water-related disasters events increased between 1980 and the end of the twentieth century Floods and windstorm events increased drastically from 1997 to 2010, but other types of disaster did not increase significantly in this period. According to national disaster management authority (NDMA), the Pakistan suffers a loss of around \$800 million every year. Disaster is a sudden unfriendly or terrible occasion which causes extraordinary harm to people, plants and individuals. Disaster happens quickly, promptly and unpredictably. These occasions which happen irritate normal natural procedures to make disaster to human culture for example, sudden structural developments

prompting to tremor and volcanic emissions, preceded with dry conditions prompting to delayed dry spells, surges, barometrical unsettling influences, crash of divine bodies etc. Natural disaster is the impact of a natural hazard (e.g., Earthquake, flood, tornado tropical storm, volcanic emission). It prompts to financial, ecological and human misfortunes).



Pakistan Disaster Profile:

The country is geographically divided into three areas: the northern highlands, the Indus river plains and the Baluchistan plateau. Pakistan’s geographical location, its topography, the nature of its economy, rapid urbanization and high population levels make it vulnerable to natural and human induced disasters. Natural disasters that repeatedly affect Pakistan include earthquakes, floods, landslides, cyclones, and droughts. In addition to this, the country is affected by industrial disasters, disease epidemics, fires, accidents (road, rail, and air), and civil and military armed conflict. Poor infrastructure, scant emergency response services and high levels of poverty, particularly in rural areas lowering coping mechanisms at all levels, aggravate the effects of these disasters. The most affected are the vulnerable groups including women, children, elderly and the disabled; this is in part due to the lack of support services available for these groups. The human impact of natural disasters in Pakistan can be judged by the fact that 6,037 people were killed and 8,989,631 affected in the period between 1993 and 2002 (World Disasters Report 2003, Geneva) with a further 20 million people affected by the 2010 floods (outlined in more detail below). In recent years, Pakistan has suffered a series of natural disasters, including the 2005 earthquake and major floods in 2010, 2011 and 2012. These calamities killed thousands and cost millions by destroying large-scale infrastructure, housing.

Hazards:

The exposure of Pakistan’s to natural hazards and disasters could be ranked between moderate to severe. Natural hazards including avalanches, cyclones and storms, drought, earthquakes, epidemics, floods, glacial lake outbursts, landslides, pest attacks, river erosion and tsunami pose

risks to Pakistani society. A variety of human-induced hazards also threatens the society, economy and environment. They include industrial, transport, oil spills, urban and forest fires, civil conflicts and internal displacements of communities. High priority hazards in terms of their frequency and scale of impact are earthquakes, droughts, flooding, Wind Storms and Landslides that have caused widespread damage and losses in the past. Here we will focus on floods.

Earthquakes:

Major Earthquakes those hit areas of Pakistan includes the great Quetta Earthquake- 1935 and the earthquake in the Northern part of Pakistan in October-2005. Besides these mega earthquakes, the country has experienced numerous small to medium magnitude quakes with localized impacts. Seismicity is especially high in the Northern and Western parts of the Country.

Year	Location	Magnitude	Deaths	Losses (Rs in Million)
Oct 2015	KP, Punjab, AJ&K and GB	8.1	280	98,069 houses and 479 schools
Sep 2013	Awaran	7.7	376	6842 houses
Oct 2008	Ziarat	6.4	160	5943 houses
Oct 2005	KP & AJK	7.6	73,338	208,091
Dec 1974	Northern Area	7.4	5,300	4400 houses
Nov 1945	Makran Coast	8.3	4,000	-
May 1835	Quetta	7.7	60,000	-

Source: NDMP and NDMA reports

Earthquakes with magnitudes larger than seven, such as the 1935 Quetta Earthquake and the 2005 Earthquake caused significant damage including a number of human lives lost. This fact can be attributed to the vulnerability of the building structures to earthquakes.

Analysis of flood in Pakistan:

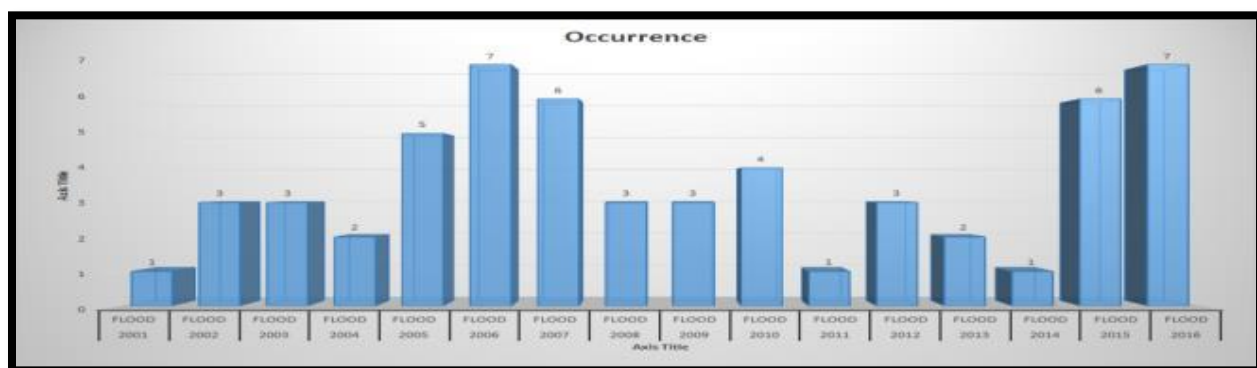
Pakistan is among first five South Asian Countries with the highest annual average number of people affected by floods. Flooding is the most recurring natural disaster causing devastation & damaging

Year	Deaths	Villages Affected (numbers)
2014	367	3,100
2013	243	8,297
2012	571	14,159
2011	520	38,700
2010	1,985	17,553
2009	99	89
2008	157	8,00
2007	586	6,498
2006	541	2,477
2005	59	1,931

tremendous human lives, infrastructure and property. Normally tropical monsoon depression systems, which originate from the Bay of Bengal during the months from July to September is the main cause of floods in Pakistan. Flood characteristics can be classified into three main categories namely Riverine Floods, Flash Floods and Urban Floods. Occurrences of flood in Pakistan show occurrences of Flood in Pakistan from 2000 to 2016. By observing the completely

mentioned period of occurrences of Flood shows that in years 2005 and 2016 Flood occurred seven times in each year respectively. In 2007 and 2015 Flood occurrence were recorded six times in each year.

In 2005, it occurred five times. In 2010 occurred four times. In 2002, 2003, 2008 and 2009 the occurrences were three times in each year. In 2004 and 2013 occurrences was two times in each year. In 2001, 2011 and 2014 occurrences was one times in each year respectively.



Vulnerable Districts of Pakistan:

Province	River/Flash Flood
Sindh	Badin, Dadu, Ghotki, Jacobabad, Jamshoro, Kamber, Karachi, Kashmore, Khairpur, Larkana, Sanghar, Shahdadt, Shikarpur, Sukker, Tando Muhammad Khan and Thatta
Balochistan	Bolan, Chagai, Gwadar, Jaffarabad, Jhal Magsi, Kech, Kharan, Khuzdar, Lasbela, Nasirabad, Nushki and Sibi
KP	Buner, Charsadda, Chitral, Dera Ismail Khan, Dir Upper, Dir Lower, Khyber, Kohistan, Kurram, Lakki Marwat, Malakand, Mansehra, Mardan, North Waziristan, Nowshera, Orakzai, Peshawar, Shangla, South Waziristan, Swabi, Swat and Tank
Punjab	Punjab Bakkar, DG Khan, Gujranwala, Gujrat, Jhang, Khushab, Layyah, Mianwali, Muzaffargarh, Narowal, Rahim Yar Khan, Rajanpur, Rawalpindi, Sialkot & Sheikhupura
AJ&K	Bagh, Bhimber, Muzaffarabad, Neelum, and Poonch
GB	Astore, Chilas, Diamer, Ganche, Gilgit, Ghizer Hunza, Nagar and Skardu

Droughts:

In Pakistan, rainfall variability is quite high due to its topography, which makes droughts an intermittent phenomenon in the Country. In recent years, droughts are reported to have brought extensive damage to Balochistan, Sindh and Southern Punjab where average annual rainfall is as

Year	Deaths	No Affected	District Affected
1997-2002	145	3.3 million	23

Source: NDMP

low as 200-250 mm. Drought differs from other natural disasters in effects, which often accumulate slowly over a considerable period and may linger on for years even after the termination of the event. Because of this, drought is often referred to as a “Creeping

Phenomenon.” The impacts of drought are less obvious and are spread over larger geographical areas.

Glacial Lake Outburst Floods (GLOFs):

The bursting of glacial lakes in the upstream reaches of the Indus River basin due to heat waves, a phenomenon termed GLOFs, is one of the natural disasters to be concerned with in Pakistan. In particular, the Karakoram Region is noted for the destructive effects of GLOFs from naturally dammed lakes. The lower parts of large glaciers in the Upper Indus River basin can severely disrupt and modify river courses in the valleys below.

In case of GLOF, some slides and debris torrents are large enough to dam rivers, such as the landslides in 1841, which blocked the Indus River and formed a lake upstream. When the dam was breached, a catastrophic flood wave resulted. Similar events occurred from 1852 to 1858 on the Hunza River. In 1977, a landslide dam was formed, possibly in association with a glacier surge (Hewitt, 1968-1969). A recent study on Indus River basin system flooding and flood mitigation by H. Rehman and A. Kamal found that, out of the 2,420 glacial lakes in the Indus basin, 52 are potentially dangerous and could result in GLOFs with serious damage to life and property.

Sediments/Landslides:

Pakistan is at considerable risk to sediment disasters. Sediment disasters are defined as the phenomena that cause direct or indirect damage to lives and property through a large-scale movement of soil and rock. Sediment disasters are likely to occur in mountainous areas of Pakistan, due to the particular organic phenomena and downspouts resulting in destabilization of the slope. Sediment disasters occur after heavy rains, which weaken the soil/ ground. In particular, the northern regions of Pakistan (GB, AJ&K and KP) are vulnerable to landslides because of their steep hilly/ mountainous topography.

Year	Area	Deaths	No Affected
2010	Attabad (GB)	18	1285
2005	Hattian Bala (AJ&K)	1,000	3,600

Source: NDMP

Avalanches:

GB and Kashmir regions and northern parts of KP experience avalanches on seasonal basis. Local communities surrounding the avalanche prone areas are vulnerable to this disaster. Avalanches are a kind of local natural disaster and their impact is localized to the communities living nearby or in areas where avalanches happen on a regular basis. Therefore, the impact of avalanches is minimal.

Cyclones:

Cyclones have caused large-scale damage to the coastal areas in Pakistan. The coastal belt of Pakistan, especially in Sindh Province, is highly vulnerable to tropical cyclones and associated storm surges. The climate changes result in an increase in frequency, intensity and changes in tracks of storms.

Year	Death	No Affected	District Affected
2010	15	0.2 million	Balochistan - 30 Sindh - 3
2007	Balochistan - 380 Sindh - 250	1.5 million	Balochistan - 10 Sindh - 4
1999	202	0.6 million	Thatta and Badin

Source: NDMP

Tsunami:

Due to the tectonic setting in the Arabian Sea where the Arabian Plate subducts beneath the Eurasian Plate, large earthquakes along the Arabian Coast have occurred historically. However, not all of the earthquakes have generated tsunamis. Besides earthquakes, tsunamis can be generated by volcanic activity. 1945 Tsunami caused by Makran Subduction Zone, located 70

Date	Time	Magnitude	Run Up (in meters)	Location
27 Nov 1945	21:56:40	8.3	15.24	Karachi, Ormara and Pasni
27 Aug 1883	02:59	Volcano	0.50	Karachi

Source: National Geophysical data Centre

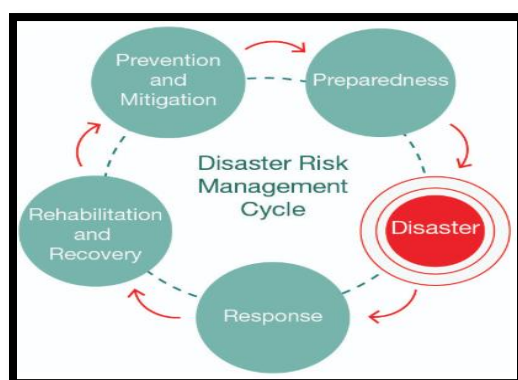
km from the Pakistan Coast, hit the coastal line in less than 20 minutes; however, distant tsunamis have not affected Pakistan so far.

Disaster Risk Reduction (DRR):

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Disaster Risk Management (DRM):

It is a systematic process of using administrative directives, organizational and operational skills; and capacities to implement strategies and policies; and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disasters. DRM aims to avoid, lessen or transfer



the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.

DRM Cycle:

The spectrum of disaster management is generally divided into pre, during and post disaster interventions. The pre-disaster activities are risk assessment, preparedness and early warning, whereas the post disaster activities include relief, recovery, rehabilitation and long term reconstruction as per needs of the affected populations in accordance with international standards. This cycle, which covers the whole spectrum of DM, is known as the disaster management cycle.

Climate change adaptation (CCA):

Climate change adaptation is the process of adjusting to current or expected climate change and its effects. It is one of the ways to respond to climate change, along with climate change mitigation.

TRENDS OF CLIMATE-INDUCED HAZARDS AND DISASTERS IN TARGET DISTRICT:



Time: 45 minutes



Content:

- Types and history of climate-induced hazards in Sindh.
- Types and history of disasters in Sindh/ Kashmore and Shikarpur.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answers.



Outcome:

- Knowledge of the participants on Types and history of disasters in Sindh will be enhanced.
- Participants will learn about Types and history of disasters in target districts.



Objectives:

- Explaining the climate-induced hazards in Sindh.
- Explaining the Types and history of disasters in target districts.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.

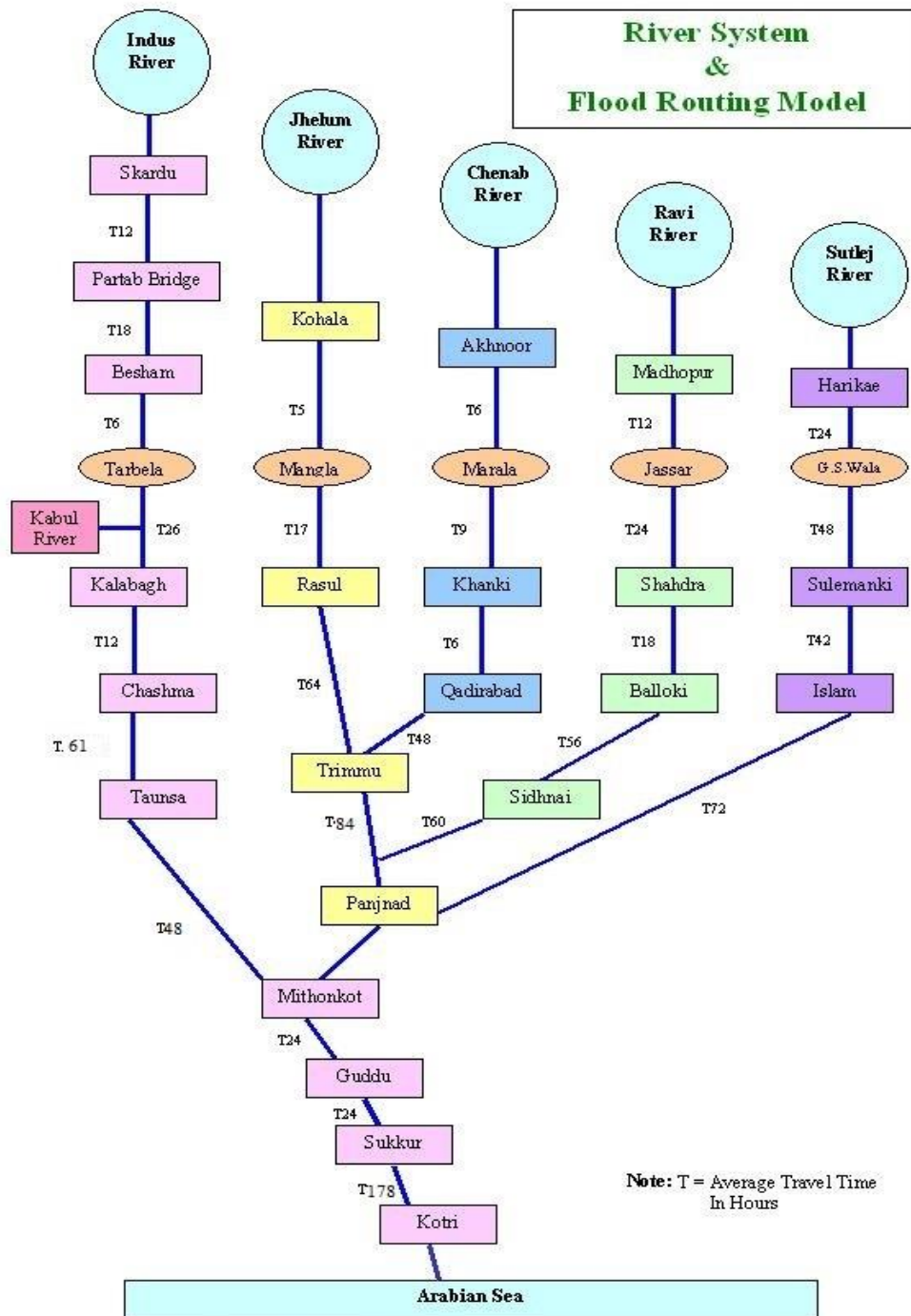


References:

- USAID RSPN Tahafuz CBDRM Manual.
- National Disaster Management Plan (2012-2022) by NDMA
- Training Manual DRM for Pakistan by ADPC

Hazard / Disaster Scenario of SINDH:

The province of Sindh is the southeastern province of Pakistan, and it covers a geographical area of 14 million hectares. 60% of land is arid or non-cultivable. Sindh contains coastal, desert, mountainous, and plain areas. The River Indus and its tributaries also flow through Sindh with overflow causing significant destruction during the monsoon floods 2010- 11.



Most of Sindh's population, currently estimated at around 43 million lives in rural areas, although the urban centers such as Karachi also hold high population levels. along with billions of dollars' worth of losses in all sectors of the economy. Floods are the recurring disaster in the province; other threats include tsunamis, cyclones, earthquake and drought.

River Indus after receiving water from 5 rivers causes floods in the Sindh province. The upper regions of the Sindh province constitute the Districts of **Kashmore, Shikarpur** and Larkana on the right bank of River Indus and Ghotki, Sukkur, Khairpur, Naushahro-feroze and Shaheed Benazirabad on the left bank of River Indus. These Districts on the right and left of River Indus face a severe threat owing to passage of River Indus. The districts in the lower Sindh, prone to Riverine flooding include Dadu, Jamshoro and Thatta on the right bank of River Indus and Tando Muhammad Khan, Matiari, Hyderabad and Sujawal on the left bank. The length of River Indus through the province is 750 kms. Districts of Jacobabad, Kambar, Shahdadkot, Larkana, Dadu, Jamshoro and Karachi East District, are also vulnerable to hill torrents, which cause flash flooding, the early warning possibility for which is minimal.

History and Risk profile of Sindh:

Floods/ Rains:

The topography of Sindh Province is almost flat and located at the bottom of Indus basin. The surplus water of Indus River and its tributaries including monsoon rainwater has to pass through Sindh. Hill torrents, which emanate from Baluchistan, are also adding up to the pressure on both accounts, until its outfall in the Arabian Sea. The River Indus in Sindh is dangerous, because it flows at ridge. In case of breach, the out flowing water cannot be drained back into the river at any point. The Indus River is also known for changing its course. High floods since the creation of modern irrigation network in 1932 are being monitored. The river Indus is contained by flood protection embankments, which are 1400 miles long, so as, to protect irrigation network emanating from three barrages having 12.8 million acres of command area. Besides, there is a large network of surface drainage and 6000 public tube wells, roads and railways network, cities / towns, rural settlements etc. The high floods occurred during 1942, 1956, 1957, 1958, 1973, 1975, 1976, 1979, 1992, 1994, 1995, 2003, 2005, 2007, 2010, 2011 and 2012.

Cyclone:

The coastal districts have also been adversely affected by heavy rainfall and cyclones. The three coastal districts - Karachi, Thatta and Badin, are highly vulnerable. The districts of Thatta and Badin have been badly affected on several occasions. Cyclones not only wiped out the human settlements and resulted in the huge losses of human and animal lives, but they also destroyed and damaged fishing boats, therefore badly affecting the livelihood of the majority of residents of these two districts. Historically, the tropical cyclones are formed over the Arabian Sea and made landfall at the coastal areas of Sindh. Major cyclones during the last 100 years which hit Sindh were in May 1902, June 1926, June 1964, November 1993, June 1998, May 1999 and June 2007 (Cyclone- 02A). The Cyclone Yemen in 1999 hit three coastal districts of Sindh, where 244 people lost life, 40177 animals perished, villages affected were 1449, houses damaged were

29873 and population affected was 0.5 million. Loss in financial terms was about Rs. 3.231 billion. Keti Bunder town was wiped out four times in recent history. The cyclones of 2010 (PHET) and 2011(KIELA) also emerged during last few years, out of which PHET caused significant damages in district Thatta. Cyclone Taukty May 2021 caused death of 5 persons in Karachi and partially damaged 7 households.

The relative severity of various vulnerabilities/hazards district-wise in Sindh

(Taken from Provincial DRM Plan Sindh Province)

District	Drought	Floods / rains	Cyclones	Tsunami	Earthquake	Landslides	Communicable diseases	Fire	Locusts / pests	Crisis situation	Industrial & mines accidents cyclones	Refugees& IDP's
Karachi	4	3	4	4	3	1	3	5	—	5	5	3
Thatta	4	4	4	4	2	—	4	2	—	2	1	3
Badin	4	5	5	4	3	—	4	1	1	2	1	4
Tharparkar	5	3	3	3	4	—	4	2	4	3	1	1
Umerkot	5	3	2	1	2	—	3	2	3	1	1	2
Mirpurkhas	4	3	2	2	2	—	3	3	1	1	1	1
Tando allahyar	3	4	2	1	2	—	3	3	1	1	1	1
Tando m.k.	3	4	2	1	2	—	4	2	1	1	1	1
Hyderabad	3	3	1	1	1	—	3	3	1	3	3	3
Mitiari	3	4	1	1	1	—	3	1	1	1	1	1
Nawabshah	4	4	1	1	1	—	3	2	3	1	2	3
Naushahro feroze	3	4	1	1	1	—	4	1	1	1	1	1
Khair pur	4	4	1	1	1	—	3	2	4	1	2	1
Sukkur	3	3	1	1	1	—	4	2	4	2	2	1
Ghotki	3	4	1	1	1	—	3	3	4	1	3	3
Shikarpur	2	3	1	1	1	—	3	2	1	3	1	2
Kashmore	2	5	1	1	1	—	4	1	1	3	1	3
Jacobabad	3	5	1	1	2	—	4	1	1	4	1	3
Larkana	3	3	1	1	2	—	3	1	1	3	1	2
Kambar Shahdadkot	5	5	1	1	3	—	3	1	1	3	1	3
Dadu	5	4	1	1	3	—	4	1	1	3	2	3
Jamshoro	5	3	1	1	3	—	2	2	1	1	2	1
Sanghar	4	4	2	1	1	—	2	1	3	1	1	3

Tsunami:

The Sindh province can be a recipient of a tsunami disaster also. A tsunami disaster occurred in November 1945 at Makran coast in Baluchistan Province. It produced sea waves of 12-15 meters

height that killed about 4,000 people. Although Karachi was away from the epicenter, yet it experienced 6 feet high sea waves which affected harbor facilities. This usually happens during the months of March, April and May. The effects of tsunami of December 2004 were also felt along the Pakistan coastline. Abnormal rise in water, detected by tide gauge station at Keti Bander area created panic in the coastal population including Karachi.

Drought:

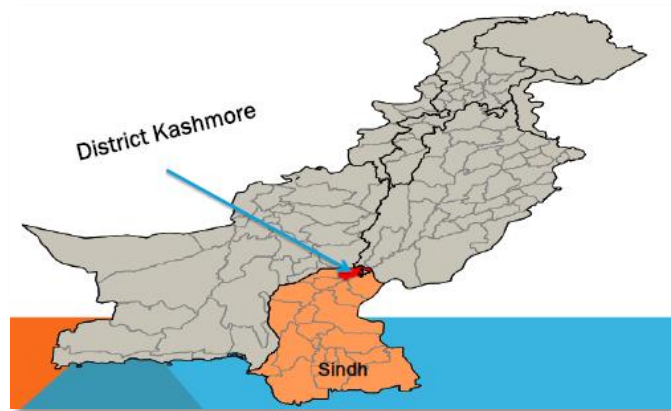
Sindh geographically can be divided into four zones namely eastern desert, western hilly / mountainous area, coastal area in the south and irrigated agriculture area in the middle. Its 60% area is arid receiving rainfall on average of 5 inches during monsoon and very little in December & January. The arid area population depends upon the scanty rainfall raising livestock and millet crops. The failure of rainfall and global climatic effects reduce the water supplies in Indus River System (IRS). Sindh, being at the end of the system, usually takes the brunt. Besides, two third of ground water is brackish and 80% agricultural land is affected by water logging and salinity. People in the arid area usually move to canal commanded area but low flow in the river Indus from 1998-2002 created havoc in the entire province. Historically, Sindh faced the worst drought situation during 1871, 1881, 1899, 1931, 1942 and 1999-2002 and 2013-14.

Earthquake:

The recent earthquake that affected Sindh desert area was recorded in the year 2001 in Tharparkar district and the bordering Badin District was badly affected. Due to this earthquake 12 people lost their lives, 115 persons got injured.

Disaster history in target districts:

1. **District Kashmore** is susceptible to numerous natural and human induced hazards including riverine floods, heavy raining, rare drought, earthquake and water logging & salinities as major natural hazards, while fires, civil unrests, road accidents and health epidemics are prominent human induced hazards. Furthermore, poor communication infrastructure, lack of healthcare facilities, low literacy ratio and poverty (especially in the remote villages) makes the area very vulnerable to these hazards.



Riverine Flooding & Heavy Rains:

Flooding has described as the major recurrent and damaging natural hazard in the district and occurs at regular intervals during the monsoon seasons. During current decade, the district was badly hit by the 2010 and 2011 floods and 2012 heavy raining. Apart from riverine flooding, heavy rains are also a major cause of flooding in the district. Besides the canal, irrigation

network and interrupted drainage system are some of the major reasons for flooding in the district.

District Kashmir Disaster History

Hazard	Frequency	Area affected	Severity	Year
Floods	Seasonal	Entire district	High	2003, 2010
Heavy rains	Seasonal	Entire district	High	2012
Epidemics	Seasonal during monsoon	Entire district	Low	Every year
Droughts	Rare	Area outside riverine belt	Low	2002
Earthquake	Rare	Entire district	Low	2001, 2013
Transport accidents	Often	Entire district especially	Low	Every year

Drought:

Drought is another hazard that is occurring in district Kashmir from time to time. A large number of areas in the region are potentially affected by drought causing shortage of food grains and livestock. The annual rainfall varies from 150 to 300 mm exhibiting arid climatic characteristics with rainfall being low in the Rabi season especially in the south and south-eastern portions of the district. Soils in the area are mostly sandy to sandy loams with small narrow tracts of clayey and silt soils. Geography, district Kashmir can be divided into different areas, but the arid area people depend upon the scanty rainfall raising livestock and millet crops. The failure of rainfall and impacts of climate variability, reduce the water supplies in the Indus River System (IRS). Historically, district faced the worst drought situation in 2002.

Water Logging and Salinity:

The flat terrain and sandy soil of areas along the River Indus falls in Kashmir, Kandhkot and Tangwani Talukas of the district causes water logging. In addition, seepage from unlined earthen canals system, inadequate provision of surface and subsurface drainage, poor water management practices, insufficient water supplies, and use of poor quality groundwater for irrigation also directly related to water logging problem. Salinity is another major problem in the irrigated areas. People living at the tail end of the canal-irrigated areas also use ground water by digging tube wells. These tube wells also carry salinity and alkalinity because of high sulphate contents. These tube wells pump bring brackish water that results into salinity.



Road Accidents:

Transport accidents are on the rise in district Kashmore with hundreds of people affected every year in transport accidents. During the period of 2011 to 2017, hundreds of people died and were injured in the road accidents in various urban and rural areas of the district. The main causes reported are over speeding, wrong turns, one wheeling, and lack of awareness about the traffic rules.

Crisis:

Crises were increasing due to unpredictable incidents such as sectarian violence leading to civil unrest, etc. In district Kashmore tribal conflict and robberies are also very common. In this regards the district law enforcement agencies are closely working to reduce the cases.

2. District Shikarpur although there is not much information available (except for the previous decade) on the history of disasters in District Shikarpur and this district is not disaster free area. Disasters of different kinds are reported in the previous decade. Earthquake was reported in 2001. Heavy rains and seasonal monsoon were reported in 2003, 2010 and 2011. Riverine and flash floods are reported in 2003, 2005, and 2010 2011. According to Board of Revenue Sindh 2010, the relative severity of floods in Shikarpur is given a rank 2 which means low floods³².

River Indus after receiving water from 5 rivers system causes floods in the northern and southern parts of the Sindh province. The upper regions of the Sindh Province constitute the districts of Kashmore, Shikarpur, Jacobabad, Larkana and Kambar Shahdadt on the right bank of River Indus and Ghotki, Sukkur, Khairpur, Naushahroferoze and Shaheed Benazirabad on the left bank of River Indus. These districts on the right and left of River Indus pose a severe threat owing to passing of River Indus. Heavy rains are also a major cause flooding in the district. The district is highly vulnerable to the floods. In 2010, District Shikarpur was severely hit by floods and a population of 778,000 persons was affected.

District Shikarpur Disaster History

Hazard	Frequency	Area affected	Severity	Year
Floods	Seasonal	Entire district	High	2003, 2005, 2010, 2011,2012
Heavy rains	Seasonal	Entire district	High	2003, 2010, 2011
Epidemics	Seasonal during monsoon	Entire district	Low	Every year
Environmental degradation	Often	Entire district	Low	Every year
Earthquake	Rare	Entire district	Low	2001, 2013
Transport accidents	Often	Entire district	Low	Every year

SESSION 4# DISASTER MANAGEMENT SYSTEM IN PAKISTAN:



Time: 45 minutes



Content:

- National Strategy, Legal Framework for Disaster management in Pakistan.
- Institutions for Disaster Management in Pakistan.



Objectives:

- Explaining Pakistan's legal framework for disaster management.
- Explaining Pakistan's national strategy for disaster management.
- Explaining Pakistan's institutions and associated public departments for disaster management.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



Outcome:

- Knowledge of the participants on legal framework, national strategy and institutions for disaster management will be enhanced.



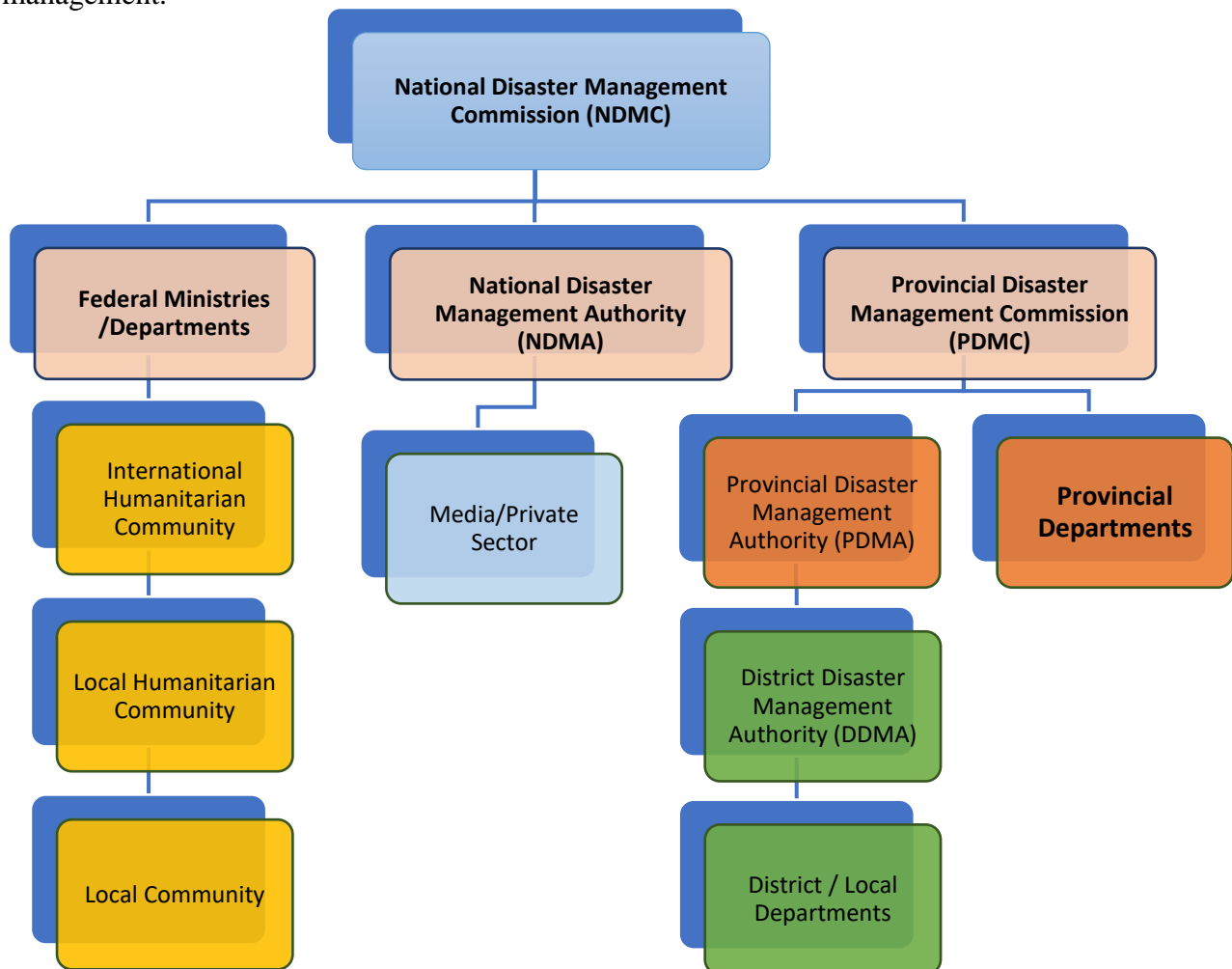
References:

- USAID RSPN Tahafuz CBDRM Manual.
- National Disaster Management Plan (2012-2022) by NDMA
- Disaster Risk Management Plan- Sindh Province by PDMA
- Building Disaster Resilience in Kashmir - Dr. Pervaiz Amir
- Training Manual DRM for Pakistan by ADPC
- NDMA & PDMA web sites

National Strategy, Legal Framework and Institutions for Disaster Management:

Pakistan is a disaster prone country, and most vulnerable to climate change. It has experienced a number of unprecedented natural and man-made calamities over a period of seventy years. It is vulnerable to disaster risks from a certain hazards including droughts, earthquakes, floods, cyclones, storms, avalanches, glacial lake outbursts, landslides, pest attacks, river erosion and tsunami. Man-made hazards that threaten the country include industrialization, oil spills, transport, urban and forest fires, and civil conflicts due to multiple factors. High priority hazards in terms of their frequency, severity and scale of impact are: - earthquakes, droughts (particularly in Sindh and Balochistan), flooding, wind storms and landslides that have caused widespread damages and losses in the past.

In Pakistan a reactive emergency response approach has remained the predominant way of dealing with disasters. The National Calamity Act of 1958 was mainly concerned with organizing emergency response. A system of relief commission was established at provincial level. An Emergency Relief Cell (ERC) in the Cabinet Secretariat was responsible for organizing disaster response by the federal government. The awareness of policy makers, media, civil society, NGOs, UN agencies and other stakeholders remained low about disaster risk management and the Country as a whole lacked a systematic approach towards disaster risk management.



The loss of life and property and the challenges that were faced in the aftermath of October 2005 earthquake affecting Azad Jammu and Kashmir and the KP province exhibited the need for establishing appropriate policy and institutional arrangements to reduce losses from disasters in future. The need for strong institutional and policy arrangements has been fulfilled with the promulgation of National Disaster Management Ordinance, 2006. Under the Ordinance the National Disaster Management Commission (NDMC) has been established under the Chairmanship of the Prime Minister as the highest policy making body in the field of disaster management. As an executive arm of the NDMC, the National Disaster Management Authority (NDMA) has been made operational to coordinate and monitor implementation of National Policies and Strategies on disaster management.

The new system envisages a devolved and decentralized mechanism for disaster management. Accordingly, Provincial Disaster Management Commissions (PDMCs) and Authorities (PDMA) have been established while similar arrangements have been made in AJ&K and Northern Areas. The District Disaster Management Authorities (DDMAs) have been notified across the country. The DDMAs are going to be the hub of the whole system and would play the role of the first line of defense in the event of a disaster.

The National Disaster risk Management Framework has been formulated to guide the work of entire system in the area of disaster risk management. It has been developed through wide consultation with stakeholders from local, provincial and national levels. The Framework identifies National Strategies and Policies for disaster management. Nine priority areas have been identified within this framework to establish and strengthen policies, institutions and capacities.



National Calamities (Prevention and Relief Act) 1958:

This Act appoints the Provincial Relief Commissioner (also member of provincial Board of Revenue) to be in charge and to ensure maintenance and restoration of law and order in areas

affected by calamities and for extending relief to the affected population. It essentially allows for:

- Resource mobilization for handling calamities: hiring of vehicles, earthmoving machinery, requisition of premises or maintenance of relief camps etc.
- Survey of damages and losses occurred as a consequence of a calamity and compensate those affected by the calamities.
- Ensure preparedness for emergencies by setting up a system of alarm and undertake situation specific preventive measures.

National Calamities Act 1958 is more directed towards relief and compensation and does not respond to disaster management as a holistic effort. The Act essentially caters for recurring damages occurring from the flood hazard. It is implemented by the revenue staff, from province to district and down to tehsils (sub-district) level.

Emergency Services Ordinance (2002):

The ordinance creation of emergency services to deal with threats to the public from modern forms of warfare grouped under the term ‘terrorism’ and disasters. A national council has been set up to deal with it and to guide and monitor the performance of these services.

According to the ordinance, the provincial governments shall have the administrative powers during such emergencies. Likewise, the District emergency Officer has been made responsible for the functional management of the service. The Federal government will mainly be responsible for ensuring uniform standards for the service throughout the country, provide advance training to Officers through National Academy and oversee the performance of provinces. Under the Emergency Services Ordinance, the Federal, Provincial and District Governments shall set-up Emergency Service, which shall be responsible for preparedness and rapid response.

National Disaster Management Ordinance (2006/07):

The Ordinance provides a basis for legal and institutional arrangements for disaster management at federal, provincial and district levels. The Ordinance has attained permanency under the Provisional Constitution Order (PCO).

The aim is to enable the Federal Government to put in place a comprehensive disaster management system for the entire country, while the Provincial Assemblies of Balochistan, KP, Sindh and Punjab under Article 144 of the Constitution, passed resolutions authorizing the Federal Government to make legislation on the subject. The Ordinance focuses on following four aspects;

- National, Provincial and District Disaster Management institutions
- National Institute of Disaster Management (NIDM)
- National Disaster Response Force
- National Disaster Management Fund

Disaster Management Institutions:

National Disaster Management Commission (NDMC):

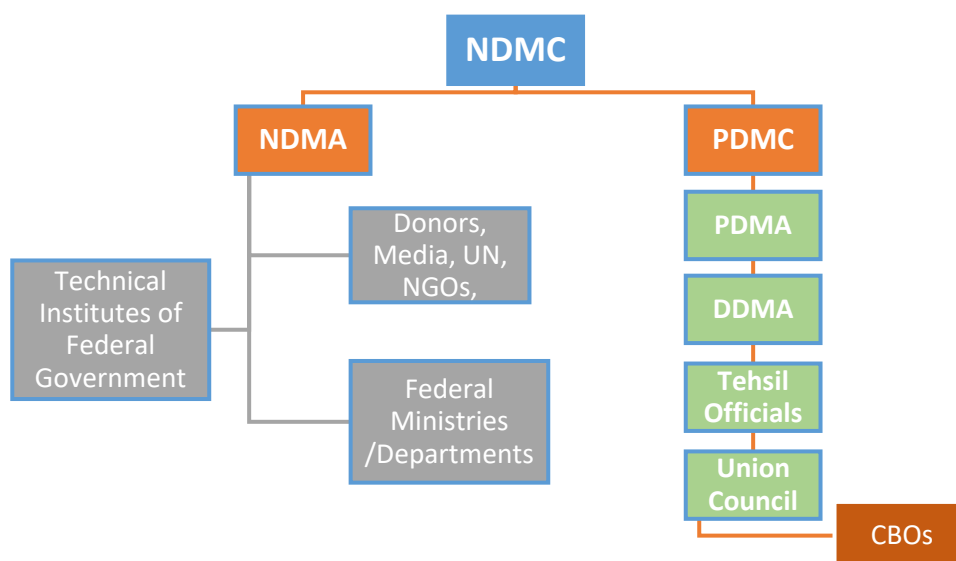
NDMC is the highest forum for disaster risk management chaired, ex-officio, by the Prime Minister of Pakistan. The national commission shall include of:

1	The Prime Minister of Pakistan	Chairman
2	Leader of the Opposition in the Senate	Member
3	Leader of the Opposition in the National Assembly	Member
4	Minister for Defense	Member
5	Minister for Health	Member
6	Minister for Foreign Affairs	Member
7	Minister for Social Welfare & Special Education	Member
8	Minister for Communication	Member
9	Minister for Finance	Member
10	Minister for Interior	Member
11	Governor KP (for FATA)	Member
12	Chief Ministers of all the Provinces	Member
13	Prime Minister, Government of AJK	Member
14	Chief Executive (Chief Minister), Gilgit Baltistan	Member
15	Chairman, JCSC or his nominee	Member
16	Representatives of Civil Society or any other person appointed by the Prime Minister	Member
17	Chairman, National Disaster Management Authority (NDMA)	Secretary

The Director General / Chairman of the NDMA acts as ex-officio Secretary to the commission.

Key roles and functions of the NDMC are:

- Prepare and lay down policies and regulations on disaster management.
- Approve the National Plan.
- Approve plans prepared by the Ministries/ Divisions of the Federal Government in accordance with the National Plan.



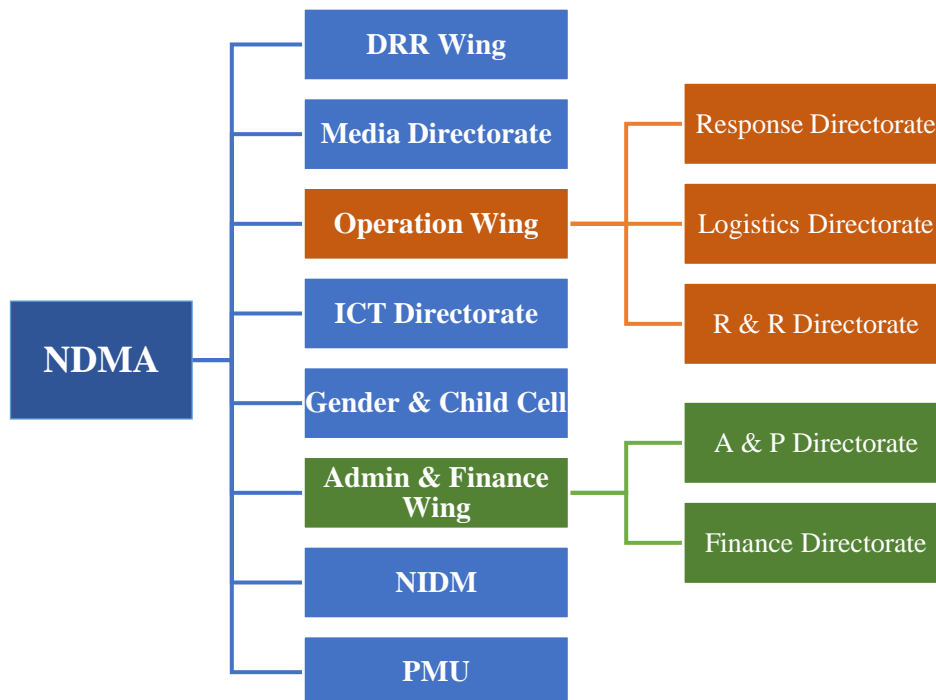
- Develop and Lay down guidelines to be followed by Federal Government and Provincial Authorities.
- Arrange for, and oversee, the provision of funds for the purpose of mitigation measures, preparedness and response.
- Provide such support to other countries affected by major disasters as the Federal Government may determine.
- Take such other measures for the prevention of disaster, or the mitigation, or for preparedness and capacity building for dealing with disaster situation as it may consider necessary.

National Disaster Management Authority - NDMA

The Chairman/Director General of the National Disaster Management Authority is appointed by the Federal Government. The National Authority shall consist of such number of members as may be prescribed and shall include as its Chairperson the Director General.

Key powers and functions of the NDMA are:

- Act as the implementing, coordinating and monitoring body for disaster management.
- Prepare the National Plan to be approved by the NDMC.
- Implement, coordinate, and monitor implementation of the National policy.
- Lay down Guidelines/ give directions to the concerned Ministries or Provincial Governments/Authorities regarding threatening disaster situation / disaster.
- For any specific purpose or for general assistance, requisition the services of any person as a Co-opted Member.
- Promote general education and awareness in the context of disaster management.
- Perform such other functions as the NDMC may require it to perform.



Provincial Disaster Management Commission (PDMC):

PDMC is headed by the Chief Minister of the Province as the Chairperson, ex-officio. Membership includes the leader of the opposition and one member to be nominated by him. Other members are nominated by Chief Minister. The Chairperson may designate one of the members as Vice-Chairperson.

Key powers and functions of the PDMC are:

- To formulate the Provincial Disaster Management Policy.
- To prepare provincial plan in accordance with guidelines provided by the National Commission.
- To approve the disaster management plan prepared by the provincial departments.
- To review the implementation of the plan.
- To oversee provision of funds for mitigation and preparedness measures.
- To review development plans of provincial departments and ensure that prevention and mitigation measures are integrated therein.
- To review the measures been taken by provincial departments for mitigation, capacity building and preparedness, and issue necessary guidelines/directions.

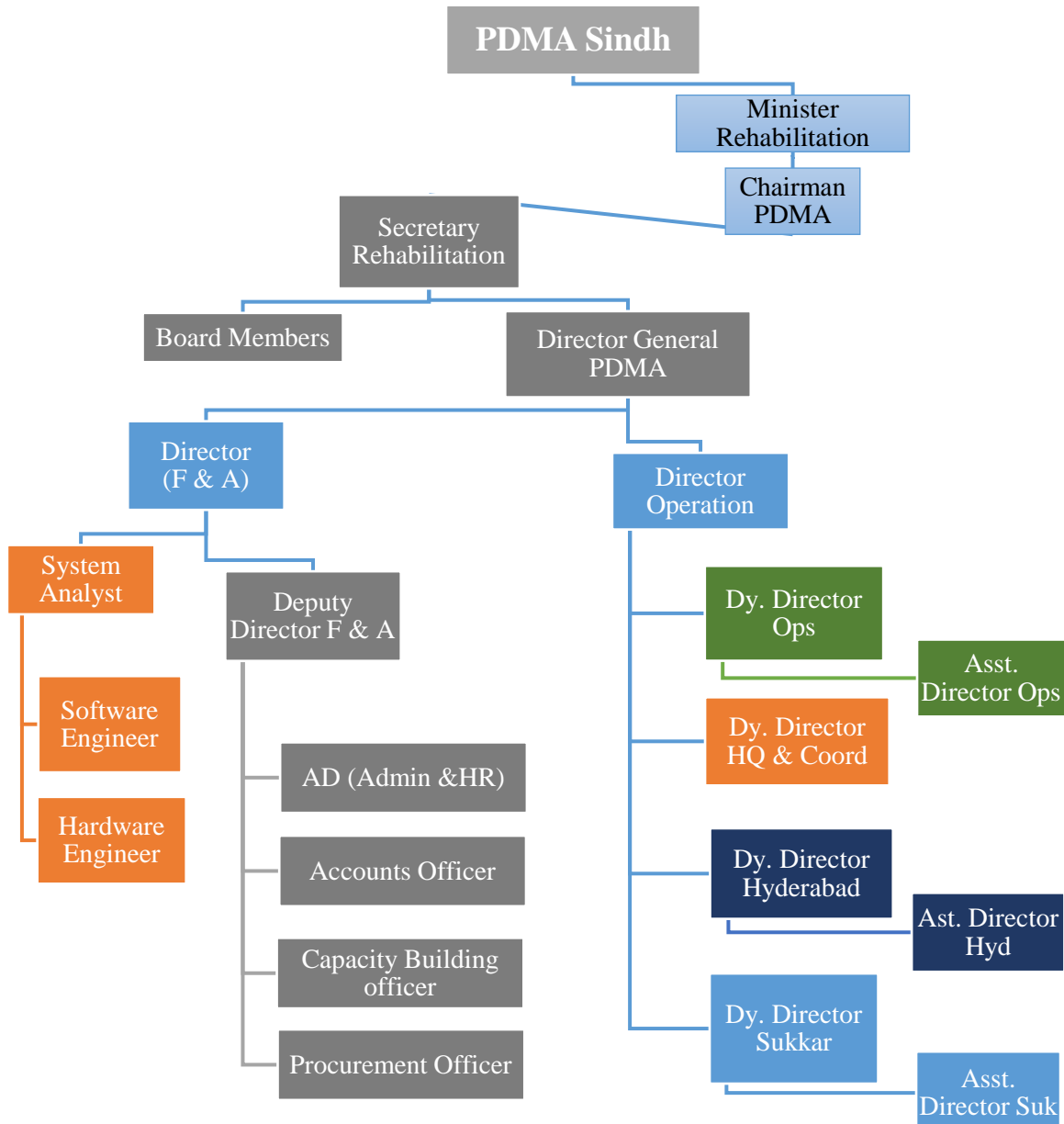
Provincial Disaster Management Authority (PDMA):

Each provincial government shall establish a Provincial Disaster Management Authority for the province. The Provincial Authority shall consist of such number of members as may be prescribed, and shall include as its Chairperson the Provincial Director General or Provincial Relief Commissioner. There shall be a Director General of the Provincial Authority, to be appointed by the Provincial Government.

Key powers and functions of the PDMA are:

- To formulate the Provincial Disaster Management Policy with the approval of the Provincial Commission.
- To coordinate and monitor the implementation of the National Policy, National Plan and Provincial Plan.
- To examine the vulnerability of different parts of the Province to various disasters, and specify prevention or mitigation measures.
- To lay down guidelines for Disaster Management Plans by the Provincial Departments and District Authorities.
- To evaluate preparedness at all Governmental or Non-Governmental levels to respond to disaster and to enhance preparedness.
- To coordinate response in the event of disaster.
- To give directions to any Provincial Department or Authority regarding actions to be taken in response to disaster.
- To promote general education, awareness and community training in this regard.
- To provide technical assistance or give advice to District authorities and local authorities.

- To advise the Provincial Government regarding financial matters in relation to disaster management.
- To ensure prescribed construction standards.
- To ensure that communication systems are in order and disaster management drills are being carried out regularly.
- To perform such other functions as may be assigned to it by the National or Provincial Authority.



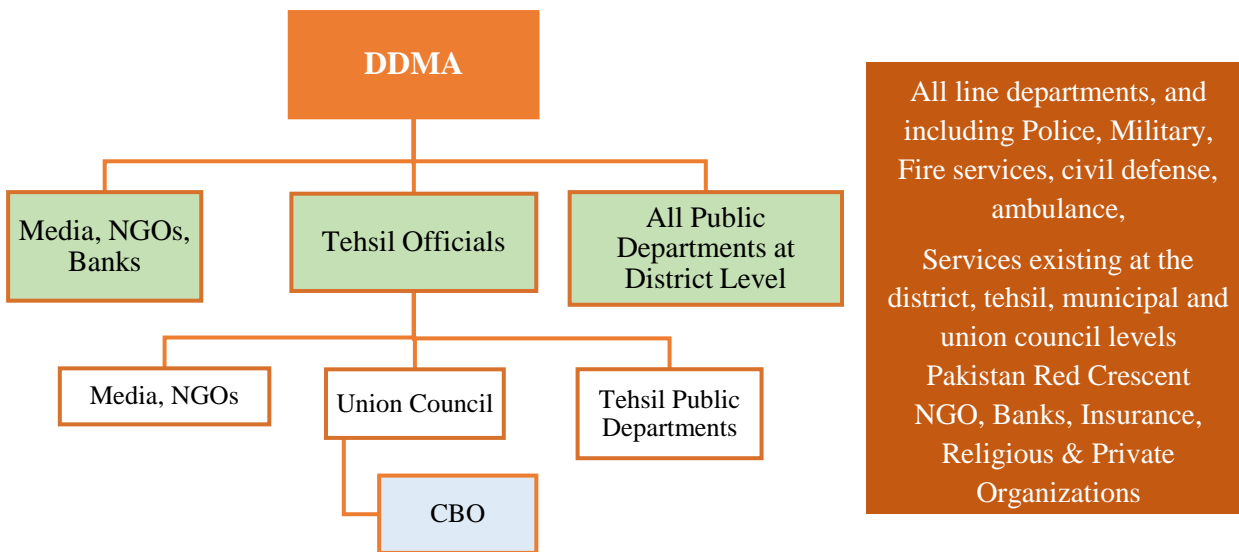
District Disaster Management Authority (DDMA):

District Disaster Management Authority (DDMA) will be headed by local council head at the district level (by whatever name called) as chairperson, ex-officio. Other members are the District Coordination Officer; the District Police Officer, ex-officio; the Executive District Officer Health; and such other district level officers, to be appointed by the District Government.

Key powers and functions of the DDMA are:

- Prepare a disaster management plan including district response plan for the province.
- Co-ordinate and monitor the implementation of the National Policy, Provincial Policy, National Plan, Provincial Plan and District Plan.
- Ensure that areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the Local Authorities.
- Ensure that the guidelines for prevention, mitigation, preparedness and response measures as laid down by NDMA and PDMA are followed by all departments of the government.
- Give directions to different authorities at the district level to take such other measures for the prevention and mitigation of disasters as may be necessary.
- Lay down guidelines for preparation of disaster management plans by the departments and local authorities in the district.
- Monitor the implementation of disaster management plans prepared by the departments of the Government at the district level.
- Organize, facilitate and coordinate specialized training and awareness programs of disaster prevention or mitigation in the district for community, different levels of officers, employees and voluntary rescue workers.
- Set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public.
- Prepare, review and update district level response plans and guidelines.
- Co-ordinate with, and give guidelines to local authorities in the district to ensure that pre-disaster and post-disaster management activities in the district are carried out promptly and effectively.
- Identify places and buildings which could in the event of a disaster situation, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places.
- Establish stockpiles of rescue and relief materials or ensure preparedness to make such materials available at a short notice.
- Provide information to the Provincial Authority relating to different aspects of disaster management.
- Ensure communication systems are in order and disaster management drills are carried out periodically.

- Perform such other functions as the Provincial Government or Provincial Authority may assign to it or as it deems necessary for disaster management in the district.



National Institute of Disaster Management (NIDM):

NIDM is tasked to develop training modules, undertake research and documentation in the field of Disaster Management, and organize training programs. The Institute will formulate and implement a comprehensive Human Resource Development Plan, covering all aspects of Disaster Management. The NIDM will also provide assistance in national and provincial level policy formulation in the field of Disaster Management.

NIDM will develop educational materials for Disaster Management including Academic and Professional Courses and will promote awareness among stakeholders, including College or School Teachers and Students, technical personnel and others associated with multi-hazard mitigation, preparedness and response measures.

National Disaster Response Force (NDRF):

The Ordinance allows NDMA to establish a National Disaster Response Force for the purpose of specialist response to a threatening situation or disaster. The Force shall be constituted in a prescribed manner and the terms and conditions of service of the members of the Force shall be laid down. The general superintendence, direction and control of the NDRF shall vest in the NDMA.

National Disaster Management Fund (NDMF):

Under Ordinance, the Federal Government has a provision to constitute a National Disaster Management Fund through Notification, for meeting any threatening situation or disaster.

The Fund shall be financed from the following sources, namely;

- Grants made by the Federal Government,

- Loans, aid and donations from the national or international agencies,
- Donations received from any other source.

NDMF shall be kept in one or more accounts maintained by the NDMA, in local or foreign currency, in any scheduled bank in Pakistan and shall be operated in accordance with the directions of the NDMA. The Fund shall be administered by the NDMA towards meeting the expenses for emergency preparedness, response, mitigation, relief and reconstruction.

Each Provincial Government shall establish a Provincial Disaster Management Fund. It shall be financed through grants made by the Federal Government/Provincial Governments; loans, aid and donations from the national / international agencies. This Fund shall be used for meeting the expenses for emergency preparedness, response, mitigation, relief and reconstruction in the Province.

Institutions/Public Departments Working on Disaster Management in Pakistan:

Phase	Agency
Mitigation and Prevention	Federal Flood Commission
	Provincial Irrigation Departments
	Water and Power Development Authority (WAPDA)/ Dams safety council
Preparedness and Response	Armed Forces
	Civil Defense
	Emergency Relief Cell
	Fire Services
	National Crisis Management Cell (NCMC)
	Pakistan Meteorological Department
	Police
	Provincial Communication and Works
	Provincial Food Departments
	Provincial Health Departments
	Provincial Relief Commissioners
	Provincial Agriculture and Livestock Departments
	Rescue 1122
	Space and Upper Atmospheric Research Commission (SUPARCO)
Recovery and Reconstruction	Earthquake Reconstruction and Rehabilitation Authority (ERRA)
	Provincial Irrigation Departments

Role of Public Department in Disaster:

Civil Defiance: Facilitates training on rescue and relief work and conduct search and rescue during a disaster situation.

Education: Develops curriculum for schools, colleges and universities on disaster risk reduction, particularly in hazard-prone areas; adds features in schools in hazard prone areas for use as emergency shelters such as facilities for water, sanitation and cooking.

Forestry: Undertakes vulnerability assessment, implement programs for conservation and rehabilitation of natural resources and develops mechanisms for assessment of environmental losses and damages in the aftermath of disasters.

Revenue: Allocates financial resources, based upon plans of the DDMA and other relevant ministries and departments for implementation of disaster risk management activities as part of the development plans.

Agriculture: Advises communities on crop diversification to deal with climate variations (e.g. producing drought resistant crops) & how to save crops, agricultural land and livestock in case a disaster occurs; provides inputs like seeds, fertilizers and agriculture equipment's to those affected by disasters.

Health: Stockpiles medical supplies and provide timely first aid and medical services and supplies to affected population.

Works and Services: Coordinates assessment of the extent of damages to roads and structures in the community and facilitate emergency repairs to restore public transport routes.

Information and Technology: Implements programs on awareness raising of vulnerable communities in high risk areas and develops a plan to ensure availability of communication services in case a disaster occurs.

School and Literacy: Conducts assessment to identify most vulnerable social groups in hazard prone areas and allocate funds for disaster preparedness and vulnerability reduction activities for the most vulnerable social groups.

Finance and Planning: Mobilizes resources of the district by coordinating with other departments in providing emergency assistance to affected population.

SESSION 5# KEY CONCEPTS RELATED TO CLIMATE CHANGE & DISASTER REDUCTION:



Time: 60 minutes



Content:

- Understanding and application of key concepts related to climate change and disaster reduction.



Objectives:

- Explaining key concepts and terminologies related to DRR.
- Explaining key concepts and terminologies related to Climate Change.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answer.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



Outcome:

- Knowledge and understanding of the participants will be enhanced on basic and key concepts of DRR and CC.
- Participants will learn about key terminologies used in DRR and CC.



References:

- Mainstreaming DRR & CCA into Development Process at Local Level by ADPC (2015)
- Training Manual DRM for Pakistan by ADPC
- NDMA & PDMA web sites
- National Disaster Management Plan (2012-2022) by NDMA
- Disaster Risk Management Plan- Sindh Province by PDMA
- <https://ec.europa.eu/clima/policies/>

Basic Terms and Concepts used in Disaster Reduction and Climate Change:

Crisis:

A crisis is any event that is, or is expected to lead to, an unstable and dangerous situation affecting an individual, group, community, or whole society. The management is required to take appropriate decisions and measures to manage the crisis properly because if not managed properly, it can lead to a disaster.

Disaster:

Serious disruption of the functioning of society, causing widespread human, material or environmental losses, which exceed the ability of the affected people to cope using their own resources.

Disaster Management:

Disaster Management is a collective term encompassing all aspects of planning for, preparing and responding to disasters and refers to the management of the consequences of disasters and includes all the pre and post disaster interventions.

Hazard:

A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Vulnerability:

Vulnerability means the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Types of Vulnerability:

- **Physical Vulnerability** Physical weakness or structural drawback that makes some buildings, assets or areas susceptible to damaging impacts of disasters.
- **Social Vulnerability** Conflicts among communities, lack of capacities, lack of knowledge, skill or preparedness or giving in attitude of the communities make them vulnerable to negative impacts of hazards.
- **Economic Vulnerability** Lack of economic resources or dependence on one source of livelihood because of which a community, or some part of it, becomes liable to damages in case of a disastrous event.
- **Environmental Vulnerability** Environmental degradation, deforestation or other environment related factors which makes the surrounding areas vulnerable to losses by possible disasters.

Exposure:

By exposure we mean, proximity or closeness of the people, property, systems, or other elements to the hazard zones that are thereby subject to potential losses in case of any disasters.

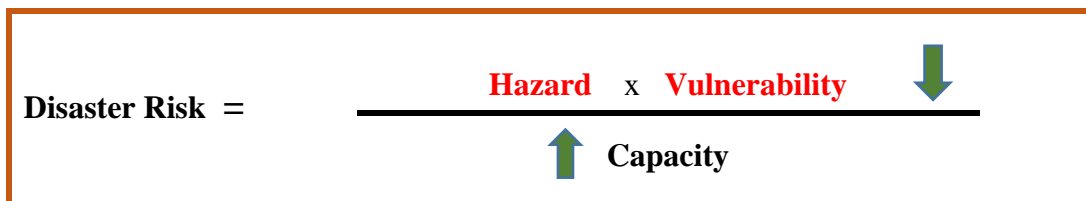
Capacity:

Capacity is the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals or to resist and fight the negative impacts of disastrous situation. Building capacities is the key to reducing vulnerabilities and constructing disaster resilient societies because coping capacity is the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

Disaster Risk:

The potential losses in lives, health status, livelihoods, assets and services, which could occur to a particular community or society over some specified future time period (UNISDR). The combination of the probability of an event to happen and its negative consequences determine the extent of disaster risk.

Components of Disaster Risk:

$$\text{Disaster Risk} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Capacity}}$$


Disaster Risk Management (DRM):

Disaster risk management (DRM) aims to avoid, reduce or transfer the adverse impacts of hazards on people, property and the environment through activities and measures. It is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.



Disaster Risk Reduction (DRR):

Disaster risk reduction is the preparation and application of policies, strategies and practices to minimize vulnerabilities and hence disaster risk throughout society. It is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Disaster Management Phases:

The whole spectrum of disaster management is generally divided into pre-disaster and post-disaster interventions. The post disaster activities are phased as per needs of the affected populations in accordance with international standards. These activities start with the immediate rescue and relief efforts to provide immediate respite to the affectees as per the estimates reached in rapid need assessment carried out soon after the disaster strikes. These activities are called response activities and protection of the vulnerable groups remains a vital consideration during this phase. In the recovery phase facilities, livelihoods and living conditions are improved to such a level that the stage is set for rehabilitation to begin and for their lives to be brought to normal. It is only when the disaster affectees are rehabilitated to a state of normalcy that the process of reconstruction starts wherein the cities, infrastructure, households and economies are built back better so that their vulnerabilities to a similar disaster in the future are reduced.



The pre-disaster interventions start with **Risk assessment** which include hazard, vulnerability, exposure and capacity or resource assessments in detail to gauge the extent of disaster risk, its possible damages, vulnerable populations and the capacity of and resources available with the communities to absorb the effects of disasters. This assessment serves as the basis for strategizing and prioritizing rest of the pre-disaster activities which include prevention and mitigation measures, awareness and capacity building of the people and disaster management practitioners to enhance their preparedness and resilience and finally establishing an effective **early warning system** to reduce the disaster risks. It is universally accepted that any investments on disaster risk reduction in the pre-disaster phase is more beneficial economically because the resultant saving in post-disaster phase is manifold. Hence, while the government and disaster management institutions remain prepared for any eventuality, their main focus is and should be on the pre-disaster activities to promote disaster resilient societies.

Early Warning System:

The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Mitigation:

All actions taken to minimize the extent of a disaster or potential disaster are called mitigation measures. These actions include physical or structural measures, non-structural interventions and steps to environmental upgradation.



Preparedness:

Disaster Preparedness involves specific measures taken before disasters strike. These methods include disaster forecasting, early warnings etc. The knowledge and capacities are developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.



Prevention:

Prevention Activities are the steps to avoid the adverse impact of hazards. These activities contain Capacity Building, Community Based Disaster Risk Management (CBDRM) etc.

Relief:

The provision of essential, appropriate and timely humanitarian assistance during or immediately after a **disaster** in order to save lives; reduces health impacts, ensure public safety and meet the basic survival needs of the people affected.



Recovery:

Recovery is an approach that means restoration and improvement (where appropriate) of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. It is a multi-dimensional process that begins in the early days of a humanitarian response.



Rehabilitation:

Rehabilitation is restoration of an entity to its normal or near-normal functional conditions after the occurrence of a disaster. It



includes Re-establishing essential services and Reviving key economic and social activities.

Reconstruction:

Permanent measures to repair or replace damaged dwellings and infrastructure and to set the economy back on course, is categorized as Reconstruction.



Resilience:

Resilience means the capacity to recover quickly from difficulties.

Disaster/Climate Resilience:

It is the ability of individuals, communities, organisations and states to adapt to, prepare for, respond to and recover from hazards, shocks or stresses without compromising long-term prospects for development.

Weather:

Weather describes the conditions outside right now in a specific place. It is the state of the atmosphere – its temperature, humidity, wind, rainfall and so on – over hours to weeks, e.g. rain, snow, wind, and storm etc.

Climate:

Climate describes the weather conditions that are expected in a region at a particular time of year, or the general weather conditions of a place over many years.

Climate Change:

Climate change describes a change in the average conditions of weather – such as temperature, humidity, wind, and snow/rainfall – in a region over a long period of time. It means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

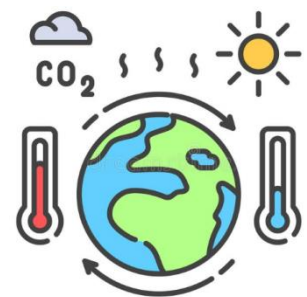


Emissions:

"Emissions" means the release of greenhouse gases into the atmosphere over a specified area and period of time. These are the substances that are emitted; in an energy sense, these are most often waste products of a process aimed at obtaining useful work. They are measured by their concentrations, or parts per million, in the atmosphere.

Greenhouse Gases:

These are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the



sunlight brings from leaving the atmosphere. The main greenhouse gases are water vapour and carbon dioxide etc.

Global Warming:

Global warming is the phenomenon of increasing average air temperatures near the surface of Earth over the past one to two centuries.

Climate Change Adaptation:

Climate change adaptation refers to actions that reduce the negative impact of climate change, means taking action to prepare for and adjust to both the current effects of climate change and the predicted impacts in the future.

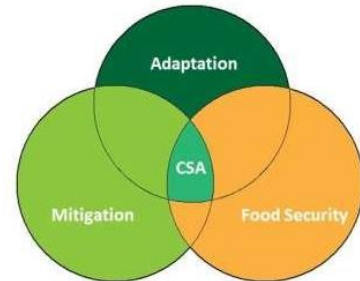


Environmental Protection:

It is the practice of **protecting** the **natural environment** by individuals, communities, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment and, where possible, to repair damage and reverse trends.

Climate-Smart Agriculture (CSA):

CSA is an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate.



SESSION 6# IMPORTANCE & PROCESS OF CBDRM:



Time: 45 minutes



Content:

- Introduction and Importance of CBDRM
- Nature and Indicators of Resilience Communities
- Essential feature and elements of CBDRM
- Principals of CBDRM



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answers.



Outcome:

- The participants will be able to understand about the basic concept of Community Based Disaster Risk Management (CBDRM)
- Participants will Learn principle and process of CBDRM



Objectives:

- Explaining the basic concept of Community Based Disaster Risk Management (CBDRM).
- Explaining essential features and elements of CBDRM.
- Explaining principals of CBDRM.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



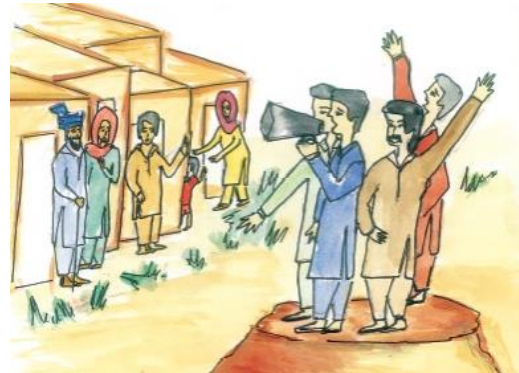
References:

- www.ndma.org.pk
- www.adpc.net
- www.adrc.asia
- USAID Tahafuz CBDRM Manual

Introduction and Importance of CBDRM:

Community-based disaster risk management (CBDRM) is a process in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. This means that people are at the heart of decision-making and implementation of disaster risk management activities. The involvement of most vulnerable social groups is considered as paramount in this process, while the support of the least vulnerable groups to them is necessary for successful implementation.

CBDRM builds safer communities, in which local people, particularly the most vulnerable, are aware of disaster risks and have capacity to protect themselves, families, properties, their life and production from negative effects of hazards. As a result, risks are reduced and hazards do not escalate into disasters.



In Pakistan, CBDRM was first introduced by some international NGOs in 2005 and has soon become popular for many disaster risk reduction projects and programs implemented by NGOs and government organizations. Especially, in the context of climate change worsening the complicated nature and severity of disasters, it is very critical for communities and development organizations to adopt innovative approaches like CBDRM.

The importance of involving members of targeted communities and their knowledge in the actions and discussions around risk reduction has become widely accepted. It is now time to implement programs that are truly participatory and that work towards fundamental empowerment of people and communities who are most at risk. The approach of the community based DRM is activities, measures, projects and programs to reduce disaster risks are primarily designed by people living in high risk communities, and are based on their urgent felt needs and capacities.

In Community-Based Disaster Risk Management (CBDRM), a community can be taken as a group that may share one or more things in common such as living in the same environment, similar disaster risk exposure, or having been affected by a disaster. Common problems, concerns and hopes regarding disaster risks may also be shared. However, people living in a community have different vulnerabilities and capacities, for example men and women. Some may be more vulnerable or more capable than others.

CBDRM Importance:

Community involvement is essential in the development process because nobody can understand local opportunities and constraints better than the local communities themselves who therefore need to be involved in the identification and resolution of disaster vulnerability issues. In

addition, nobody is more interested in understanding local affairs than the community whose survival and well-being is at stake. Therefore, the information should be generated in a manner and language that is understood by the community. There is growing evidence to show that most top-down disaster risk management and response programs fail to address specific local needs of vulnerable communities, ignore the potential of local resources and capacities, and may in some cases even increase people's vulnerability. As a result, a broad consensus has been reached among disaster risk management practitioners to put more emphasis on community-based disaster risk management programs. This means the vulnerable people themselves will be involved in planning and implementing disaster risk management measures along with local, provincial, and national entities through partnership.

Nature and Indicators of Resilience Communities

The Nature of Resilient Communities; A resilient community is one that has certain capacities in three phases;

Phase 1: The ability to absorb the shocks of hazard impact, so that they do not become disasters (thus to reduce the probability of failure),

Phase 2: The capacity to bounce back during and after disaster (thus to reduce the consequences of failure),

Phase 3: The opportunity for change and adaptation following a disaster (thus to reduce the time needed for recovery as well as patterns of vulnerability).

Characteristics of resilience before a disaster:

Societies anticipate and reduce disaster impact by adopting many approaches:

- using traditional experience and knowledge (coping mechanisms);
- preparing for any possible hazard by having emergency kits or supplies, (buffer stocks) ready for the event;
- having family or community disaster plans as well as adaptive behavior, strengthening houses, providing emergency protection of doors and windows from high winds, etc.);
- organizing training courses in first aid, etc.;
- temporary evacuation before an impending flood or cyclone or volcanic eruption;
- permanent relocation of the community away from unsafe sites

Characteristics of resilience during a Disaster:

Themes need to be addressed such as integrating recovery plans to link social, physical and economic recovery; following a disaster recovery plan; recognizing the importance of securing a prepared community who know what to do to recover; and taking actions to reduce future vulnerability. Societies cope during and after a disaster by:

- Drawing on the support of their community.

- Taking stock to determine what they have and what or who is missing.
- Restoring communications to facilitate aid distribution.
- Mitigating future risks (both psychological as well as material threats).
- Recognizing that physical recovery work can combine bereavement therapy with a possible income source.
- Regarding the entire experience as a learning process.

Characteristics of resilience after a Disaster:

The following concerns need to be addressed during the recovery process; together they will build far more resilient communities:

- Devise a community recovery plan that links social, physical, economic and environmental recovery.
- Regard physical recovery work as bereavement therapy and a possible income.
- Source and the entire reconstruction experience as a learning process.
- Draw on support of their community by being adaptable, flexible and patient.
- Where possible ensure that there is a local purchase or reconstruction goods using.
- Local labor to re-vitalize the damaged local economy.
- Recognize the value of a prepared community who know what to do to recover.
- Take actions to reduce future vulnerability as the recovery proceeds.

Essential Features of CBDRM:

Involvement and community participation are used interchangeably, which means that the community takes responsibility for all stages of the program including both planning and implementation. Experiences in the implementation of CBDRM point to the following essential features:

- **Community should be at center of DRM:** The focus of attention in disaster risk management is the local community. The CBDRM approach recognizes that the local people are capable of initiating and sustaining their own development. Responsibility for change rests with those living in the local community.
- **Aim is Disaster risk reduction (DRR):** The main strategy is to enhance capacities and resources of most vulnerable groups and to reduce their vulnerability in order to avoid the occurrence of disasters in future.
- **Link between DRM and development process:** CBDRM should lead to general improvement in people's quality of life and the natural environment. The approach assumes that addressing the root causes of disasters, e.g. poverty, discrimination and

marginalization, poor governance and bad political and economic management would contribute towards the overall improvement in the quality of life and environment.

- **Key resource for DRM is community:** The community is the key actor as well as the primary beneficiary of the disaster risk management process.
- **Application of multi-sectoral and multi-disciplinary approaches:** CBDRM brings together the many local community and even national stakeholders for disaster risk management to expand its resource base.
- **CBDRM as an evolving and dynamic framework:** Lessons learned from practice continue to build into the theory of CBDRM. The sharing of experiences, methodologies and tools by communities and CBDRM practitioners continues to enrich practice.
- **CBDRM recognizes that different people have different perceptions of risk:** Specifically, men and women who may have different understanding and experience in coping with risk also may have a different perception of risk and therefore may have different views on how to reduce the risks. It is important to recognize these differences.
- **Various community members and groups have different vulnerabilities and capacities:** Different individuals, families and groups in the community have different vulnerabilities and capacities. These are determined by age, gender, class, occupation (sources of livelihoods), ethnicity, language, religion and physical location.

Elements of CBDRM:

- **Local people are capable of initiating and sustaining** – their own community development While role of local government, private sector and NGOs is important, the primary requirement for grassroots development is with local leadership.
- **People's participation** – community as the main actor and propeller; directly shares the benefits of risk reduction and development.
- **Priority for the most vulnerable** – children, women, elderly, farmers and fisher folk, urban poor.
- **Recognizes existing capacities** – and survival/coping strategies.
- **Risk reduction measures are community specific** – based on analysis of the community's disaster risk.
- **Aim of CBDRM** – reduce vulnerabilities and increase capacities.
- **Goal** – building safe, disaster resilient and developed communities.
- **A successful bottom-up** – strategy will include broad-based local participation in comprehensive planning and decision-making activities that promote motivation.
- **Educational opportunities** – should correspond to identify local needs.

- **Emphasis is on improving** – the utilization and management of local resources.
- **Responsible utilization** – of outside financial assistance is required.
- **Replication of a community's success** – is a powerful factor in continuing local initiative.

Process of CBDRM:

- Initiating the process** – selecting the community or community asks for assistance how to have CBDM; building rapport.
- Community profiling** – initial understanding of the community situation and an orientation on CBDRM.
- Community risk assessment** – hazards, vulnerabilities and capacities assessment and consideration of people's different perceptions of risks.
- Community disaster (risk) management plan** – appropriate and do-able measures before, during and after the disaster; focus on prevention, mitigation and preparedness measures;
- Short, medium, and long-term** disaster management activities.
- Organizing & strengthening community DRM organization** – ensures implementation of Community Disaster Management Plan.
- Community managed implementation** – implementation of short, medium, and long-term measures to reduce vulnerability and increase capacity; structural and non-structural measures.

Core Principles of CBDRM:

- The centrality of the role of the community in CBDRM
- Priority should be given to the most vulnerable people.
- Recognition of different perceptions of risks, vulnerabilities and capacities.
- Application of multi-sectoral and multidisciplinary approaches.
- Integration of disaster risk management into local development processes.
- CBDRM as an evolving and dynamic framework.
- Disaster risk reduction is the highest aim.
- CBDRM takes into account global emerging issues, such as climate change, and epidemics.

SESSION 7# GENDER AND DISASTERS:



Time: 45 minutes



Content:

- Disproportionate impact of climate change on gender.
- Women's role in agriculture and food security.



Objectives:

- Explaining the basic concept of gender.
- Briefly explain the impact of climate change and disaster on gender.
- Brief overview of women role in DRR, agriculture and food security.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question Answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



Outcome:

- The participants will be able to understand about the basic concept of gender and disaster.
- Participants will learn impact of climate change and disaster on gender.
- Participants will be able to understand the women role in DRR, agriculture and food security.



References:

- <https://www.gfdr.org/en/gender>
- Climate change profile of Pakistan by ADB
- Training manual DRM for Pakistan-ADPC
- https://en.wikipedia.org/wiki/Climate_change_and_gender
- NDMA guidelines on vulnerable groups.

Disasters often affect women, girls, men and boys differently due to gender inequalities caused by socioeconomic conditions, cultural beliefs, and traditional practices that repeatedly have put females at a disadvantage. Understanding different gender roles, responsibilities, needs, and capacities to identify, reduce, prepare and respond to disasters are critical to effective disaster risk management (DRM).

Gender-responsive DRM refers to analysing how gender differences and gaps -- in terms of access to political, economic, and social resources -- affect women and men's resilience to natural hazards; planning concrete actions to address those differences/gaps to reduce underlying vulnerabilities; and assessing the impacts of those actions. Significant evidence shows that despite gender-differentiated vulnerabilities, women and girls are also powerful agents of positive change during and after disasters. Women empowerment is therefore an important approach to build broader community resilience and contribute to sustainable development.

Women, girls, boys and men belonging to different age and socio-economic strata have distinct vulnerabilities, and this shapes the way they experience disaster, and their ability to recover from it. In countries where gender discrimination is tolerated, women and girls are particularly vulnerable to natural hazards. Not only is the percentage of women and girls who die higher in these countries, but the incidence of gender-based violence – including rape, human trafficking and domestic abuse – is also known to increase exponentially during and after disasters. Most disasters place an undue burden on women and girls who are responsible for unpaid work such as providing care, water and food for households. Agricultural work, often performed by women, is especially subject to many types of hazards. Following are two most common examples of gendered effects of disaster;

- **Different numbers of death between men and women:**

A study by the London School of Economics found that, in natural disasters in 141 countries, gender differences in deaths correlated to women's economic and social rights in those countries. Due to their social standing, women in developing countries are not generally taught survival skills like swimming or climbing, meaning they are more likely to die in a natural disaster. When women have fewer rights and less power in society, more of them die due to climate change, but when there are equal rights for all groups, death rates are more equally matched.

- **Sexual abuse and disease transmission:**

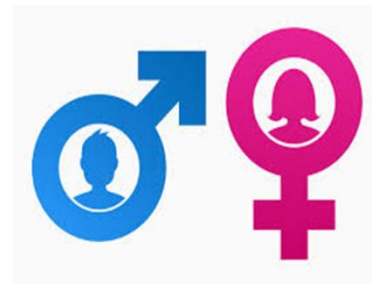
Natural disasters disrupt daily routines and complicate gender and family roles, which can cause victims of disasters to feel powerless and frustrated. These feelings often result in aggression against less powerful groups. Women and children in developed and developing countries are at higher risk of sexual abuse during and after natural disasters than before. Cases of child marriage and sex trafficking have risen and ongoing stress caused by COVID-19, affecting the lives of young girls. Combined with the accelerated spread of diseases and infections in developing countries, the breakdown of the social order and the malnourishment that sometimes accompanies climate change have led to higher rates of dengue fever, malaria, infectious diseases i.e. HIV, HBV and HCV

especially for women. Elderly women are also particularly at risk during natural disasters and times of crisis because they are more susceptible to climatically-induced health risks like disease and because they are often isolated from social support to which men and some younger women have access.

Yet, the same destructive forces of disasters also create opportunities for women as agents of change. Disasters can also provide an opportunity to redress gender disparities. For example, during the recovery period following a disaster, longstanding biases against women can be challenged by programs; that are sensitive to their needs and that involve them as equal partners in recovery work. However, if women and girls are left out of planning for disaster response or risk reduction measures, the special talents, skills and knowledge of 50 percent of the population are not capitalized upon and the needs of the most affected are unlikely to be met.

Key Definitions:

Gender: In common usage, the word gender often refers to the sexual distinction between male and female. Gender is the set of relations between and among men and women in different societies based on socially constructed roles, behaviors considered appropriate for men and women. In simple words, gender refers to the set of relationships between men and women



at a particular point of time in a given society. While discussing gender, we generally refer to the social differences and relations between men and women, which are learned and transformed. The term gender does not replace the term sex, which refers exclusively to biological differences between men and women. The following are the broad differences between gender and sex for a clear understanding in the subsequent analysis.

Gender	Sex
<ul style="list-style-type: none"> ○ Socially constructed ○ Differs between and within cultures ○ Includes variables identifying differences in roles responsibilities, opportunities, needs and constraints ○ Can be changed 	<ul style="list-style-type: none"> ○ Biologically defined ○ Determined by birth ○ Universal ○ Unchanging

Vulnerable Groups:

- Person or a group having less or no coping capacity to respond to a certain hazardous phenomenon. In local context these includes, women, children, disabled and elderly persons.
- Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments.

Heterogeneous Vulnerable Groups:

- Those groups whose needs do display many similarities but are divergent as well e.g. children, older people and person with disabilities.

Gender Equality:

Gender equality implies equality between women and men or gender equality promoting the equal participation of women and men in making decisions. Empowering or supporting women and girls so that they can fully exercise their rights; and reducing the gap between women's and men's access to and control of resources and the benefits of development is still out of reach for most women worldwide.

In disaster management, the gender equality means their equal participation in all the spheres of disaster management. Their needs being specific must be kept in mind while planning and exestuation part if equitable and sustainable progress is to be achieved, women's status must be improved, their rights must be respected, and their contributions must be recognized.

Gender Equity:

It refers to fairness of treatment for women and men according to their respective needs. This may include equal treatment, or treatment that is different but considered equivalent. For example, specific outreach strategies may be developed to ensure that relief assistance reaches female-headed households in societies where the mobility of women is restricted. Likewise, general distribution centers may be created or certain livelihood recovery activities may be designed and implemented specifically by and for women.

Gender Mainstreaming:

Is a strategy for making women's as well as men's concerns and experience an integral dimension of the design, implementation, monitoring and evaluation of policies and programs on all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality.

Climate Change and its impacts:

Climate change refers to short, medium and long term changes in weather patterns and temperature that are predicted to happen, or are already happening because of anthropogenic emissions of greenhouse gases such as carbon dioxide. These changes include a higher frequency of extreme weather events such as drought and floods, as well as greater unpredictability and variability in the seasons and in rainfall. Overlying this increased variability are expected longer-term changes, such as temperature and sea-level rises, and lower (or in some cases higher) rainfall.

Disproportionate Impact of Climate Change on Gender:

Climate Change and Gender:

It is a way to interpret the disparate impacts of climate change on men and women, based on the social construction of gender roles and relations.

Climate change increases gender inequality, reduces women's ability to be financially independent, and has an overall negative impact on the social and political rights of women, especially in economies that are heavily based on agriculture. In many cases, gender inequality means that women are more vulnerable to the negative effects of climate change. This is due to gender roles, particularly in the developing world, which means that women are often dependent on the natural environment for subsistence and income. By further limiting women's already constrained access to physical, social, political, and fiscal resources, climate change often burdens women more than men and can magnify existing gender inequality.

Gender-based differences have also been identified in relation to awareness, causation and response to climate change, and many countries have developed and implemented gender-based climate change strategies and action plans.

Gender differences in contributions to climate change:

Contribution to climate change - through emissions of greenhouse gases - is correlated to gender. A study on car use in Sweden, for example, found that men are likely to use the car more, for longer distances and alone compared to women, thereby emitting more CO₂ (a greenhouse gas).

Gender differences in vulnerability to climate change:

As the planet warms and access to water changes, the agriculture/crop yields tend to decrease. These effects are not uniform, and they have the largest impact on areas of the world where the economy depends on agriculture and the climate is sensitive to change. In developing countries, women are often in charge of obtaining water, firewood, and other resources for their families, but these resources are directly impacted by climate change, meaning women must travel further and work longer to access them during crisis. Climate change increases burdens placed on women by society and further limits their access to education and employment.

Strong gender norms around roles and access to resources in semi-arid regions often confine women-led businesses to climate-exposed sectors, particularly agriculture, but also limit the options women have to build resilience within their businesses. Despite these limitations and the need to addressing inequalities, women entrepreneurs can harness significant adaptive capacity and take advantage of new opportunities.

Increased inequalities through climate change:

The IPCC Fifth Assessment Report concludes that there is 'robust evidence' for an increase of gender inequalities as a result of weather events as well as for the perpetuation of differential vulnerabilities. The increase of inequalities due to climate change can have several reasons. For example, girls often face more serious risks than boys due to unequal distribution of scarce

resources within the household. This effect is amplified by climate change induced resource scarcity.

Furthermore, climate change often results in an increase of out-migration of men. This leaves women with an increased work-load at home, resulting in a feminization of responsibilities. Climate change is predicted to increase frequency and magnitude of natural hazards such as extreme heat. During and after these hazards especially women are burdened with increased care work for children, the sick and old, adding furthermore to already significant amount of household duties. Women also tend to donate their food in times of food scarcity, leaving them more vulnerable to health, social and psychological damages

Women's role in agriculture and food security:

Women produce between 60 and 80 per cent of the food in most developing countries and are responsible for half of the world's food production, yet their key role as food producers and providers and their critical contribution to household food security is only recently becoming recognised.

The major constraint to the effective recognition of women's actual roles and responsibilities in agriculture is the scarcity of gender desegregated data available to technicians, planners, and policy-makers. Therefore, the first step towards women's empowerment and full participation in rural development and food security strategies is the collection and analysis of gender desegregated data to understand role differences; in food and cash crop production as well as men's and women's differential managerial and financial control over production, storage and marketing of agricultural products. In many countries women are also responsible for fishing in shallow waters and in coastal lagoons, producing secondary crops, gathering food and firewood, processing, storing and preparing family food and for fetching water for the family.

A UN Food Agriculture Organization report shows that women farmers will be more affected by food insecurity due to climate change. Even though they represent 43% of farmers in developing countries, female farmers find it hard to compete with men farmers. This is due to their responsibility to be present at home, and their limitations to market credit access. In addition to that, women do not usually invest more money in sectors that might increase agriculture productivity. An FAO report on Women and Agriculture reported, "The obstacles that confront women farmers mean that they achieve lower yields than their male counterparts. Yet women are as good at farming as men. Solid empirical evidence shows that if women farmers used the same level of resources as men on the land they farm, they would achieve the same yield levels.

FAO studies confirm that while women are the mainstay of small-scale agriculture, farm labour force and day-to-day family subsistence, they have more difficulties than men in gaining access to resources such as land and credit and productivity enhancing inputs and services.

Food security' in fact, has been defined by the FAO not only in terms of access to, and availability of food, but also in terms of resource distribution to produce food and purchasing power to buy food where it is not produced. Given women's crucial role in food production and

provision, any set of strategies for sustainable food security must address their limited access to productive resources security must address their limited access to productive resources.

Women's limited access to resources and their insufficient purchasing power are products of a series of interrelated social, economic and cultural factors that force them into a subordinate role, to the detriment of their own development and that of society as a whole.

The four dimension of food security from a gender perspective:

1. **Availability:** - Inequalities in ownership of, access to and control of livelihoods assets negatively affect women's food production and food security. Tenure insecurity for women results in lower investment and potential environmental degradation. It compromises future production potential, increases food insecurity, and reduces women's income and the availability of food.
2. **Stability:** - Differences in risk and vulnerability between men and women can affect the stability of their food security in different ways. During times of crisis, women and girls are often forced to reduce their intake in favour of other household members. In cases of crop failure or natural disasters, cultural traditions make it easier for men to leave their farm in search for employment elsewhere, leaving women behind to struggle for feeding their families and making ends meet.
3. **Utilization:** - Women's role in food utilization for food security is perhaps the most critical and outweighs the importance of their role in food production and how they spend the income, they earn. Women are typically responsible for food preparation and thus are crucial to the dietary diversity of their households.
4. **Access:** - Access to food within the household is determined by cultural practices and power relationships within the family. Although food may be available, adequate amounts to maintain nutritional intake may not necessarily be as accessible to women compared to men.

Hence, securing women's human rights is a key strategy in assuring food security for all. Women are involved in a variety of agricultural operations such as crops, livestock and fish farming. They produce food and cash crops at subsistence and commercial levels. At community level, women undertake a range of activities that support natural resource management and agricultural development, such as soil and water conservation, afforestation and crop domestication.

Women often have unique perspectives on, as well as understanding of local biodiversity importance for the development of adapted and improved varieties. Also for dietary diversity, women have a decisive role. Poor households headed by women often succeed in providing more nutritional food for their children than those headed by men. There is a strong correlation between a higher level of gender equality and lower level of child mortality.

Cultural traditions and social structures often mean that women are more affected by hunger and poverty than men are even though women, and in particular expectant and nursing mothers, often need special or increased intake of food. Too often, child hunger is inherited: a mother who is stunted or underweight due to an inadequate diet often give birth to low birth weight children.

SESSION 8# PARTICIPATORY RISK ASSESSMENT:



Time: 135 minutes



Content:

- Introduction to Participatory Risk Assessment.
- Risk Identification.
- Hazard Vulnerability Capacity and Risk Assessment (HVCRA) by Village committees.
- Risk Mapping by Village committees.
- Historical Profile of Disaster.
- Preparation of Seasonal Calendar.
- Vulnerability Assessment by Village committees.
- Capacity Assessment by Village committees.



Method:

PPT Presentation, Brainstorming, Group Activities, Discussion, Constant Interaction with participants, and Question Answers.



Outcome:

- The participants will have clear understanding about the basic concepts and approaches related to Participatory Risk Assessment



Objectives:

- Explaining the basic concept and approaches of Participatory Risk Assessment at Village level.
- Explaining the Hazard Vulnerability Capacity and Risk Assessment (HVCRA).



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers, Charts, Format related to Risk Assessment/ Mapping etc.



References:

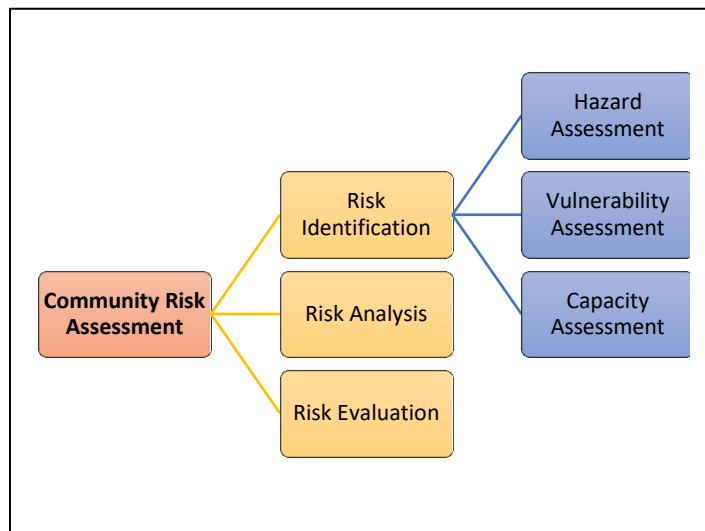
- USAID Tahafuz CBDRM Manual
- www.adpc.net
- www.ndma.org.pk
- www.unisdr.org

Introduction to Participatory Risk Assessment:

The risk assessment is a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing vulnerabilities that together could harm exposed people, property, services, livelihoods and the environment. The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period is known as disaster risk, this could be defined as;

$$\text{Disaster Risk} = (\text{Hazard} \times \text{Vulnerability}) / \text{Capacity}$$

The participatory risk assessment is a participatory process of determining the nature, scope and magnitude of negative effects of hazards to the community and its households within an anticipated time. It determines the likely negative effects on elements at risk' (people; household and community structures, facilities like schools and hospitals; livelihood and economic activities, jobs, equipment, crops, livestock etc.; lifelines, access roads and bridges) and why particular households and groups are vulnerable to specific hazards and others are not. The coping mechanisms and the resources present in the community are also identified.



Participation of community members is an essential component of community risk assessment, which determines the methodologies and tools to be used. CRA combines both scientific and empirical data concerning known hazards and other possible threats to the community. Although indigenous knowledge is vital, but scientific data is especially important in a situation when the community has not yet experienced the hazard. Community Risk Assessment expresses the possibility of suffering from a hazard that can cause death, injury, disease, economic loss or environmental damage. Community Risk Assessment has three interrelated steps as follows:

- 1. Risk Identification**
- 2. Risk Analysis**
- 3. Risk Evaluation**

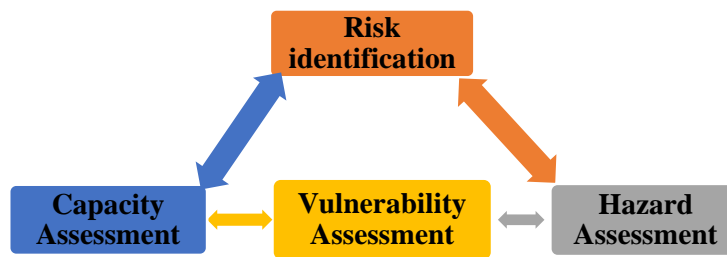
1. Risk Identification:

It includes the hazard and vulnerability assessments. Hazard assessment includes identification of the nature and behavior of the hazards the community is exposed to. Sources of threat as well as level of likelihood of its occurrence are also identified. The vulnerability assessment identifies what elements are at risk and why they are at risk (the reasons for their vulnerability). The

capacities of the community are also identified in order to determine their ability to deal with the potential risks. Risk can be identified using following assessments;

- A. Hazard assessment,
- B. Vulnerability assessment
- C. Capacity Assessment

Hazard, vulnerability and Capacity assessment also known as components of risk assessment, following are the details of each component.



A. Hazard Assessment: The process of studying the nature of hazards determining its essential features including degree of severity, duration, extent of the impact area called Hazard Assessment. Hazard assessment is concerned with the properties of the hazards or threats. Hazard analysis consists of assessing the frequency (in the past) or probability (in the future) of a hazard and the magnitude (or extent) of it such as flood levels, duration of dry days in case of drought, velocity and speed of storms, height of tidal waves, and so on. For undertaking a hazard analysis, possible sources of information include national and local government and related institutions, meteorological institutions, disaster-related institutions (e.g. disaster management committees), NGOs, etc. Other important sources are the local people who often know very small patches of land that have been differently affected by previous hazards. Discussions with village representatives and elders are useful, as well as walking around together in the village to record and map past hazards and damages. Looking at climate change, it is most likely that hazards will increase, in terms of both probability and magnitude. For an analysis of hazards, information must include location, **probability of occurrence (frequency)**, and **magnitude/extent**.

Probability of Occurrence (frequency) describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. For instance, flood frequency analysis uses historical records of peak flows to produce guidance about the expected behavior of future flooding. To be able to analyze the frequency of hazards, the question to ask is “How often do floods occur in the given area?”

Magnitude/Extent describes the strength or force of an event. Only occurrences exceeding some defined level of magnitude are considered extreme, disastrous, or even hazardous. In the case of floods, for example, magnitude is often described as the maximum height of floodwaters above average sea level, flood stage, or simply above ground. For seismic

events, magnitude describes the total energy released by the earthquake; for a rock fall it is the volume of material expected from a rock fall.

The formula for calculating the hazard risk value:

[Probability (Frequency) + Magnitude (Extent)] / 2 = Hazard risk value

Types and Classification of Hazards:

Hazards are generally of three types, physical hazards, chemical hazards and biological hazards and can be further classified as following:

- **Natural Hazards**
 - Hydro Meteorological Hazards
 - Geological Hazards
 - Biological Hazards
- **Environmental Hazards**
- **Technological Hazards**

To understand the nature and behavior of hazards we need to identify:

- i) **Force:** wind, water (rain, flood, overflow, run-off, flashflood, tidal wave, storm surge, epidemic), land (slides, deposits by river, lahar, mudflow), fire (forest fire, settlement fire), seismic (earthquake, tsunami, liquefaction), conflicts (civil war, insurgency, other actions leading to displacement and refugees), industrial/technological (pollution, radio-activity, explosions), other human-related (famine, drought, pests, etc.)
- ii) **Warning signs and signals:** scientific and indigenous indicators that a hazard is likely to happen.
- iii) **Forewarning:** time between warning and impact.
- iv) **Speed of onset:** rapidity of arrival and impact. We can distinguish between hazards that occur without almost any warning (earthquake) and hazards that can be predicted three to four days in advance (typhoon) to very slow-onset hazards like drought and famine.
- v) **Frequency:** does hazard occur seasonally, yearly, once every 10 years, once in a lifetime, etc.
- vi) **When:** does hazard occur at a particular time of the year (wet or dry season; in November to December?
- vii) **Duration:** how long is hazard felt (earthquake and aftershocks; days/weeks/ months that area is flooded; length of period of military operations).

The Hazard Matrix helps us to systematize information regarding the properties of the community's hazard exposure.

Sample Hazard Matrix							
Hazard Type	Force	Warning sign	Forewarning	Speed Of Onset	Frequency	When	Duration
Flood	Water volume	Monsoon Sudden rise in Temp.	weather forecasting, water level situation in Dams	Rapid onset	Seasonal/ Annual		Weeks
Epidemic	Pathogenic vectors/ microbes	Monsoon flooding Disease outbreak	Water contamination sewerage Pollution of water channels	Rapid onset	seasonal		months
Drought	Non availability of water, no vegetation	Rainfall deficit over long time period	Ground water level & soil fertility deplete	Gradual/ slow onset	3-4 year		years
Earth quake	Movement shakes	Indigenous Animal behavior Cyclic reoccurrence Sounds/ whistling from ground	Highly Rapid/ no forewarning	Highly Rapid/ no forewarning	Not established		Seconds

The important information that required while doing hazard assessment is;

- Understanding of factors that create, result in a hazard.
- Historic reports on past incidence of hazards, in particular the location, frequency, severity, duration of the events.
- Scientifics studies/Maps, long term monitoring.

Several other tools can help in hazard assessment process. The most commonly used **Hazard Assessment Tools** are the following:

- 1) **Hazard Mapping:** drawn to locate the probable area covered by a hazard's impact and the elements at risk.
- 2) **Historical Profile or Time Line:** can make us understand how hazards have changed over time, which hazards have happened in the past; or the start of particular hazard occurrence.
- 3) **Seasonal Calendar:** visualizes the time, frequency and duration of common hazards.

- Areas where merged hazards overlap in space and time are displayed in a hatching pattern to indicate that more than one hazard is defined for that area/time and a higher score is given.

2) Historical Profile:

- **What:** Gathering information about what happened in the past.
- **Why:** To get insight into past hazards, changes in their nature, intensity and behavior, to understand present situation into community (causal link between hazards and vulnerabilities) to make people aware of changes.
- **When:** At initial phases.
- **How:** Plan a group discussion and ensure that key-informants (old people, leaders, & teachers) are present. Invite as much people as possible, especially the young ones, for them to hear the history of their community. Ask people if they can recall major events in the community, such as:
 - Major hazards and their effects,
 - Changes in land use (crops, forest cover, etc.)
 - Changes in land tenure.
 - Changes in food security and nutrition.
 - Changes in administration and organization major political events.

(Format Historical Profiling)

Year	Location	Disaster	Impacts	Secondary hazards	Intensity
2012	Kashmor	Flood	Loss of Human life, Houses and crops destroyed.	Epidemics	High

3) Seasonal Calendar:

- **What:** Making a calendar showing different events, experiences, activities, conditions throughout the annual cycle.
- **Why:** Identify periods of stress, hazards, diseases, hunger, debt, vulnerability, etc.
 - Identify what people do in these periods, how they diversify sources of livelihood, when do they have savings, when do they have time for community activities, what are their coping strategies.
 - Identify gender specific division of work, in times of disasters and in normal times.
- **Who:** Village Committee members, project team and community members; have separate sessions for men and women if required.

- **How:** Use board or chart paper. Mark months of the year on the horizontal axis on top. Ask people to list sources of livelihood, events, conditions, etc., and arrange these along the vertical axis. Ask people to enumerate all the work they do (e.g. planting, weeding, etc.) for each source of livelihood / income by marking months and duration, adding gender and age.

Seasonal Calendar Sindh, Pakistan

Sr No.	Activity/ Event	Months												Explanation
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Rainy & Dry Seasonal													 Sunshine Rainy
2	Strong Wind													 Wind
3	Planting Season													 Planting
4	Harvest Season													 Harvest
5	Hunger Season													 Hunger
6	Landslide Season													 Landslides
7	Flood Season													 Flood
8	Drought Season													 Drought
9	Disease Season													 Disease
10	Pest Season													 Pest
11	Religious Activities													 Mosque Church
12	Selling of Crops													 Crop Selling
13	Construction of Houses													 Construction

B. Vulnerability Assessment: Vulnerability refers to conditions (social, political, economic, and environmental, etc.) that affect the ability and capacity of a community to prepare for and responds to disasters effectively. Vulnerability Assessment is the process of estimating the susceptibility of ‘elements at risk’ to various hazards and analyzing the causes behind their vulnerability. The assessment takes into account the physical, geographical, economic, social, political and psychological factors, which make some people more vulnerable to the dangers of a given hazard while others are relatively protected. People may differ in their exposure to risk as a result of their age, class, gender, ethnicity, identity, and other factors. Addressing such vulnerabilities forms the basis of the vulnerability analysis.

The formula for calculating the vulnerability value (using again a score between 1 and 3 for each parameter) is as follows:

$$[\text{Exposure} + \text{Fragility} + \text{Lack of Resilience}] / 3 = \text{Vulnerability Value}$$

Exposure: It is fundamental to know that the severity of the impacts of disasters depends strongly on the level of exposure. It refers to the elements at risk from a natural or man-made hazard event. This could include: individuals; dwellings or households and communities; buildings and structures; public facilities and infrastructure assets; agricultural commodities; environmental assets; and business activity. Collect exposure information about the location, characteristics and attributes of each of the elements and about what is at risk. This information will identify what elements at risk are in the location, and enough information about each of the elements to help understand how they are likely to behave when subjected to natural or man-made hazard.

Fragility: It is crucial to recognize that while some risks are inherent, some exist or can be created within socioeconomic systems. Although there is no worldwide blueprint for choosing the right indicators, socioeconomic and cultural fragility may be represented by indicators such as poverty, lack of personal safety, dependency, illiteracy, income inequality, unemployment, inflation, debt, environmental deterioration, and so on. There is a need to standardize objective and quantifiable socio-economic indicators that can be applied by the assessment team. These indicators reflect relative weaknesses that increase the direct impacts of dangerous phenomena.. During the vulnerability assessment it is important to clearly describe which indicators will be used and for what reason. For the assessment of socio-economic and cultural weakness, possible indicators are:

- Household assets (e.g. having a vehicle, bicycle or washing machine),
- Sources of income (e.g. agricultural output, salary, off-farm income),
- Access to productive resources (e.g. size of arable land),
- Household composition (e.g. women headed household, ratio of working adults to family members, presence of elderly or handicapped)
- Situation of infrastructure/Access to basic services

Lack of resilience/capacity of a household or community refers to the inability to recover from a disaster, and is inversely proportional to variables that measure human development, human capital, economic redistribution, governance, financial protection, community awareness, the degree of preparedness to face crises, and environmental protection. Possible indicators for lack of resilience are:

- Education level of family members/head of family
- Availability of neighborhood support systems (or extended family systems)
- Percentage of family labor force compared to total number of family members.

How to do vulnerability assessment:

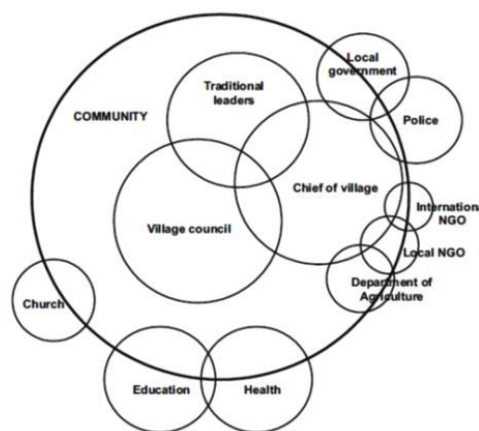
In contrast to the hazard analysis, vulnerability analysis usually covers individual households. The assessment is done by individual interviews with representatives of households. Households that are not affected by hazards under investigation do not need to be included in this analysis (because where there is no hazard there is no disaster). If the social, economic and cultural situation in one community is rather homogeneous and if the purpose of the assessment is to conduct a rapid appraisal, families can be clustered for group

interviews. Specific local patterns of vulnerability are identified, including vital links between root causes, pressures and unsafe conditions. Unsafe conditions revealed in this process become targets for action in CBDRM.

- **Elements at Risk:** Establishing what the impact of the hazard could have on which elements of a given society (mainly based on factual information gained from people past experience).
- **Vulnerable Conditions:** Establishing why the elements are at risk.
- **Pressures:** Establishing who or what is creating the vulnerable conditions and how this is taking place?
- **Underlying Causes:** Establishing why vulnerable conditions are created or ignored by the pressures. Limited access to power structure, Lack of resources, Ideologies, Political Systems, Economic Systems and Conflicts are the y major underlying causes.
- **Underlying Values and Belief Systems:** Considering what beliefs encourage, ignore or challenge the underlying causes of vulnerability.

A variety of tools can be used to enrich the community’s participation in vulnerability assessment. These are as follows:

1. **Hazard maps** - helps in visualizing the ‘elements at risk’
2. **Transect walk** - helps to get a better understanding of the community map and affords opportunity to ask more questions on physical/material vulnerability
3. **Seasonal calendar** - gives insight on periods of stress, diseases, hunger, debt, etc.
4. **Livelihood analysis** - gives a picture of the varying effects of hazards on different households and groups
5. **Venn diagram** - shows the state of coordination among organizations and Government agencies or leadership patterns



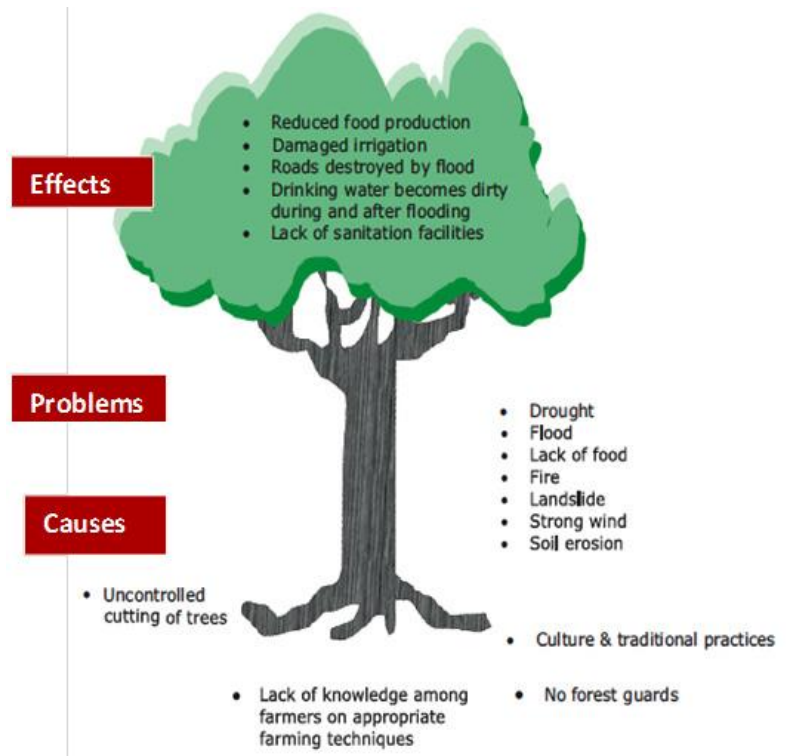
Stakeholder and Social Network Analysis:

- **What:** Making a diagram that shows key organizations, groups and individuals in a community, nature of relationship and level of importance.
- **Why:**
 - Identify organizations (local & outside), their role/importance, and perceptions that people have about them,
 - Identify individuals, groups, organizations that play a role in disaster response and can support community.
- **Who:** Village Committee and community members.

- **How:**
 - Become familiar in advance with the names of the organizations.
 - Ask people to determine criteria for the importance of an organization and to rank them according to these criteria.
 - Ask people to what extent organizations are linked to each other; note kind of relationship.
 - Draw circles to represent each organization or group; size of circle indicates importance.
 - Continue focus group discussion on history of organizations; activities undertaken in community; how well do they function; how is coordination; which organizations, groups, individuals are important in times of disasters, community level decision-making mechanisms, etc.

Problem Tree

- **What:** Problem tree showing relations between different aspects of causes, problems and effects.
- **Why:** Identify local major problems/vulnerabilities as well as root causes and effects.
- **When:** During later part of situational analysis or community risk assessment especially in hazard, vulnerability and capacity assessment.
- **Who:** Team facilitates community members' meeting (optional to have separate meeting for men and women).



- **How:**
 - From other tools and interviews, team can learn the various concerns and problems.
 - Give all people small pieces of paper and ask them to write one major problem on each card, and to put these on the wall.
 - Ask two or three volunteers to group the problems according to similarity or interrelationship.

- Now the making of the ‘problem tree’ can start the trunk represents the problems; the roots are the causes; the leaves are the effects.

C. Capacity Assessment: Capacity refers to existing resources, strengths and skills available in a community that which enable them to reduce disaster risks and withstand any natural or human-induced shocks on their own.

Capacity assessment is the process to determine how people cope in times of crisis to reduce the damaging effects of hazards. Through capacity assessment, the community’s coping strategies and resources, which are available, for disaster preparedness, mitigation and prevention are identified. The capacity assessment process involves the following key components:

- Understanding people’s previous experiences with hazards and the coping strategies they have developed.
- Analyzing resources that are available and used by the community to reduce disaster risk.

The capacity can be divided into four different types as listed below;

1. **Human /Technical Capacity:** (manpower, skills, equipment).
 - a. How much man power available.
 - b. Gender wise distribution of human resources
 - c. What are the available skilled manpower available and required in case of any disaster
 - d. What kind of equipment required and available if any disaster occurred
2. **Physical / Material Capacity:** such as Cash, Land, Tools, Food, Jobs, and Access to Credit.
 - a. What are the capacities of the village in terms resources (land, water, animals, capital, skills, etc)? Economic activities (means of productions, sources of livelihoods)? Who has access to and control over resources?
 - b. What are the hazards affecting the village? How do disasters affect the physical/ material aspects?
 - c. What are the basic services or facilities like roads, bridges, health facilities, schools, housing, electricity, communications, etc. in the village?
 - d. Which among them provide good services? Which create problems to the people?
 - e. What is the mortality rate, diseases, nutritional status, population, literacy rate, poverty levels of the population?
 - f. What is the status of the environment? Forest? Soil quality? River condition? etc.
3. **Social / Organizational Capacity:** such as Social Networks, Extended Family, Local and National Welfare Institutions.

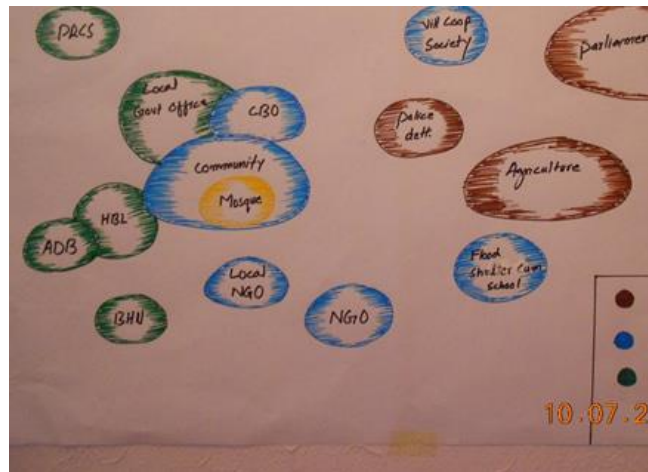
- a. Are there community projects/activities? Who makes decisions?
 - b. What is the level of people's participation in village projects/activities?
 - c. Is there an existing village level organization? (formal, informal, traditional, or government initiative)
 - d. Access to outside information by the people.
4. **Attitudinal / Motivational Capacity:** such as Sense of Control, Power, Capabilities, and Confidence.
- a. What is the level of people's awareness of disaster events that happened in the village?
 - b. How do people view their ability to create change or development in the village?
 - c. What are people's perceptions of risk? Ex.: It is God's will and they cannot do anything about it, or they can do something to manage the risk.

The triggering **factors for capacity development** are;

- High impact events
- Frequent events
- Motivated individuals and institutions (champions)

Venn diagram:

- **WHAT:** Making a diagram that shows key-organizations, groups and individuals in a community & nature of relationship and level of importance.
- **WHY:** Identify organizations (local & outside), their role importance, and perceptions that people have about them; and to identify stakeholders in CBDRM.
- **WHO:** Team and community members.
- **HOW:**
 - Know in advance, names of organizations.
 - Ask group to determine criteria for importance of an organization or individual.
 - Ask group about level & type of linkages amongst organizations.
 - Draw circles to represent each institution, group or individual.
 - Distance & overlap shows level of interaction amongst organizations.
 - Continue discussion by asking questions on:
 - History.



receive a value of 1-3, while households of medium risk will receive a value of 4-6, and households of high risk will receive a value of 7-9.

Risk mapping by village committee is a continuous and participatory process. The steps to be taken depend on the community and how organized it is, as well as on the nature of the risks and hazards present in the area. It is the community itself that must decide which procedures best fit its own conditions, and which steps it should take to produce the map; the process includes following steps:

- i. Organizing the work (Assigning the roles and responsibilities)
- ii. Discussing community risk and hazards (Discussing the basic concept of hazard, vulnerability and risk everyone should be at the same page)
- iii. Preparing guidelines for observation and data collection (It is important to produce guidelines to let stakeholders know what to look for during their tour. The questions regarding risk include what, why, when, where, how are important to be considered)
- iv. Touring the community (to gather information on the local risks and hazards, and which places might be used as shelters or security zones in the event of a disaster, to care for the injured and the most vulnerable)
- v. Discussing and Analyzing the Preliminary Results (The information collected during community tour must be discussed and analyzed, and priorities must be assigned)
- vi. Development of the Risk Map by Village committee.

3. Risk prioritization / Evaluation:

It involves the comparison of risk against the pre-established elements or criteria. Most important risks from the perspective of vulnerable people are identified in this process. This also enables decision making about the potential strategies that should be followed for dealing with different kind of risks.

The purpose of risk evaluation is to make decisions about what strategies should be followed for the reduction of various disaster risks. The risk evaluation can also be used to rank the most vulnerable communities. This is done upon the basis of information from risk analysis. Communities and local authorities jointly can agree on criteria to rank the risks. They can decide what levels of risk are acceptable about which no actions need to be taken. The other risks would be ranked as high priority due to the potential damage and loss, which they may cause to people, their livelihoods or environment. The decision about risk management may include:

- i. Whether a risk needs treatment.
- ii. Whether an activity should be undertaken.
- iii. Priorities for treatment

Risk Treatment key:

Upon the basis of risk analysis and risk evaluation the local authorities should prioritize the communities based on the potential losses they may suffer. This will be essential for the launching of community-based disaster risk management.

Risk Level	Actions
Very High Risk	Immediate Action
High Risk	Heightened action
Low risk	Business as usual

Village committees (VC) can use following tools for participatory risk assessment at village level, depending upon the situation VC can also use additional tools such as gender resource mapping, wealth ranking, livelihood analysis, and poverty score card.

Tools for collection of information and Assessment:

The below table shows that the major tools which SRSO CRP can be utilized for the collection of information from community and utilized for the hazard, vulnerability and capacity assessment accordingly. The brief detail of each tool (including some of the important tools) is also listed in the given table.

#	Methods/Tools	Hazard	Vulnerability	Capacity
1	Direct Observation	x	x	x
2	Secondary Data collection	x	x	x
3	Group Discussion	x	x	x
4	Semi-structured interviews	x	x	x
5	The hazard Map	x	x	
6	Transect walk	x	x	x
7	Historical Profile	x	x	x
8	Ranking	x	x	
9	Hazard and seasonal Calendar	x	x	x
10	The Venn Diagram (institutional and social network analysis)		x	x
11	Do it Yourself		x	x
12	Livelihood analysis		x	x
13	Problem tree		x	
14	Gender resource mapping			x
15	Household wealth ranking		x	

SESSION 9# NEED AND IMPORTANCE OF EARLY WARNING SYSTEM:



Time: 75 minutes



Content:

- Defining early warning system
- Importance of early warning system
- Local committee on information
- Possible methods of early warning
- Points to remember in early warning
- Local level early warning system
- Introduction to ICT based weather forecasting services.



Objectives:

- Defining early warning system.
- Explaining importance, possible methods and points to remember of early warning system.
- Explaining local level early warning system
- Explaining Information Communication Technology (ICT) based weather forecasting services.



Method:

PPT Presentation, Brainstorming, Discussion, and Group Work.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers.



Outcome:

- Knowledge and understanding of the participants will be enhanced on basic and key concepts of DRR and CC.
- Participants will learn about key terminologies used in DRR and CC.



References:

- Mainstreaming DRR & CCA into Development Process at Local Level by ADPC (2015)
- Training Manual DRM for Pakistan by ADPC
- National Disaster Management Plan (2012-2022) by NDMA
- Disaster Risk Management Plan- Sindh Province by PDMA

Defining Early Warning System:

Early Warning System is the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Importance of Early Warning System:

Warning system includes actions to alert people about an impending hazardous event or circumstances in their location, which may threaten their safety and security, and which requires and adaptive response.

There are three important purposes of giving an early warning. They are;

- i) To inform the community about hazards and elements at risk;
 - Who is at risk?
 - What is the risk?
- ii) To advise on means of protection and preparedness; e.g.
 - Preventive evacuation,
 - Sand bagging to reinforce the flood bank, or
 - Fire suppression etc.
- iii) To instruct them who will do what to deal with the impending hazard.

Organize a local committee on Information:

The task of this committee will be to monitor and prepare all the materials for the dissemination of early warning information and the monitoring of all hazards (natural or human-made). The flow of information from the “field” until it is processed and packaged for information dissemination to the community should be clear. The warning should;

- Be area specific and target group specific,
- Be hazard specific,
- Be based on the Community Hazard, Capacity and Vulnerability Assessment,
- Give advice on what to do,
- Inform community of the possible effects / risks that may cause them if they don't follow or do what is advised.

Community should know the meanings of actions to be taken (What “READY, GET SET AND GO” mean). Or recommended action should be specific like: - pack-up things, proceed to pick-up point or proceed to evacuation site.

Identify roles and responsibilities:

For every role, a committee or an official must be responsible in order to undertake the tasks. Two methods of describing these roles and responsibilities can be used by the local committee;

- i) List organizations involved and describe their roles for each hazard.
- ii) List hazards and identify the lead/support organizations for each hazard.

For any one element, an organization or an individual must be able to determine that it has;

- Primary role - responsibility for initiating and maintaining action.
- Secondary role - responsibility for undertaking risks in support organization.
- No role at all.

Possible methods of early warning:

The different possible methods of giving or receiving warning information include;

- i) Large Scale Warning dissemination methods;
 - Verbal or pictorial messages through Social Media
 - Radio
 - Notices/posters/billboards
 - Short Films
 - Television / Cable TV
 - Newspaper
- ii) Local Scale Warning dissemination methods;
 - Verbal or pictorial messages through Social Media
 - Village/Community meetings
 - Notices boards at visible place
 - Local Cable TV
 - Announcement
 - Sirens
 - Other indigenous forms and channels

Points to remember in early warning:

When giving or disseminating early warning information's below points to be considered;

- Make warning and communication system inclusive for all.
- Inform the people of the different phases of warning and their meaning.
- Inform or update the evacuees/community of the forecast and the warning using symbols or sounds that everybody can understand.
 - If symbols are to be used, these can be painted or mounted in plywood or boards that can be read or seen even from a far.
 - Make sure to change the symbol or sound when a change in the warning or forecast is made by warning agencies or by the community monitoring team.
- “Information boards” can be placed in strategic or conspicuous areas/places like;
 - Mosques, schools or government buildings, mountains or high places.
 - Stores/transportation facilities.
 - Other places where people frequently pass or gather.

Local level Early Warning System:

Local level early warning is a system developed, managed and maintained by the community itself, that empowers individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner to reduce the possibility of personal injury, loss of life, damage to property, damage to environment and loss of livelihood.

Local level early warning system helps communities to use local resources and capacities effectively to better prepare for and respond to disasters and adopt measures to reduce their vulnerability.

- The system is structures to ensure that the early warning messages reach the last and most vulnerable person of the community.
- The early warning messages should help to reduce disaster risks and be beneficial for saving human, physical and financial capital of the community.
- Proper management of the resources to ensure they are used in the most appropriate way.
- Community understanding and perception about the immediate hazard should be clear and appropriate.
- Timely dissemination of early warning messages and response.
- To ensure that the voices of the most vulnerable people in the community are heard.
- To ensure the special needs of women, elderly people, people with disabilities and children are properly addressed.

Introduction to ICT based Weather Forecasting Services:

From 1947 – 2021, a lot of natural disasters happened nationwide and especially in Sindh province in which millions of people affected and thousands of lives were lost. Ninety percent of these disasters were caused by weather and water connected events such as floods and droughts. On the other hand science of weather forecasting and monitoring, which is serious to reducing such high casualty and damage rates, is being advanced by the development in Information Communication Technologies (ICTs).

ICT in Agriculture focuses on the enhancement of agricultural and rural development through improved information and communication processes. In this context, ICT has been used as an umbrella term which encompasses all information and communication technologies including devices, networks, mobiles, services, and applications – which range from innovative Internet-era technologies and sensors to other pre-existing aids such as fixed telephones, televisions, radios, and satellites.

Pakistan is on the journey of digitalizing different aspects of sectoral value chains for delivering better services to the farmers and improving livelihoods. Two major ICT based weather forecasting initiatives are currently active in Sindh Province. One is ICT agricultural extension services by Sindh Agriculture department and the second is Khushahal Zamindar by Telenor Pakistan. ICT can play multiple roles in strengthening weather information systems from data collection to dissemination.

- **Data collection:** ICT can facilitate real-time data collection needs in several different ways, it can also be used to collect information on the impact of climate change by monitoring key weather parameters such as rainfall, temperature, and water flows, as well as related impacts on the agriculture ecosystem;
 - Attaching satellite based weather forecasting/ data collection,
 - Attaching ground based weather forecasting/ data collection instruments,
 - Another way of collecting weather forecasting/ data is by providing trained local intermediaries in remote and specific micro-climate areas with simple weather measurement tools who can then transfer data via SMS for analysis.

- **Data dissemination:** ICT tools can also be used to disseminate weather information directly to users in a cost effective way that can be customized by geography, language and specific needs of the users. Timely dissemination of weather information is a key strength of ICT over the traditional dissemination strategies. No other traditional channel can be as precise as an automated weather feed sent out via SMS or voice message to the farmer at a specific time and for his particular geographic area down to village level. Some of the most common uses of ICT for disseminating agro-meteorological information include:
 - Transmitting simple weather forecasts including seasonal, ten day, or short-term forecasts that are daily or every few days.
 - Warnings or alerts for disasters or extreme weather events, such as storms, lightning and flooding. Flood warning is very important for farmers situated along major rivers.
 - Reminders or tips that are related to the actions that farmers can take in response to the expected weather conditions (e.g. sunshine tomorrow, spray fertilizer or pesticide for a given crop).

SESSION 10# BASIC SEARCH, RESCUE AND EVACUATION:



Time: 90 minutes



Content:

- What is search and rescue?
- Techniques for search and rescue.
- Role and responsibility of search and rescue team.
- What is evacuation?
- Time to evacuate.
- Evacuation planning.
- Role and responsibility of search and evacuation team.



Objectives:

- Defining search, rescue and evacuation.
- Explaining techniques, role and responsibility of search, rescue and evacuation teams.
- Explaining evacuation planning.



Method:

PPT Presentation, Brainstorming, Discussion, Role play and simulation.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers. Rope & sticks for simulation



Outcome:

- Knowledge of the participants will be enhanced on basic search, rescue and evacuation concepts and techniques.
- Participants will learn about evacuation planning and role and responsibility.



References:

- USAID Tahafuz CBDRM Manual
- <http://www.sdmassam.nic.in/download/searchandrescuemanual.pdf>
- <http://www.nzdl.org/cgi-bin/library>

What is Search and Rescue?

Search and rescue is a specialized task and must be carried out by trained personnel (called Search & Rescue Team). The S&R team will be comprised of members from village committee. The S&R team will carry out the search and rescue activities, and attend to the casualties under adverse conditions, where life is at threat. Search and rescue is organized in close cooperation with the community and in a team approach.

The qualified and trained S&R team is the most important working team at disasters/accidents sites in emergencies. Because they directly relate to lives rescue of people who may be exposed to death if there is no help provided to them especially when they are inside damaged buildings or in disaster area.

Search and Rescue Team Composition:

S&R Team will be constituted of physically and psychologically sound volunteers (male and female), having demonstrated ability, capacity and willingness to work in an emergency.

- Team volunteers, of both the sex, above 18 years of age.
- With a minimum education level to read and write in local language.
- Preference would be given to ex-military or army personnel and artisans from the village or from the locality.
- Team comprising of 8 members, out of which a minimum of 2 members should be skilled persons. The team members should be from the community or village.
 - Team leader: 1
 - Skilled persons: 2
 - Members: 5

Techniques for Search and Rescue:

The search and rescue activities are undertaken in two ways;

1. **Community Local Rescue:** With adequate safety measures, rescue immediately after any natural calamities such as flood, earthquake and fire in a community.
2. **Outside Community Resources:** Circumstances where the situation is grave and the local rescuers do not have required efficiency and equipment's, then specialist assistance from outside the community is required.

S&R team immediately take up the search and rescue activities after a flood, earthquake and fire etc. where people might be trapped by fallen debris and in need to be rescued without delay. The community S&R team shall have to be in readiness to respond quickly, when a flood is likely to strike. The S&R team efficiency level to be maintained with thorough practice, demonstrations and mock-drills during the non-disaster period. The S&R team should undergo standard training from time to time.

Assessment and Planning:

Search and rescue requires necessary assessment and planning at the beginning of the operation and continually as long as the operation continues. Proper planning and assessment saves time and improves better performance.

The **Assessment** can be done in two methods:

1. **INFORMATION:** Information provided by the local community or the local leader or from the village committee is important. Collect information on the extent of; the damage, approach to the damaged area, particulars of the damage, and if any further damage is likely to occur.
2. **OBSERVATION:** Follow the 3 key principles during the assessment;
 - i) **LOOK:** See physically the incidents and make a thorough visual inspection.
 - ii) **LISTEN:** Listen to all sources of information from the community, from the people, Government records etc. Assess the community data regarding people in danger.
 - iii) **FEEL:** Feel convinced regarding the facts, the gravity of the dangers and your own capacity to respond.

Planning: Rescue is a team effort that needs coordination and planning amongst the members for an optimum response operation. After the assessment, the S&R team would be in a position to adequately plan the Rescue Operation based on the following details and specifications;

- Manpower
- Equipment's
- Methods

Planning and assessment important steps to be remembered:

1. Gather facts
2. Assess damage
3. Consider probabilities
4. Assess your situation
5. Establish priorities
6. Make decisions
7. Develop a plan of action
8. Take action
9. Evaluate progress

Specific Safety Considerations for Search and Rescue:

Regardless of the severity of structural damage, rescuer safety must be the primary concern. The two most frequent causes of rescuer deaths are:

- Disorientation
- Secondary collapse

Follow these guidelines during all search and rescue operations:

- **Use a buddy system:** Successful search and rescue depends on teamwork.
- Be alert for hazards (e.g., power lines, natural gas leaks, hazardous materials, sharp objects, etc.). You should never attempt to search an area where water is rising.
- **Use safety equipment:** two types of safety equipment are necessary;
 - Personal Equipment's for Rescuer:
 - Helmet
 - Gloves
 - Torch
 - Life-line (is a fall protection safety device)
 - Gum-Boots
 - Dust mask
 - Life-Jackets (for Water Rescue)
 - Whistle

Wearing gloves and a helmet will protect a rescuer's hands and head. Also, the primary cause of rescuer problems after working in a structural collapse is breathing dust, so a dust mask is essential. However, a dust mask will not filter out all harmful materials. If the presence of chemical or biological agents is suspected, notify professional responders.

- Team Equipment's for S&R Team:
 - Rope-3-inch (7 cms) diameter of 200 ft (61.5 mtrs)
 - 6 Sash-cord-inch (2.54cms) (made of premium-quality cotton yarn)
 - Pulley blocks with different sheaves
 - Ladder (Wood/Bamboo)
 - Small cutting tools
 - First Aid Box
 - Life Buoy
 - Crow Bar
 - Hammer
 - Stretcher
 - Blanket

- **Have backup teams available** to allow rotating of teams, prevent fatigue, and ensure help if a team gets into trouble. Have teams drink fluids and eat to keep themselves fresh.

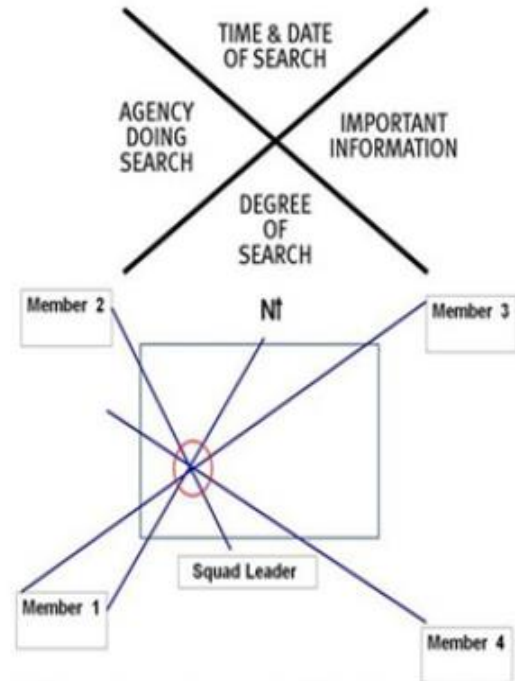
Search Techniques:

- **Search Methodology-Interior Search:**

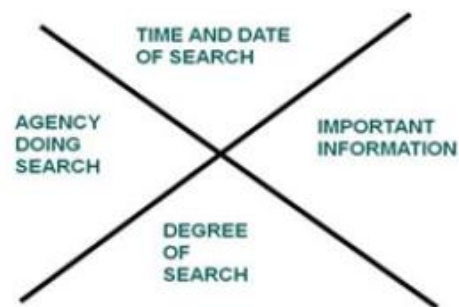
- i) Upon entering each space or room, call out to victims. Shout something like, “If anyone can hear my voice, come here.” If any victims come to you, ask them for any information that they may have about the building or others who may be trapped, then give them further directions such as, “Stay here” or “Wait outside” (depending on the condition of the building).
- ii) Remember that even those who are able to get to you may be in shock and confused. When giving directions to victims, S&R team members should look directly at the victims, speak in short sentences, and keep their directions simple.
- iii) Use a systematic search pattern. Ensure that all areas of the building are covered. Examples of systematic search patterns to use include:
 - Bottom-up/top-down
 - Right wall/left wall

Effective Search Methodology

- Indicates rescuer location
- Prevents duplication of effort



Effective Search Methodology



Keep in mind that every interior space has six sides — including the floor and ceiling. Rescuers must check all six sides especially to locate hazards such as fixtures that may be hanging from the ceiling.

- iv) Stop frequently to listen. Listen for tapping, movement, or voices.

- v) **Triangulation** can be used when a potential victim's location is obscured. If access permits, three rescuers, guided by victim sounds, form a triangle around the area and direct flashlights into the area. The light shining from different directions will eliminate shadows that could otherwise hide victims.

Triangulation should not be used as an initial search method. Report results and keep complete records both of removed victims and of victims who remain trapped or are dead. Report this information to emergency services personnel when they reach the scene.

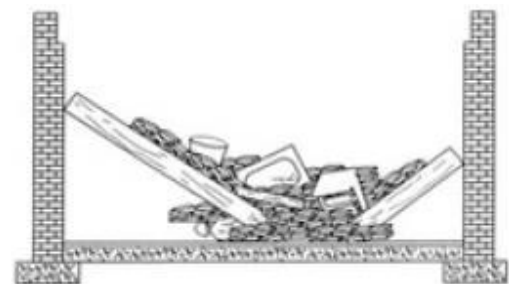
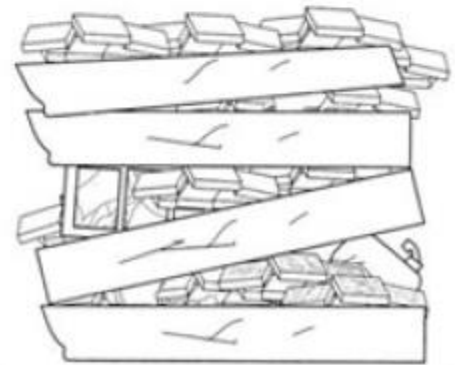
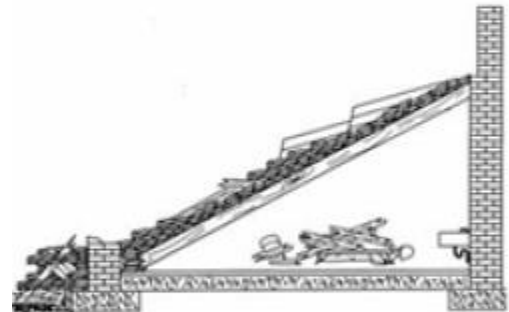
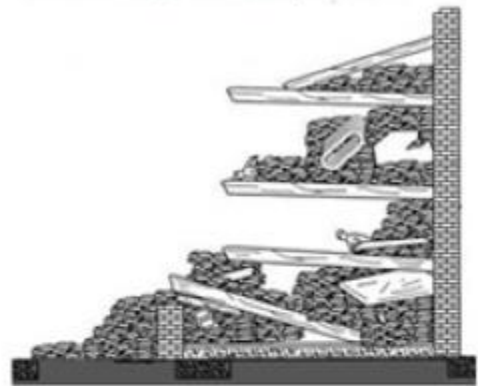
- **Search Methodology-Exterior Search:**

In addition to searching inside a structure, S&R team members might also be required to search open areas outside of buildings. Conducting an effective search in open areas requires that searchers work methodically and follow standard procedures established by those in charge of the search operation. This is true in all cases, and especially if the area to be searched is a crime scene where all potential evidence must be protected.

When searchers are needed, they assemble in a central staging area and sign in. Authorities will brief the searchers on what they will be looking for, what areas they are responsible for searching, the pattern of the search, and what they should do if they discover the missing person, evidence, or related information.

Exterior search patterns include grid, line, quadrant or zone, and spiral. A grid pattern is typically used in large open areas or small areas when a hands-&-knees search is conducted.

Conducting Search Operations



To conduct a grid search:

- The area to be searched is viewed as a grid, with searchers initially positioned at one side of the grid.
- The distance between the searchers should be set according to visibility and debris. In all cases, searchers must remain within line of sight and voice contact with searchers on either side of them.
- It is also critical that the area to be covered by each searcher overlaps that of the searchers on either side of them.
- The searchers proceed, maintaining as straight line as possible across the entire search area. As each searcher moves across the area, they conduct a thorough search for victims within their designated row of the grid.
- In order to ensure full coverage, S&R team must record each area that has been searched.

Rescue Techniques:

Rescues involve three primary functions:

- Moving objects and debris to free victims and to create a safe rescue environment.
- Triaging victims by checking for the “three killers,” airway obstruction, major bleeding, and shock.
- Removing victims as safely and as quickly as possible.

Creating Safe Environment:

There are three safety considerations for all rescue operations:

- To maintain rescuer safety.
- To triage in lightly and moderately damaged buildings.
- To evacuate victims as quickly as possible from moderately damaged buildings while minimizing additional injury.

None of these can be achieved without creating as safe an environment as possible before attempting rescue. There are, therefore, certain precautions that rescuers must take to minimize risk.

Precautions to Minimize Risk:

There are certain precautions that rescuers must take to minimize risk and increase their chances of achieving their rescue goals.

- **Know your limitations:** Many volunteers have been injured or killed during rescue operations because they did not pay attention to their own physical and mental limitations. Rescuers should take the time to eat, drink fluids, rest, and relax so that they can return with a clear mind and improved energy.

- **Follow safety procedures:** Team members should always use the proper safety equipment required for the situation and follow established procedures, including:
 - Work in pairs.
 - Triage and treat only in lightly damaged buildings.
 - In moderately damaged buildings, triage only and remove victims as quickly as possible.
 - Never enter an unstable structure.
 - Lift by bending the knees, keeping the back straight, and pushing up with the legs.
 - Carry the load close to the body.
 - Lift and carry no more than is reasonable.
 - Remove debris as needed to minimize risk to rescuers and to free entrapped victims.

Removing Victims:

There are two basic types of victim removal:

- Self-removal or assist
- Lifts and drags

It is usually best to allow an ambulatory victim to extricate him- or herself. Be aware that sometimes ambulatory victims are not as strong and uninjured as they think they are. When victims become free from entrapment, they may need assistance to exit the structure.

Extrication Method:

The type of extrication method selected should depend on the:

- General stability of the immediate environment.
- Number of rescuers available.
- Strength and ability of the rescuers.
- Condition of the victim.

If safety and time permit, you should not use lifts and drags to remove victims when closed-head or spinal injury is suspected. In such cases, the spine must be stabilized using a backboard. Doors, tables, and similar materials can be used as improvised backboards. The backboard must be able to carry the person and proper lifting techniques must be used. When moving victims, rescuers must use teamwork and communication and keep the victim's spine in a straight line. Remember, rescuer safety and the condition of the building will dictate the approach.

Sometimes rescue materials are not available to the rescue team at site in emergency situations. There are various other methods, which could be useful for rescue. Such methods are known as, "Emergency Methods of Rescue". The adequate methods of

rescue is to be determined depending upon the nature of the casualty, the nature of the injuries and the position in which the casualty is found.

1. Rescues with One Rescuer:

a. **One-Person Arm Carry:** If a rescuer is physically able and the victim is small, the rescuer may use the one-person arm carry to lift and carry the victim by:

- Reaching around the victim's back and under the knees.
- Lifting the victim while keeping the rescuer's back straight and lifting with the legs.



Note: Consider the size of the victim and the distance he or she needs to be carried before using this carry.

b. **Pack-Strap Carry:** Another way for a single rescuer to lift a victim safely is by using the one-person pack-strap carry. Using this method, the rescuer should:

Step 1: Stand with his or her back to the victim.

Step 2: Place the victim's arms over the rescuer's shoulders and grab the hands in front of the rescuer's chest.

Step 3: Hoist the victim by bending forward slightly, until the victim's feet just clear the floor.



Note: The pack-strap carry is most effective for quick removal of a victim over a short distance.

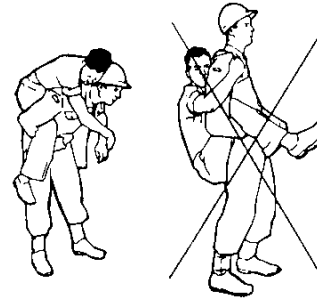
c. **Human Crutch:** A single rescuer acts as crutch to the injured victim. This method is used when the victim is in a position to walk. Using this method, the rescuer should:

- Stand and assist the injured victim to place their arm around the shoulder.
- Grasp it with the hand. At the same time, place the other hand around the injured person's waist and assist the person to move. This is called "Human Crutch".



d. **Pick-a-back** This method is applicable only when the casualty is conscious, without any injury but not able to walk. Using this method, the rescuer should:

- Lift the injured person onto his/her back.
- The victim holds on with his legs and arms around the waist and neck of the rescuer.
- The rescuer passes both hands behind and back or under the knees and supports the injured person.



2. Rescues with Two or More Rescuers:

a. **Two-Person Carry:** Victim removal is easier when multiple rescuers are available. The victim's upper body will weigh more than his or her lower body; therefore, rescuers with greater body strength should be positioned at the victim's upper body. A victim may be removed using a two-person carry:

- **Rescuer 1:** Squat at the victim's head and grasp the victim from behind around the midsection. Reach under the arms and grasp the victim's left wrist with rescuer's right hand, and vice versa. Crossing the wrists creates a more secure hold on the victim and also pulls the victim's arms and elbows closer to their body. This will be helpful if the victim is carried through any narrow passages.

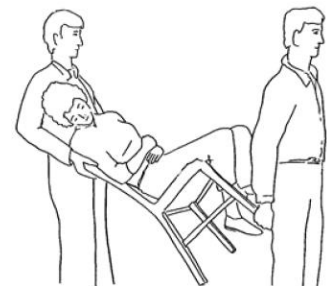


- **Rescuer 2:** Squat between the victim's knees, facing either toward or away from the victim. Note that, if the rescuers will carry the victim over uneven areas such as stairs, the rescuers will need to face each other. Grasp the outside of the victim's legs at the knees.

Note: Both rescuers: Rise to a standing position simultaneously, keeping backs straight and lifting with the legs. Walk the victim to safety.

b. **Chair Carry:** Two rescuers can also remove a victim by seating him or her on a chair:

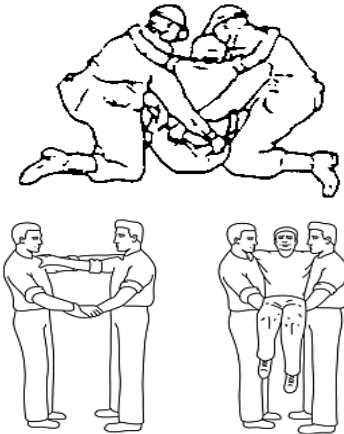
- **Rescuer 1:** Cross the victim's arms in his or her lap. Facing the back of the chair, grasp the back upright.
- **Rescuer 2:** Grasp the two front legs of the chair.
- Both rescuers tilt the chair back, lift simultaneously, and walk out.
- It is best to use a sturdy, non-swivel chair for this lift.



Note that, if rescuers will need to carry the victim over uneven surfaces such as stairs, the rescuers must face each other.

c. **Two-Handed Seat:** Using this method, the rescuers should:

- Two rescuers face one another kneel on either side of the casualty, get him into a sitting position.
- Pass his/ her arm under the casualty's back, below the shoulders, and grip his/her clothing.
- The casualty's back is raised and the rescuers slip their other arms under the middle of his/her thighs holding their hands with a handgrip.
- The casualty is lifted and the rescuers move with short pace.



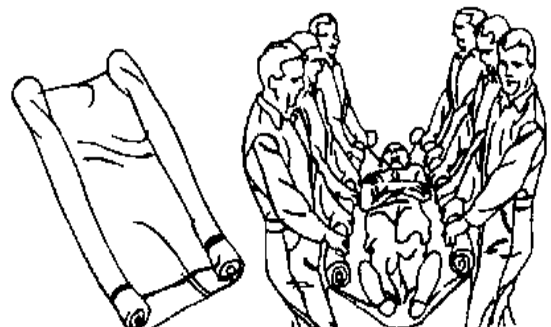
d. **Two-Person Human Crutch:** This method can be used when the victim is injured, conscious and can help, but is unable to walk.

- Rescuers take up their positions either side of the casualty.
- Place the victim's arms round the shoulders and grasp his/her wrists with the other hands.
- Pass the arms round the victim's waist, grasping the clothing at the hip and assisting him/her as crutches.



e. **Blanket Carry:** You can use the blanket carry for victims who cannot be removed by other means. The blanket carry requires four to six rescuers to ensure stability for the victim and that one rescuer must be designated the lead person:

- Position a blanket next to the victim, ensuring that the blanket will extend under the victim's head.
- Tuck the blanket under the victim, and assist the victim in moving to the center of the blanket. If necessary, use the log rolling technique to position them on the blanket.
- With three rescuers squatting on each side, roll up the edges of the blanket against the victim to grasp a "handle." The lead person checks the team for even weight distribution and correct lifting position.



- The lead person calls out, “Ready to lift on the count of three: One, two, three, lift.”
- The team lifts and stands in unison — keeping the victim level — and carries the victim feet first.

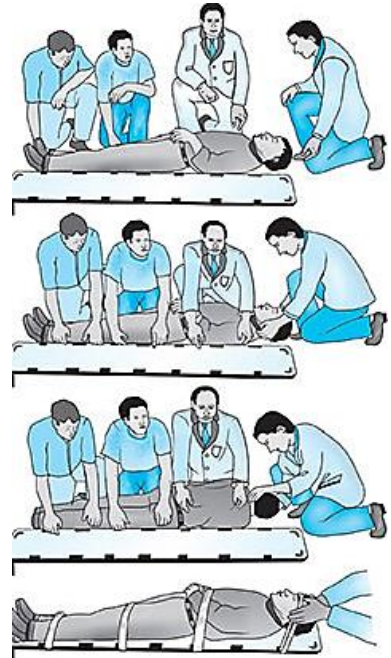
The team must also lower the victim together, using the following steps:

- The lead person calls out, “Ready to lower on the count of three: One, two, three, lower the casualty.”
- The team lowers the victim in unison, exercising caution to keep the victim level.

A variety of materials — such as blankets, carpets, and folded tables — can be used as improvised stretchers.

Log Rolling:

Log rolling should be used to move victims with a suspected or confirmed cervical spine injury. If the victim is unconscious, assume he or she has a cervical spine injury. The rescuer at a victim’s head should give commands as fellow rescuers roll the victim as a single unit onto the blanket, backboard, or other support.



Log Rolling

Fire Fighting:

Fire is a chemical reaction between three elements: oxygen, heat and fuel. If any of the three elements disappear, the fire will disappear too.

1. Fuel - Fuel or combustible materials e.g. papers, cloths, woods, plastic, carpet, furniture, etc.
2. Oxygen - Present in the air.
3. Heat - Flames, electricity, hot metal, or even a tiny spark of fire.



If conditions are right, a fire can start almost anywhere at any time. Most fires occur when the weather is dry and hot. The source for starting a fire can be natural, for example a lightning strike, or human-made, like careless use of fire or even cigarettes. Fuels include anything from dry grass and leaves to branches, wood or houses! Different types of fuel burn at different temperatures, because each substance has a so-called “ignition temperature”. The oil in the leaves of eucalyptus trees is one of the most explosive fuels that exist in nature due to its low ignition temperature.

- **Fires at Home:** Your home together with your loved possessions can be destroyed by fire mainly due to carelessness. It can also injure or kill members of your family. The major causes of fire in homes include:
 - Matches & smoking hazards
 - Overheating & cooking hazards
 - Electrical hazards
 - Lighted Joss-sticks and Candles
 - Children playing with matches & other lighting apparatus
 - Flammable liquids; e.g. petrol, paints, thinners
 - Domestic Liquefied Petroleum Gas
 - Burning rubbish
 - Curtains

- **Home Fire Escape Plan:** Designing a home escape plan, draw the floor plan of your home on a piece of paper. Post your plan where it can easily be seen (such as on your refrigerator). Be sure to include:
 - All doors and windows
 - Primary and alternate exits
 - Emergency phone numbers
 - Outdoor meeting place
 - Special assignments (who will call fire department, sound the alarm, check that everyone got out, etc.)
 - Location of smoke detectors

- **Fire Survival Tips:**
 - Crawl to the door on your hands and knees, not on stomach. Smoke and gases rise to the ceiling and the air is safer close to the floor.
 - Feel the door before opening it. If it's cool, brace yourself against it and open it carefully. If you notice smoke or heat, close it immediately.
 - Use an alternate exit (second way out - window if possible) if the door is hot or smoke comes through it.
 - Signal for help by waving a sheet or any light colored clothing if you cannot escape through the window.
 - Go to your family meeting place in front and away from your home to check that everyone got out and to meet the fire department.
 - Never go back into a burning building. Tell firefighters immediately if someone is left in the building.
 - Seek medical help for burns and other injuries.

- **Fire response Procedures:** First-attack fire response procedures involve six steps that should be taken when a fire occurs:

- Warn anyone in danger and tell about the fire and warn them to get out of the area.
- Report the fire to the relevant authorities and the local emergency control organisation and the relevant fire/ emergency service, or make sure it has been reported.
- Decide whether to attack the fire Decide whether or not to attack the fire, based on the **four 'Ss'**:
 - **Support:** Never fight a fire alone. Always have someone backing you up and/or getting help for you.
 - **Size:** Unless you are very experienced, a fire bigger than about 1 m by 1 m is too large for you to combat using first-attack firefighting skills.
 - **Surroundings:** Hazardous chemicals or sealed containers (for example gas cylinders and aerosol cans) may suddenly explode or give off very toxic fumes in a fire. Such fires are too dangerous for you to combat using first-attack firefighting skills.
 - **Smoke:** If there is a danger of smoke, fumes and heat affecting you, the situation is probably too dangerous for you to combat using first-attack firefighting skills.
- Select the correct and the most appropriate firefighting agent and equipment if it is safe to attack the fire, use equipment according to the type of material that is burning.
- Safely attack the fire:
 - Attack the fire from upwind if it is out of doors or in a breezy area (that is, the wind should not be blowing the smoke towards or near you).
 - Attack the fire from uphill if it involves spilt flammable liquids.
 - Do not open a door that is hot or shows signs of fire behind it.
 - Always have a safe escape route available to you.
 - Check your equipment before committing yourself to firefighting.
 - Keep low and stay clear of smoke, fumes and heat.
 - Fight the fire from a safe distance, using the maximum effective range of your equipment.
 - Lie used extinguishers on their sides to indicate they are discharged.
 - If the fire is not being safely extinguished, evacuate the area, closing doors behind you when you and other occupants are clear.
- Follow the correct procedures after the fire is out;

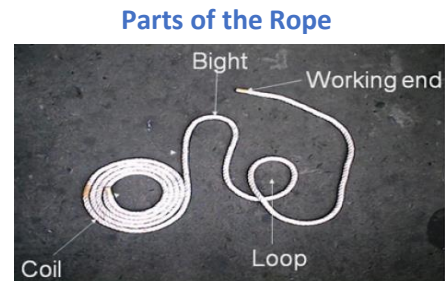


- If possible, do not disturb the fire area. This allows the cause to be more easily determined.
- Keep out of smoke and affected areas, even if the fire appears to be out.
- Do not reoccupy the area until the responsible firefighting organization declares it safe.
- Arrange for any equipment used to be serviced and recharged.

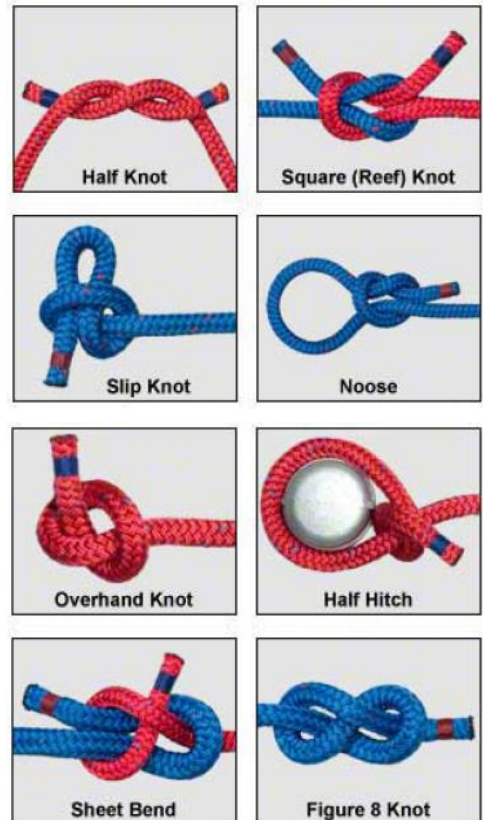
Knots:

The eight knots in this section are the most basic knots - the building blocks of knot tying.

General Principles of Knot Tying: Certain general principles govern the tying of all knots and apply to all suture materials.



1. The completed knot must be firm, and so tied that slipping is virtually impossible.
2. The simplest knot for the material is the most desirable.
3. The knot must be as small as possible to prevent an excessive amount of tissue reaction when absorbable sutures are used, or to minimize foreign body reaction to non absorbable sutures. Ends should be cut as short as possible. In tying any knot, friction between strands (“sawing”) must be avoided as this can weaken the integrity of the suture.
4. Care should be taken to avoid damage to the suture material when handling.
5. Avoid the crushing or crimping application of surgical instruments, such as needle holders and forceps, to the strand except when grasping the free end of the suture during an instrument tie.
6. Excessive tension applied by the surgeon will cause breaking of the suture and may cut tissue. Practice in avoiding excessive tension leads to successful use of finer gauge materials.
7. Sutures used for approximation should not be tied too tightly, because this may contribute to tissue strangulation.
8. After the first loop is tied, it is necessary to maintain traction on one end of the strand to avoid loosening of the throw if being tied under any tension.
9. Final tension on final throw should be as nearly horizontal as possible.



10. The surgeon should not hesitate to change stance or position in relation to the patient in order to place a knot securely and flat.
11. Extra ties do not add to the strength of a properly tied knot. They only contribute to its bulk. With some synthetic materials, knot security requires the standard surgical technique of flat and square ties with additional throws if indicated by surgical circumstance and the experience of the surgeon.

Water Rescue:

Floods are the most common of all natural disasters and generally cause greater mortality than any other natural hazard. Rescue from water related disasters is one of the important challenges for the rescuer. The rescuers must be equipped with swimming and floating aids and should have adequate swimming capacity for rescuing the drowning casualty. The rescuers must have knowledge and practice while rescuing the victims.

Safety Considerations for a Rescuer:

- Jumping in the water to rescue a drowning person is the last resort and you should do everything possible to avoid getting into a dangerous situation in the first place.
- If you have to make a rescue attempt, think of your own safety first and never put yourself in danger.
- If the rescue is too dangerous, wait until the specialized emergency services arrive.
- “Reach and throw – don't go!” Never try to save anyone by jumping in yourself; then two people are at risk. Throw them something that floats, or grab a pole that reaches them.

Water Rescue Methods: They should be attempted in the order given:

1. **Reach** – Try to reach the victim with your arm or leg. If a pole or sturdy stick is available, try to use that to reach out to the victim and pull him to safety. Be careful not to hit the victim.
2. **Wade** – Test the depth with a long stick before wading in and then use the stick to reach out. Hold on to someone else or the bank.
3. **Throw** – Throw rope bags, life rings, and floats - anything that will float which can keep the victim above water (this is only effective when the subject is cooperative). Be careful not to hurt the victim by hitting them with something hard.



4. **Row** – Get a boat out to the victim. You will need two people in the boat – one to handle the boat and one to help the victim. Be careful when helping the victim that you don't capsize the boat.
5. **Go (with support)** – Swim out to the victim to rescue him. This should only be attempted by someone who is trained in swimming and lifesaving. This can be dangerous for the rescuer if he does not know the correct techniques. Take something along which floats for the victim to hold on to. Avoid direct contact with the victim. This is the rescue method of last resort.



Golden Rule of Water Rescue: Never Place yourself close enough to be grabbed by a panicky victim. Always place distance and device between rescuer and the victim.

- **Use of life Jackets:** Life Jackets in rescue are important for water rescue. The life jacket is made out of waterproof canvas and is filled with fine cotton, weighing about 4 kgs equivalent 8.82 (pounds). Normally the life jacket is to be worn like a jacket, and has three tying ropes to secure the jacket.

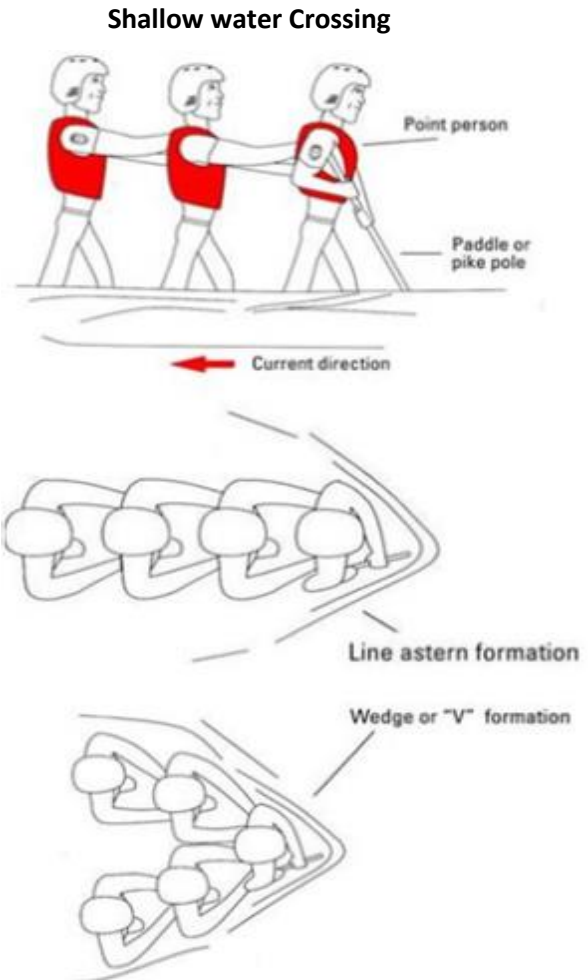
Improved Swimming and Floating Aids: Standard manufactured life jackets may not be available in rural areas or during emergency, however swimming and floating aids could be improvised from the locally available materials

- **Empty Tins and Jerri Canes:** Steps for preparing floating equipment:
 - Collect 20 ltr capacity empty tins.
 - Seal the openings of the empty tins.
 - Collect two equal size 4 feet (120 cm) bamboo pieces.
 - Place both the tins with a gap of 1.5 feet (45 cms) from each other or equal to the width of the chest of the rescuer.
 - Tie the empty tins with the bamboo poles at two places with ropes, and tighten as far as possible to prepare the floating aid.
 - This can help to float a person in the water. The rescuer can use the device for water rescue also.
 - Empty and air tight 15 ltr Capacity Jerri canes also could be used as floating aids.
- **Motor Tubes:** Collect good leak-proof motor tubes (Jeep, Truck, Car, and Bus only). Fill up with air. The swimming aid is prepared. This can help to float a person in the water. This also can be used for water rescue.
- **Empty Bottles:**
 - Collect 8 empty bottles of 750 ml capacity.
 - Seal the openings of the bottles with waterproof materials to make them airtight.

- Tie each bottle at two places at the bottom edge and at the neck edge by using thumb knots in a series to prepare the floating aid as shown in the picture This can help to float a person in the water.

Sectorization of Rescue Operation:

- **Upstream group:** Responsible to watch for and advise of any obstacles and hazards that may hinder the rescue operation.
- **Downstream group:** Prepare to rescue victims and rescuers that may be swept downstream. All members in this group should have a throw rope bag in hand and deploy on both sides to the bank.
- **River right/left group:** Responsible for rigging the opposite end of a rope rescue system.
- **Rescue group:** Responsible for developing an action with command. Once action plan has been developed, rescue group will execute plan in the safest possible manner.
- **Medical group:** Responsible for providing first aid treatment to victims removed from the water.



Role and Responsibility of Search and Rescue team:

- Prepare an updated list of the vulnerable people in the village at regular intervals.
- Keep the S&R kit ready.
- Check and replace equipment on regular intervals.
- Carry out search and rescue activities as and when required.
- As the name suggests, has the work of searching and rescuing the victims from the disaster area and take them to safe places.
- Search and rescue is a technical activity rendered by a group of specially trained personnel, who rescue and attend to the casualties under adverse conditions, where life is at threat.
- Provide first –aid to the injured people.
- Selection of volunteers to form S&R team.

- Coordinate with Project team and local authorities for training of the S&R team volunteers on Search and Rescue.
- Ensure regular meetings of the S&R team members to plan, review and follow up team activities.
- Ensure development of S&R team contingency fund at village and UC level.
- Advocate and seek support for sustainability.

Previous disasters have shown that the first response to trapped victims immediately after almost every disaster is by spontaneous, untrained, and well-intentioned persons who rush to the site of a collapse in an attempt to free the victims. More often than not, these spontaneous rescue efforts result in serious injuries and compounded problems. Rescue efforts should be planned and practiced in advance. People, including rescuers, have died when the rescuers weren't prepared and trained.

What is Evacuate?

- Evacuation is an organized movement of people from an area of risk to a safer location.
- Evacuation is a temporary movement of people from identified danger zones to the designated safe houses/centers in order to protect their lives.
- Preventive evacuation refers to evacuating when the flood water and other hazards or threats have not yet reached the houses of peoples at risk.

Time to Evacuate:

1. Inundation of living areas by flood, storm surge or tsunami.
2. Serious damage to construction of homes by earthquake.
3. Fire.
4. Situation of drought for long time period.

Evacuation Planning:

Phases of Evacuation:

1. Warning
2. Order to Move
3. Actual Evacuation
4. Evacuation Center Management
5. Return to former or new place

Plan for Actual Evacuation:

- Identify a safe place for evacuation
- Identify shortest and safest route
- Identify and prepare alternative routes
- Identify pick up points or assembly points for people
- Place "road signs" along evacuation routes

- Prepare master list of evacuees and check at each pick-up point if the group is complete.
- Prepare evacuation schedules and groupings in case transportation will be used.
- Set provisions and plan evacuation of animals and other properties of evacuees.
- Organize an Evacuation Committee among community members.
- Identify and prepare requirements during evacuation (transport, gasoline, food, water, medicine, road signs, communication systems, etc.)

Role and Responsibility of Evacuation team:

Task of Evacuation Team:

1. Pre-evacuation:

- a. Prepare evacuation plan including warning system.
- b. Training and education of community members.
- c. Identify and prepare logistical needs for evacuation.
- d. Networking, coordination and resource generation for the purpose of evacuation.

2. During evacuation:

- a. Give order to move.
- b. Manage logistical needs for the evacuation.
- c. Ensure orderly evacuation.
- d. Act as marshals/guides during evacuation.
- e. Search and rescue

3. In Evacuation Camp:

- Coordinate with health, food, sanitation, security, information committee.
- Manage relief operations while in evacuation center.
- Networking, public information, advocacy, resource generation.

Evacuation Camp Management:

Setting up emergency shelter or Evacuation Camp (EC) is not encouraged during times of emergencies and disasters, This is because, it often results in overcrowding, inadequate food supply, poor access to safe and adequate water and generally deteriorating environmental sanitation. All of these expose the displaced population to communicable diseases, and the vulnerable groups, i.e. the children, women and the elderly, to serious malnutrition. However, there are situations when the setting up of evacuation camp is unavoidable.

Evacuation camp setting up at local level is a major task, Evacuation Camps (EC) are governed by the type of emergency involved. Short duration EC are usually set up during typhoons and

flooding. The longer ones are often established when permanent damage to houses and other residential buildings occurs, such as in earthquakes, flash floods, tsunamis, storms (as what was experienced during the earthquake 2005 and flood 2010) in such long duration EC, the most common outcome is the permanent resettlement of the displaced community.

There are several considerations which should be kept in mind by village/ union council level disaster management committees when planning for an evacuation camp. These are as follows:

- **Safety of the place/building:** Be sure that it is not threatened by the same hazard that brought about the emergency.
- **Arrangement & important points for site selection:**
 - **Building is to be used as an EC**, be sure it is suitable for the purpose. It is common for public spaces and buildings to be used for temporary shelter until people can safely return home. EC is a critical requirement for survival and is necessary to protect security, health, human dignity, to sustain family and community life, and to enable affected populations to recover from the impact of disaster. In the area the most common buildings should be used for the purpose, and they are; schools, mosques, temples, churches, and gyms etc.
 - Must be accessible to major transportation.
 - The schools/other buildings must have grounds /space, which is big enough for temporary tents which can be used by the evacuees during the day when classes are being conducted in the classrooms.
 - The site must not be prone to flooding.
 - Toilet facilities/ latrines with provision for person with disabilities.
 - Hand washing facilities (individuals should be taught/ informed to bring their own soap and water).
 - Areas for bathing and washing clothes.
 - Good drainage (should be above flood level)
 - Must have space for community kitchen.
 - Must have electricity.
 - Area for food storage.
 - Solid Waste disposal system.
 - Must have space for small children to play.
 - **Makeshift shelter is to be set up**, site selection will include;
 - Appropriate shelter, taking into consideration socio- cultural differences among the evacuees.
 - Accessibility (to major transportation and communication).
 - Topography and drainage (if proper drainage or sewerage system is not in place, ground must be above flood level and preferably in slightly sloping terrain to allow easy drainage of waste water),

- Proximity to water source.
- Toilet facilities/ latrines with provision for person with disabilities.
- Hand washing facilities (individuals should be taught/ informed to bring their own soap and water).
- Areas for bathing, washing clothes and cooking.
- Free of environmental hazards (i.e. malaria, diarrhea etc.)
- Layout of the makeshift houses (should allow for spaces in between houses, access road and spaces for children to play.)
- Adequate vegetation for shade; soil condition may permit future cultivation.
- Presence of electricity
- Area for food storage.
- Solid Waste disposal system.

SESSION 11# LINKAGES AND COORDINATION WITH GOVERNMENT DEPARTMENTS:



Time: 45 minutes



Content:

- Need and importance of linkages and coordination with govt line departments and existing policies and frameworks.
- Stakeholder analysis for CBDRM:
- Disaster Management authorities
- Local NGOs/ implementation agencies.
- Civil Society Organizations



Method:

PPT Presentation, Brainstorming, Discussion, and Group work.



Outcome:

- Knowledge of the participants will be enhanced about the role and importance of different stakeholders.
- The participants will be able to do stakeholder analysis independently.



Objectives:

- Explaining importance of linkage and coordination development with government line departments and other stakeholders.
- To orient the participants about the importance of stakeholder analysis for CBDRM Planning.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers. Charts, Multi-color Markers, Masking tape.



References:

- USAID Tahafuz CBDRM Manual
- www.adpc.net
- www.ndma.org.pk
- https://www.researchgate.net/publication/Roles_and_Linkages_Analysis_of_Stakeholders.

Need and importance of linkages and coordination with government line departments and existing policies and frameworks:

What is Linkage development?

Linkages are interactions among the potential partners or stakeholders, to ensure the exchange of information, knowledge, resources or power among them in mutual manner.

What is Stakeholder?

Stakeholder(s) may be an individual, group, or department which have an ability to significantly impact directly or indirectly the activities of a project. So, stakeholders are all those who affect and are be affected by policies, decisions or actions within a particular system.

Stakeholders can be at any level or position in society, from the international to the national, and from the national to regional level. Stakeholders may be primary, secondary and key stakeholders who depend most directly on the issues at stake, and are ultimately affected either positively or negatively by any intervention in the environment or thematic area for which the project is to be developed.

Stakeholders Analysis for Community Based Disaster Risk Planning and Partnership:

There are multiple stakeholders and actors in the community based disaster risk management process. The CBDRM actors can be divided into two broad categories:

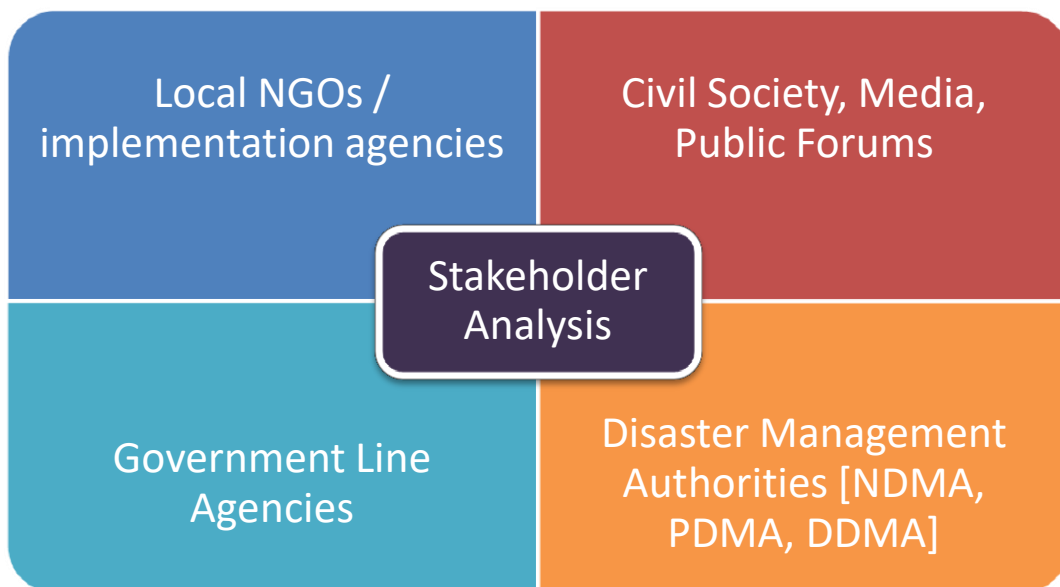
1. **The Insiders:** The term Insiders refer to those individuals, organizations and stakeholders who are located within the community. Amongst the Insiders, the village disaster management committee and union council disaster management committee are the focal points to ensure the management of disaster risks.
2. **The Outsiders:** The outsiders refer to those sectors and agencies which are located outside of the community and want to reduce community vulnerability and enhance its capacities for disaster risk management. The Outsiders include the government departments and agencies, NGOs, UN, and private sector.

The village and union council committees with the help of its members and community facilitates the implementation of disaster risk reduction measures. Aside from the these committees every individual, family, organization, business and public service within a community has a role to play in reducing disaster risks, as all of them would be affected by disasters. The implementation of multiple actions is essential for effective disaster risk management. The village and union council committees should mobilize men, women, farmers, fishers, laborers, youths and other people with special needs to implement the multitude of actions.

In order to establish working relations, the village and union council committees should recognize differing perceptions, interests and methodologies and facilitate a broad consensus on targets, strategies and methodologies among the multiple stakeholders in the community. The

Outsiders include the government departments and agencies, NGOs, UN, private sector and other outside agencies. Their role is to support the community’s efforts in reducing their vulnerabilities and enhancing capacities for the longer-term. They can do this through providing technical, material, financial and political support. The outside agencies may initiate the process as part of their agenda or the community may contact them in order to receive support. The abundant financial resources, technical expertise and political clout of outside agencies can put them in a dominant position vis a vis the community, so they might be inclined to push forward their agenda at the cost of community priorities. However, exertion of control by outside agencies over community decision-making process can harm community capacity. Thus, Outsider agencies must be extremely careful and sensitive to community capacity building.

Once village disaster management committees are established and trained, it would become important to conduct a stakeholder analysis of relevant actors/organizations/institutions from which these committees can enact and draw support. The following matrix gives a snapshot of potential stakeholders from whom support can be drawn.



Disaster Management authorities:

Village disaster management committees will enact direct link with union council level disaster management committees by virtue of having its representation therein. Thereafter union council disaster management committees will coordinate with DDMA & PDMA for support building in terms of replicating their tools and methodologies relevant to preparedness and mitigation.

Local NGOs/implementation agencies:

Consortium of Village disaster management committees and Union council disaster management committees will coordinate with local NGOs for support building in terms of services these organizations can render to them in terms of members capacity building, refining and arranging

their DRR plans and providing them opportunities to be part of projects where DRR activities are mainstreamed. Particularly by course of their outreach and strong presence with communities these NGOs will be point of contacts for emergency response strategies in case of disasters.

Government line agencies:

Regular support will be sought from government line agencies for different activities relevant to agriculture and livestock, health and education, water & sanitation and other themes in which DRR is mainstreamed. Linkages with line department will be coupled with administrative, logistic and other required support so that these local committees evolve continually and stabilize their inherent role in their respective areas.

Civil Society Organizations:

From time to time support will be enacted from media, philanthropists for purpose of advocacy and awareness so the prevailing issues in the villages are propagated in different forums and voice is raised to attract different development opportunities to make communities more resilient to disasters.

SESSION 12# COMMUNITY BASED CLIMATE CHANGE ADAPTATION AND MITIGATION:



Time: 60 minutes



Content:

- Defining Climate change
- Climate change and its impacts on target districts
- Why poor are more vulnerable to climate change
- What is community based climate change adaptation
- Climate risk cycle management
- Participatory tools used in CCA
- Identifying and planning adaptation activities
- Types of participation



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Outcome:

- Knowledge of the participants will be enhanced on Climate change, its adaptation.
- Participants will learn about participatory tools utilized in CBCCA.



Objectives:

- Explaining the concept of climate change & its impacts.
- Defining CBCCA approach.
- Explaining the Participatory tools used for CCA & types of participation
- Explaining adaptation activities



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



References:

- Community-based adaptation to climate change: an overview by HANNAH REID et al. 2010
- Mainstreaming DRR & CCA at local level by ADPC
- Integrating Adaptation to Climate Change into Secure Livelihoods by Christian Aid 2009
- Frame work for implementation of climate change policy by climate change division 2013

Climate change:

Climate change describes a change in the average conditions of weather – such as temperature, humidity, wind, and snow/rainfall – in a region over a long period of time. It means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change and its impacts on target districts:

Climate change is an established fact and its impacts on water, agriculture, health, biodiversity, forest and socio-economic sectors are quite visible around the globe. According to IPCC (2007), developing and the least developed countries are expected to suffer more due to climate change as compared to the developed countries. This is true if we scale down this fact to the community level; in case of any climatic anomaly the poor people face the consequences due to lack of resources and access to information. Anthropogenic activities are mainly blamed to be responsible for the surging trend of climate related disasters occurring in different parts of the world and marginal income people are the major sufferers. After industrial revolution, emission of Green House Gases (GHGs) to the atmosphere increased drastically from industry and vehicular fossil fuel burning. Such gases have large warming potential and long lifetime to sustain warming process for decades to centuries. During 20th century, the increase in the global temperature was recorded as 0.76°C but in the first decade of this century, 0.6°C rise has been noticed. Among 16 warmest years recorded over the globe, 9 top most were from the first decade of 21st century.

For Pakistani's, Climate Change is no longer a distant threat-we are already feeling and experiencing its impacts across the country and the region. The country experienced devastating floods during the last decade. These changes come with far reaching consequences and real economic costs. Losses in the 2010 floods alone exceed US\$ 9.6 billion. The major climate threats identified are briefly summarized below:

- Considerable increase in the frequency and intensity of extreme weather events, coupled with erratic monsoon rains causing frequent and intense floods and droughts
- Projected recession of the Hindukush-Karakoram-Himalaya (HKH) glaciers due to global warming and carbon soot deposits from transboundary pollution sources, threatening water inflows into the Indus River System (IRS)
- Increased siltation of major dams caused by more frequent and intense floods
- Rising temperatures resulting in enhanced heat and water-stressed conditions, particularly in arid and semiarid regions, leading to reduced agricultural productivity
- Further decrease in the already scanty forest cover, from too rapid change in climatic conditions to allow natural migration of adversely affected plant species
- Increased intrusion of saline water in the Indus Delta, adversely affecting coastal agriculture, mangroves, and the breeding grounds of fish

- Threat to coastal areas due to projected sea level rise and increased cyclonic activity due to higher sea surface temperatures
- Increased stress between upper and lower riparian regions in relation to sharing of water resources
- Increased health risks and climate change-induced migration.

Under the influence of all these factors the Water Security, the Food Security and the Energy Security of the country are under serious threat. Compounding these problems are the expected increased risks to the coastal areas and the Indus deltaic region due to sea level rise, coastal erosion, saline seawater intrusion and increasing cyclonic activity in the Arabian Sea. The Indus Delta is already located in the intense heat zone and any rise in temperature would impact human health due to heat strokes, diarrhea, cholera, vector borne diseases; and human settlements due to frequent floods, droughts and cyclones. In this region, temperature is likely to increase by 4°C until 2100 and rainfall is going to be highly variable on temporal and spatial scale.

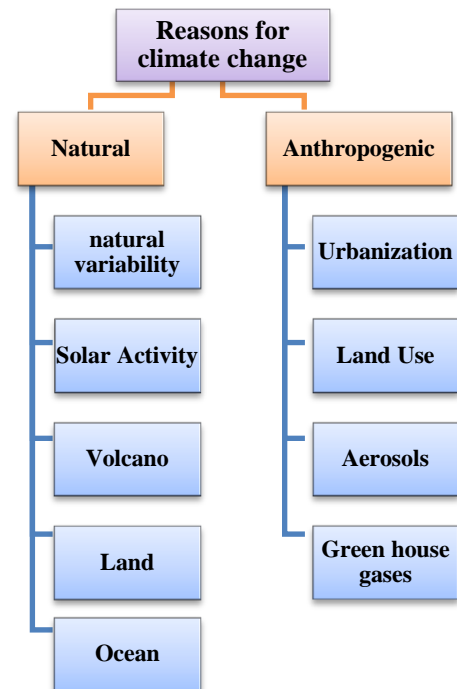
Reasons of climate change include natural as well as anthropogenic related to human activities. Anthropogenic reasons have surpassed the natural giving push to rapid warming of the biosphere. Following visible impacts of climate change can be observed in the country.

Water: Increased water demand due to frequent heat waves; widespread stress on water availability during drought; higher temperature may adversely affect HKH glaciers reserves, which are the main source of water supply in Indus river system (IRS); increased salt water intrusion in Indus delta.

Agriculture: Warmer temperatures in some areas may result in higher yields, but higher evapotranspiration and water deficit may affect crop yield in other areas. Warmer environment would increase the incidence of pest and disease. Increased extreme weather events would cause crop losses and land erosion in floods and reduced crop yields in droughts.

Energy: Increased energy demand because of higher temperatures. Decreased hydropower potential due to reduced water availability in long term.

Human Health: Increased risk of vector-borne disease (e.g. malaria, dengue) and heat related mortality due to warmer temperatures. Increased risk of deaths and injuries from extreme weather events and diarrheal outbreak due to reduced access to clean drinking water.



Ecosystem: Increased risk of extinction of many species due to the synergistic effects of climate change and habitat fragmentation: Increased threat to the stability of wetlands, mangroves and coral reefs.

Pakistan in general and Sindh in particular, has people, livelihoods and infrastructure exposed and vulnerable to climate change related disasters. Both the target districts Shikarpur and Kashmore are more susceptible to impacts of climate change i.e. extreme heat waves, super floods, drought and increased salinity of soil. These effects cause livelihood and food insecurities. Due to the rising frequency and intensity of these events, the dangers will be manifold in the times to come. It requires prevention, mitigation and adaptation strategies at local, provincial and national levels to promote disaster and climate change resilient societies in the future.

Why Are Poor People Most Vulnerable To Climate Change?

Poor countries and communities are more vulnerable to climate change because they tend to be located in geographically vulnerable areas. For example, the slums and informal settlements surrounding many developing country cities are usually sited on land prone to landslips or to flooding and riverbank erosion. Wealthy people, commerce, and industry can afford to situate themselves on safer land. Many poor communities are heavily dependent on natural resources for their livelihoods. Smallholder farmers have much experience of adapting to their complex, diverse, and risk-prone environments. However, farming is now becoming even more difficult and risky because of greater unpredictability in the timing of rainy seasons and the pattern of rain within seasons, making it more difficult to decide when to cultivate, sow, and harvest, and needing more resources to seize the right time for planting, and to maintain crops and animals through dry spells. Heat stress, lack of water at crucial times, and pests and diseases are serious problems that climate change appears to be aggravating.

Vulnerability to climate change is not just a function of geography, or dependence on natural resources; it also has social, economic, and political dimensions which influence how climate change affects different groups. Poor people rarely have insurance to cover loss of property due to storms or cyclones. They cannot pay for the healthcare required when climate change induced outbreaks of malaria and other diseases occur. They have few alternative livelihood options when their only cow drowns in a flood or drought kills their maize crop for the year.

Poor communities already struggle to cope with the existing challenges of poverty and climate shocks, but climate change could push many beyond their ability to cope or even survive. It is vital that these communities are helped to adapt the climate change phenomenon.

What Is Community Based Climate Change Adaptation (CBCCA):

Community-based adaptation to climate change is a community-led process, based on communities' priorities, needs, knowledge, and capacities, which should empower people to plan for and cope with the impacts of climate change. Some key CBA principles include -

- It is a **community-led** process - CBA operates at a community level. The focus is usually on vulnerable communities but can be applied in any community. CBA is about the community making choices, not having them imposed from outside, and should therefore enhance the ability of the community to have a wider range of choices in the future, establishing a community-owned vision of what their climate-resilient community should look like.
- Other change processes such as environmental degradation, weak governance and poor access to land and resources, often exacerbate risks faced by communities from climate-related causes.
- CBA complements **both the development and disaster communities**, and it adopts methods and tools from both. Likewise, as both development and disaster communities are trying to learn more about incorporating climate adaptation into their own activities, the different languages of the climate adaptation, development and disaster communities need to be translated and shared.
- The CBA plan is a living entity **subject to revision** particularly as new climate science becomes available and new adaptation priorities and funding to address them emerges.

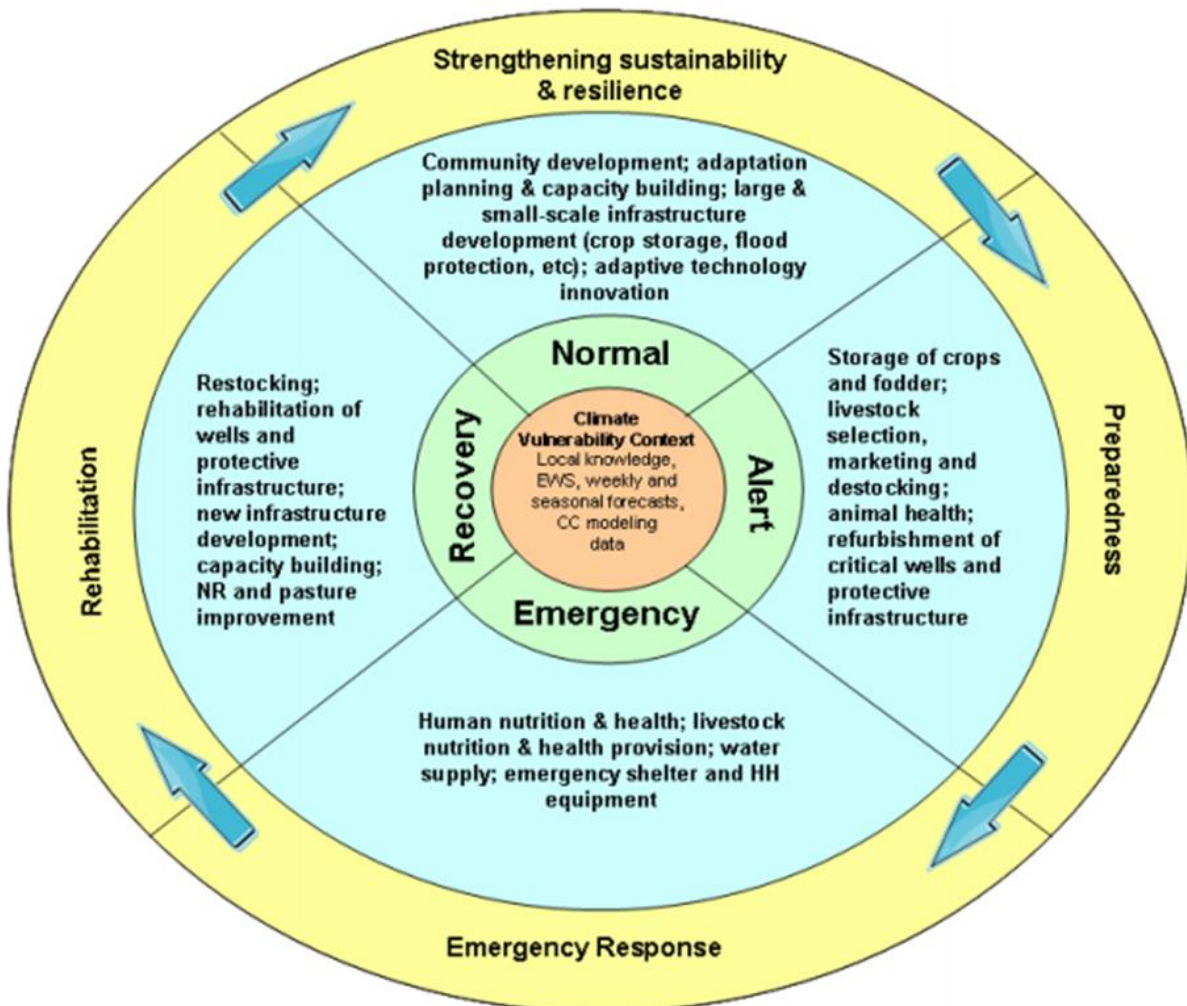
Climate Risk Cycle Management:

A climate risk cycle management approach takes as a basic starting point the inevitability of variation and changing trends and therefore the need to be proactively planning for future change, including inevitable emergencies. So if longer-term development is more resilience-focused, both the immediate impact of an emergency event and the recovery time from it are reduced. If a community moves through a complete cycle and returns to the “normal” stage, climate change will mean that, it is a slowly changing normality and so this needs to be integrated into community-based planning or community-based adaptation.

Some basic features when using a climate risk cycle approach to adaptation planning include:

- Building in a climate risk cycle management approach to the implementation of adaptation plans - the community determines which party of the cycle it is in and therefore the mix of adaptation/livelihood activities that need to be implemented. This therefore needs a sustainable link between both short-term weather forecasting/early warning institutions and longer-term climate change prediction capacity (these may not be completely different sources of information) to enable the determination by the community of **specific indicators** that trigger transition from one part of the cycle to the next and therefore which part of the cycle it is in and which interventions to implement. Indicators that are used to move from normal to alert and alert to emergency critically depend on effective early warning systems.
- It is more than likely that some adaptation will already have been implemented, so the extent that spontaneous adaptation by the community has been successful should be regarded as valuable experience that forms the basis for further planning.

- For planning in the **proactive part** of the cycle (normal and alert), the community-based adaptation plan distinguishes between priorities to be implemented in both the short (1-2 years) and the longer term (2-10 years). This should differentiate between:
 - Changes in structure: activities that address infrastructure (roads, flood defenses, etc – these are more likely to be relevant to all wealth ranks but not necessarily).
 - Changes in livelihoods: activities that protect or transform livelihoods (e.g. identifying more drought-resistant crops/crop varieties).



- Both of these can be supported by establishing a community-based adaptation fund to support livelihood projects or receive funds for infrastructure development.
- Situations may well occur in which a community moves from alert back to normal which, as long as it does not result in so many false alarms that community confidence in the system is eroded, is not a bad thing. However, moving from recovery back to emergency (the **reactive part** of the cycle) risks a community being caught in a **recovery trap**

which if repeated results in a downward spiral of diminishing assets and income and increasing vulnerability and poverty.

The aim of any risk cycle management approach is to maximise the time a community spends in the top right-hand half of the cycle (normal – alert) and minimise the time spent in the bottom left-hand half (emergency – recovery).

Participatory Tools Used In CCA:

Many of the participatory tools used in community based CCA. Most of them are familiar to us, as we have already discussed in detail in CBDRM and Participatory risk assessment. The below table provide an overview of tools utilized in community based CCA. During this process, they reinforced and expanded their own knowledge of climate change, with the input of external agents.

No	Participatory tool	Uses
1	Mental models	<ul style="list-style-type: none"> • Drivers and effects of climate change
2	Seasonal calendars	<ul style="list-style-type: none"> • Seasonality and link with livelihood • Can be combined with timelines to show perceived changes in seasonality over time
3	Timelines	<ul style="list-style-type: none"> • Hazards and events • Trends in climate e.g. temperature and rainfall
4	Community mapping and modelling	<ul style="list-style-type: none"> • Resources • Types and causes of risks and threats • Extent of vulnerable areas • Vulnerable household and individuals • Planning DRR/CC adaptation measures
5	Transect walk	<ul style="list-style-type: none"> • Vulnerability/risks • Land use • Resources
6	Ranking	<ul style="list-style-type: none"> • Vulnerabilities and hazards • Coping and DRR strategies, e.g. water management options, crop varieties
7	Dream maps and drawings	<ul style="list-style-type: none"> • Vision of community or farm and how to achieve
8	Theatre, poems, songs	<ul style="list-style-type: none"> • Awareness raising of risks and risk reduction measure • Advocacy
9	Participatory video	<ul style="list-style-type: none"> • Awareness raising • Farmer to farmer communication • Advocacy
10	Stakeholder analysis	<ul style="list-style-type: none"> • Institutions, relationships, power
11	Key informant discussions	<ul style="list-style-type: none"> • In-depth discussion of vulnerability, livelihood sources

Identifying and Planning Adaptation Activities:

Participatory ways of documenting, prioritizing, and sharing risk reduction and adaptation approaches are important if CBA is to fit with community priorities, and build on existing practices or those used in the past, for example traditional rice varieties which have better salinity tolerance than more recent varieties. Commonly mentioned on-farm adaptation options include diversification of the crops grown, changes in farming practices, better water management, and food storage. In extreme cases, for example, where droughts are likely to be of such magnitude that crops can no longer survive, then alternative livelihood strategies, or even migration may need to be explored. As farmers learn and take action at the farm level, the focus shifts to collective actions; such as sharing responsibility for collecting weather data, and implementing soil and water conservation measures.

Fifth IPCC report points out that Adaptation of freshwater resources to climate change can be identified as developing adaptive/integrated water resource management of the trade-offs balancing water availability against increasing demand, in order to cope with uncertainty and change. National Climate Change Policy 2012 envisages mitigation, as well as, adaptation measures in different sectors for fighting dangers posed by climate change. Energy sector mitigation measures include changing energy mix to increase the ratio of and promote renewable energy. It also suggests energy efficiency and conservation.

In agriculture and livestock sector, it suggests reducing GHG emissions from rice cultivation, reducing release of nitrous oxide from agricultural soils/ nitrogenous fertilizer, reducing GHG emissions from enteric fermentation and manure management. For forestry sector it advises carbon sequestration, develop national REDD+ strategies, programs, and accessing carbon markets.

Climate change adaptation measures, as proposed in National Climate Change Policy 2012, place water resources adaptation at first priority. Water resources adaptation measures contain water conservation strategies, water management by building small and large water reservoirs and capacity building of farmers and irrigation officials.

Types of Participation:

Communities can be classified on the bases of their participation level in CBA process

No	Type of participation	Characteristics
1	Passive participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management without listening to people's responses. The information being shared belongs only to external professionals
2	Participation in information giving	People participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings as

		the findings of the research are neither shared nor checked for accuracy.
3	Participation by consultation	People participate by being consulted, and external people listen to views. These external professionals define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.
4	Participation for material incentives	People participate by providing resources, for example labour, in return for food, cash, or other material incentives. Much on-farm research falls into this category as farmers provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5	Functional participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6	Interactive participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies; that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions and so people have a stake in maintaining structures or practices.
7	Self-mobilization	People participate by taking initiatives independent of external institutions to change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

SESSION 13# IMPORTANCE AND NEED OF SOCIAL SAFETY NETS AND AVAILABLE INSTRUMENTS IN PAKISTAN:



Time: 60 minutes



Content:

- Defining social safety concept
- Importance and need of social safety nets
- Social welfare, social policy and social protection
- Social safety nets available in Pakistan



Objectives:

- Explaining the concept of social safety net and its importance.
- Defining Social welfare, social policy and social protection.
- Explaining the available social safety nets in Pakistan



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



Outcome:

- Participants learn about Social welfare, social policy and social protection
- Knowledge of participants enhanced on social safety net, its importance and available options in Pakistan.



References:

- The State of Social Safety Nets 2018 by World Bank Group
- Pakistan Economic Survey 2019-20
- https://en.wikipedia.org/wiki/Social_safety_net
- Sindh Social Protection Policy Note-2019

Defining Social Safety Concept:

The social safety net (SSN) consists of non-contributory assistance existing to improve lives of vulnerable families and individuals experiencing poverty and destitution. Examples of SSNs are previously contributory social pensions, in-kind and food transfers, conditional and unconditional cash transfers, fee waivers, public works, and school feeding programs.



The core idea of SSN can be understood as an analogy to a circus artist walking on a tightrope with a net hanging under it, ready to catch the artist if she falls. It is not helping her to get up on the line again, but prevents her from falling to the ground, avoiding potentially life-threatening damages. In the same way, the economic social safety net provides a certain minimum amount of welfare or safety that the society has agreed that no one should fall below.

Initially, social safety nets were intended for three purposes: Institutional reform, make the adjustment programs feasible politically, and most importantly poverty reduction. In the early 1990s the term "social safety net" surged in popularity. These programs were intended to restructure the economies of developing countries, and these countries introduced social safety nets to reduce the impact of the programs on the poorest groups.

Importance and Need of Social Safety Nets:

The increased importance of SSN over the last decades is also shown in UN's Sustainable Development Goals (SDG). One of the 17 goals is to eradicate poverty and among the sub-goals are implementing social protection systems and floors for everyone, and substantially reducing the potential impacts of environmental, economic and social shocks and disasters on the poor.

Social Welfare, Social Policy and Social Protection:

Social welfare is a type of government support intended to ensure that members of a society can meet basic human needs such as food and shelter. Social security may either be synonymous with welfare, or refer specifically to **social insurance** programs, which provide support only to those who have previously contributed (e.g. most pension systems), as opposed to social assistance programs, which provide support on the basis of need alone (e.g. most disability benefits). The International Labour Organization defines social security as covering support for those in old age, support for the maintenance of children, medical treatment, parental and sick leave, unemployment and disability benefits, and support for sufferers of occupational injury.

The social protection system refers to designing and implementing targeted social and economic policies aimed at reducing poverty and income inequality by providing relief to the most vulnerable and marginalized sections of the society. Social protection aims to enhance the capacity of poor and vulnerable people to manage economic and social risks, such as unemployment, exclusion, sickness, disability, and old age.

Social protection and labor (SPL) interventions are well recognized for promoting resilience, equity, and opportunity. The *World Bank 2012– 2022 Social Protection and Labor Strategy: Resilience, Equity, and Opportunity* argues that SPL systems, policies, and instruments help individuals and societies manage risk and volatility and protect them from poverty and destitution (World Bank 2012). Equity is enhanced through instruments that help protect against destitution and promote equality of opportunity. Resilience is promoted through programs that minimize the negative effect of economic shocks and natural disasters on individuals and families. Opportunity is enhanced through policies and instruments that contribute to building human capital and facilitate access to jobs and investments in livelihoods. SPL instruments generally fall into the following three categories:

1. Social safety net (SSN)/social assistance (SA)

These programs are noncontributory interventions designed to help individuals and households cope with chronic poverty, destitution, and vulnerability. SSN/SA programs target the poor and vulnerable. Examples include unconditional and conditional cash transfers, noncontributory social pensions, food and in-kind transfers, school feeding programs, public works, and fee waivers.

2. Social insurance programs

These programs are contributory interventions that are designed to help individuals manage sudden changes in income because of old age, sickness, disability, or natural disaster. Individuals pay insurance premiums to be eligible for coverage or contribute a percentage of their earnings to a mandatory insurance scheme. Examples include contributory old-age, survivor, and disability pensions; sick leave and maternity/ paternity benefits; and health insurance coverage.

3. Labor market programs

These can be contributory or noncontributory programs and are designed to help protect individuals against loss of income from unemployment (passive labor market policies) or help individuals acquire skills and connect them to labor markets (active labor market policies). Unemployment insurance and early retirement incentives are examples of passive labor market policies, whereas training, employment intermediation services, and wage subsidies are examples of active policies.

Social Safety Nets Available In Pakistan:

In Pakistan, owing to the government's welfare orientation and commitment towards the achievement of Sustainable Development Goals (SDGs), social protection has gained high priority, and the government is determined to prepare and implement all-inclusive social protection policies that have transparent and manageable targeting system. In the post-devolution scenario, both federal and provincial governments are jointly working towards the achievement of optimal social protection and minimum social exclusion.

Pakistan's multi-sectoral poverty reduction strategy encompasses targeted interventions, such as the Benazir Income Support Programme (BISP), alongside private philanthropy and improved access to microfinance. Key social safety initiatives include Pakistan Bait-ul-Mal, Zakat, and Ushr programmes, Employees Old-Age Benefits Institution (EOBI), the Worker's Welfare Funds (WWF) and provincial Employees' Social Security Institutions.

Recognizing the need to protect the poor and the vulnerable, the government is carrying out several social safety net programmes. The following social safety nets are the major initiatives to reinforce the government's efforts to reduce the adverse effects of poverty on the poor:

1. Benazir Income Support Programme (BISP)

The BISP is a federal unconditional cash transfer programme for the poorest segment of the society. Due to its importance for the current Govt., the budgetary allocation has been increased up to 180 billion in FY2020. The number of beneficiaries now stands at 4.5 million families. It is in line with the prime minister's vision of financial inclusion of poor women through one woman-one account as envisaged under the Govt. flagship Ehsaas programme. BISP is engaged with following development partners;

- i. World Bank
- ii. Department for international development (DFID)
- iii. Asian development Bank (ADB)

Major initiatives under BISP are as following:

- **Unconditional Cash Transfer (UCT) programme** has been strengthened as the Kafalat programme. Through which monthly cash stipend of 2000 will be given to at least 7.0 million most deserving and poorest women all over the country.
- **EHSAAS Emergency** cash programme for vulnerable/affected families due to COVID-19 pandemic has also been observed.
- **Conditional Cash Transfer (CCT) Waseela-e-Taleem**

BISP is currently implementing the CCT programme linked with primary education in 50 districts of the country. BISP has plans to expand the programme coverage in additional 50 districts of the county in 2020. The overall objective of this programme is to incentivize primary education through regular cash transfers and to encourage investment in human capital development. Under this programme, top-up of Rs 750/- quarter is distributed to the beneficiary children enrolled in primary education conditional upon 70 percent attendance compliance. To promote girls' enrollment and to eliminate gender gap, cash grant for girls has been revised upwards to Rs 1,000/- per quarter from FY2020.

- **CCT (Health and Nutrition)**

BISP has designed a CCT intervention to accelerate the take up of health and nutrition services amongst its beneficiaries. The programme will be piloted in 9 districts of the country to test the feasibility of implementation design in the first phase. One district each will be selected from four provinces, and one district each will be selected from AJK erstwhile FATA, and three districts will be selected from GB. The programme will cover around 122,000 beneficiaries over a period of three years.

2. Pakistan Poverty Alleviation Fund (PPAF)

PPAF is a flagship poverty reduction strategy of the country. The funding provided to PPAF is dedicated to micro credit, enterprise development, community-based infrastructure and energy projects, livelihood enhancement and protection, social mobilization, and capacity building institutional assistance for the partner organizations of the PPAF.

- **The PPAF under Ehsaas Programme**

The present government has launched the National Poverty Graduation Initiative (NPGI) under the flagship Poverty Alleviation Programme 'Ehsaas' organized by the PPAF. Key components of the initiative include (i) Asset Transfers,(ii) Vocational and Skills Training, and (iii) Interest-Free Loans (IFL).

Under the NPGI, following two major programmes are being implemented by the PPAF.

- i. **National Poverty Graduation Programme (NPGP)**
- ii. **Interest-Free Loan (IFL) Programme**

3. Micro Finance Initiatives:

The Pakistan Microfinance Network (PMN) is the national association for retail players in the microfinance industry with a membership of 46 microfinance providers, including Microfinance Banks (regulated by SBP) and Non-Bank Microfinance companies (regulated by SECP). The microfinance industry broadly provides services in three categories of micro-credit, micro-savings, and micro-insurance.

4. Zakat:

The subject of Zakat was devolved to the provinces and federal areas following the 18th Constitutional amendment. The federal government is responsible for the collection of Zakat and its distribution to the provinces/federal areas in accordance with the Zakat distribution formula approved by the Council of Common Interests (CCI). A total amount of Rs 9,256.66 million was collected during FY2019 and distributed during FY2020.

5. Pakistan Bait-ul-Mal (PBM):

The PBM is significantly contributing towards poverty alleviation by providing assistance to destitute, widows, orphans, invalid, infirm, and other needy persons irrespective of their gender,

caste, creed, and religion through its establishment at the district level. From July to March FY2020, the PBM has disbursed an amount of Rs 2.705 billion through its following core projects/schemes.

- **Individual Financial Assistance (IFA):** Through the IFA, poor, widows, destitute women and orphans are supported for medical treatment, education, and general assistance.
- **Child Support Programme (CSP):** This is a CCT programme¹, in which cash incentive is provided to the parents for sending their children to schools.
- **Institutional Rehabilitation for NGOs:** The PBM provides grant-in-aid to registered NGOs having a good track record aimed at institutional rehabilitation of the poor and deserving persons of the society.
- **Schools for Rehabilitation of Child Labour (SRCLs):** The PBM has established 159 SRCLs countrywide since 1995 for primary (non-formal) education.
- **Women Empowerment Centers (WEC):** Vocational Training Centres, now called Women Empowerment Centers have been established throughout the country since 1995.
- **Dar-ul Ehsaas/Pakistan Sweet Homes:** 35 Pakistan Sweet Homes (orphanages) are established for the orphan children where they are being provided free food, nutrition, medical treatment, boarding, and lodging, as well as free education through well-reputed educational institutes.
- **Pakistan Great Homes (PGH):** Presently, two PGHs have been established on a pilot basis in Lahore and Karachi. Thereafter, this initiative would be scaled-up to provincial headquarter level and at divisional/district level in a phased manner. The enrolled seniors' citizens (above 60 years of age) are being provided free of cost boarding/lodging, messing, and medical care of excellent standard at the district level throughout the country.

6. Employees Old-Age Benefits Institution (EOBI):

The EOBI provides monetary benefits to old age workers through various programmes such as Old Age Pension, Invalidity Pension, Survivors Pension, and Old Age Grants.

7. Workers Welfare Fund (WWF):

The WWF was established under the Workers Welfare Fund Ordinance, 1971, for providing low-cost housing and other amenities to the industrial labour.

Major Social Protection Programs in Sindh:

Program	Department	Funding Source	Overall goal of program
Guzara Allowance	Zakat & Ushr Department	Provincial Budget	Provision of assistance to deserving families having destitute, widow and old aged persons for daily dietary needs
Union Council Based Poverty Reduction Program (UCBPRP)- Community Investment Fund (CIF)	P&D - (Sindh Growth and Rural Revitalization Program) SGRRP	Provincial Budget	UCBPRP is a women targeted program providing income generating grants, interest free loans, construction of low cost housing , training, water schemes, and education and health Services.
Sindh Social Relief Fund	Finance Department	Provincial Budget	Provide relief to the vulnerable and disadvantaged people of Sindh
Sindh Skills Development Project, component-I	Benazir Bhutto Shaheed Youth Development Program (BBSYDP)	Provincial Budget	Addresses poverty and unemployment through youth based human resource development
UCBPRP - Vocational Training programs (VTP)	P&D - SGRRP	Provincial Budget	Provide vocational training to women
UCBPRP – Income generating grant	P&D - SGRRP	P&D - SGRRP	Provide Income Generating Grants & interest free loan to women
Provision of Solar Pumps Subsidy to Farmers (50%)	Agriculture Department	Provincial Budget	Provision of solar water pumps/ tube wells on subsidized rates to farmers in Sindh
Provision of power sprayer to growers on 50%	Agriculture Department	Provincial Budget	To enhance agriculture production by provision of machinery at subsidized rate.

SESSION 14# PROMOTING CLIMATE RESILIENT LIVELIHOOD OPPORTUNITIES:



Time: 90 minutes



Content:

- What is climate resilient livelihood?
- Why climate resilient livelihood?
- Resilient livelihood strategies
- Diversification
- Protection
- Seasonal calendar important tool
- Strengthening
- Engaging local government units in dialogue for support



Method:

PPT Presentation, Brainstorming, Discussion, and Group work and Question answers.



Outcome:

- Participants will be able to define Climate resilient livelihood (CRL).
- Participants will learn the importance of CRL.
- Participants will learn the available strategies for CRL.
- Participants will be able to engage local government units in dialogue for support



Objectives:

- Defining the concept of Climate resilient livelihood (CRL).
- Explaining the importance of CRL.
- Explaining the available strategies for CRL.
- Briefing how to engage local government units in dialogue for support



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

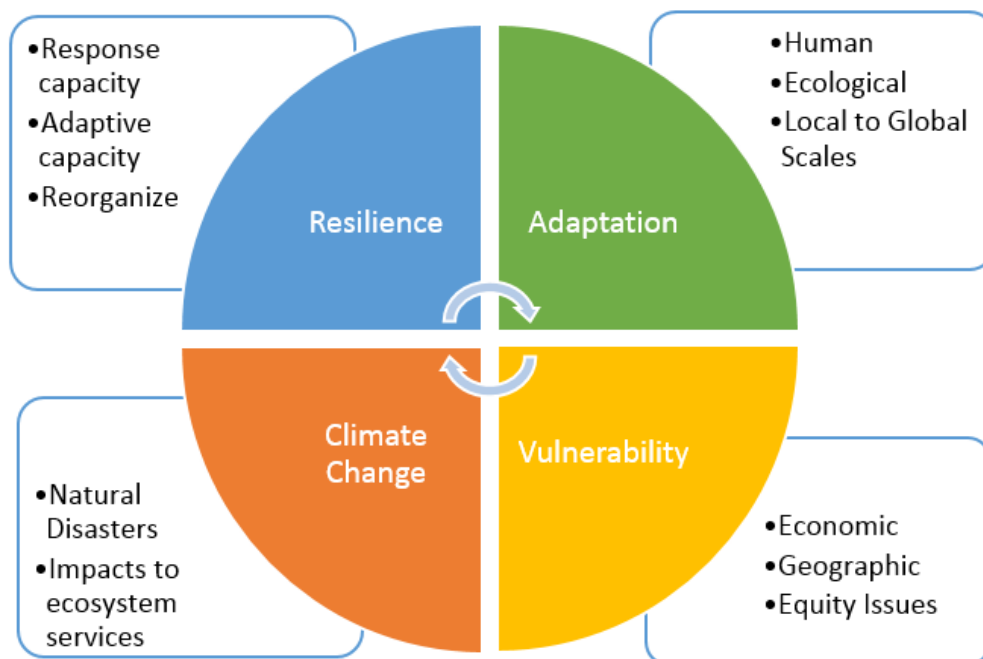
- Resilient livelihood-2018 by CARE ACCORD and Partners for resilience
- https://en.wikipedia.org/wiki/Climate_resilience

What is climate resilient livelihood?

Climate resilience can be generally defined as the adaptive capacity for a socio-ecological system to:

- (1) absorb stresses and maintain function in the face of external stresses imposed upon it by climate change, and
- (2) Adapt, reorganize, and evolve into more desirable configurations that improve the sustainability of the system, leaving it better prepared for future climate change impacts.

On the other hand a livelihood is a means of making a living. It encompasses people's capabilities, assets, income and activities required to secure the necessities of life. Thus a livelihood is climate resilient and sustainable when it enables people to cope with and recover from shocks and stresses (such as natural disasters and economic or social upheavals) and enhance their well-being and that of future generations without undermining the natural environment or resource base.



A conversation about climate resilience is incomplete without also incorporating the concepts of adaptations, vulnerability, and climate change. If the definition of resiliency is the ability to recover from a negative event, in this case climate change, then talking about preparations beforehand and strategies for recovery (aka adaptations), as well as populations that are more or less capable of developing and implementing a resiliency strategy (aka vulnerable populations) are essential. This is framed under the assumed detrimental impacts of climate change to ecosystems and ecosystem services.

Why climate resilient livelihood?

Disasters cause substantial losses not only in lives but also in livelihoods. Chronic disasters cause the adverse impacts of these losses to accumulate by not allowing affected households to rebuild their livelihoods and recover. The accumulated negative impacts of recurring disasters on household livelihoods have long-term effects, reinforcing intergenerational transmission of poverty and pushing poor households further into greater vulnerability. Damage to livelihoods resulted not only in already limited income sources becoming further diminished, but also in households losing one or more of their food sources. To cope with the loss of livelihoods and to meet their critical needs, households resort to a number of coping strategies, including negative ones such as the sale of remaining assets, reduced food consumption, sending family members elsewhere for work, child labor or begging (OCHA, 2013).

Thus, climate resilient livelihoods are of prime importance in the climate change scenario. Therefore, a person or family can survive from the negative impacts of recurring disasters on household and livelihoods. In order to break the cycle, households and communities need to protect their livelihoods from future losses by building resilience. With households adopting resilient livelihood strategies, losses will be avoided or reduced, and there will be less of a need to resort to negative coping strategies. Households will become less vulnerable to the impacts of climate change and recurring natural hazards

Resilient livelihood strategies:

Resilient livelihoods as a practice has evolved through various humanitarian actions in response to disasters, with theoretical and practical contribution from other humanitarian and disaster risk reduction, climate change adaptation, and ecosystem management and restoration (also referred to as integrated risk management) projects. Households can make their livelihoods more resilient by adopting strategies to diversify, protect, and strengthen livelihood assets and capacities. Sustainable agriculture and working with natural technologies are not new. They are long-time practices that have been proven effective.

Diversification:

Livelihood diversification is defined as a strategy of households of having diverse capacities and assets and engaging in diverse activities to support their means of living. A household whose primary means of living is agriculture can also engage in fishing, retail trade, or daily labor as additional livelihood activities. Growing a variety of crops, as opposed to the practice of monocropping, is also an example of livelihood diversification.

- **Crop diversification through relay cropping:** Relay cropping is a method of multiple cropping where one crop is seeded into standing second crop well before harvesting of second crop. Relay cropping may solve a number of conflicts such as inefficient use of available resources, controversies in sowing time, fertilizer



application, and soil degradation. Relay cropping is a complex suite of different resource efficient technologies, which possesses the capability to improve soil quality, to increase net return, to increase land equivalent ratio, and to control the weeds and pest infestation.

- **Diversification of livelihoods:** It can be achieved by engaging community members in other livelihood activities, including non-agriculture-based livelihood activities. Identified alternative livelihood activities should be less prone to hazards, climate shocks, and other stresses.

Protection:

Protection means taking active measures to safeguard livelihood assets from sustaining damage from natural hazards and climate change impacts, as well as to ensure that livelihood activities do not contribute to exacerbating environmental and other risks. Risk-informed household and community livelihood strategies are examples of protective measures.

- **Risk-informed livelihood plans:** Livelihood plans are informed by the result of the risk assessments conducted by the community. Risk assessments are standard activities introduced to the community to inform other activities of the village such as contingency planning, risk reduction planning, household and community livelihoods, shelter, and water supply, sanitation, and hygiene (WASH), among others. For livelihoods, household and community members are asked to identify hazards that could inflict damage on their livelihoods and to incorporate measures that would reduce the impact of those hazards. Examples of risk reduction measures include ensuring that assets are not located in hazard-prone areas; and community contingency plans include mechanisms for securing livelihood assets. Households and community members are also asked to look into their livelihood plans to see whether activities could exacerbate existing risks or create new ones. Once risks were identified, they incorporated the corresponding risk reduction measures in their livelihood plans.
- **Harnessing ecosystem services to reduce risks:** Resilient livelihood activities and mitigation activities (e.g. water systems that incorporate risk reduction measures) will be supported on the condition that communities will undertake ecosystem restoration activities. This activity will be aimed to improve, restore forests ultimately forest's ecosystem service of regulating flood, and riverbank erosion would be enhanced. In the long term, lives and livelihoods will be better protected from floods and erosion.

Seasonal calendar important tool:

The seasonal calendar, a risk assessment tool, is particularly useful in guiding households and communities on when to calendar livelihood activities in such a way that seasonal hazard events such as floods and droughts could be avoided or have minimized impacts.

SEASONAL CALENDAR												
EVENTS/MONTHS	J	F	M	A	M	J	J	A	S	O	N	D
Dry Season <small>NEON</small>												
Painy Season <small>WET</small>												
Hot days & nights												
Lean months												
Increased Income												
Security of Food												
Floods												

Strengthening:

Strengthening livelihoods includes measures such as building the technical capacities of households in relevant themes such as sustainable agriculture, financial management, organization development, and dialogue capacity in order to mobilize government support.

- **Technical and financial management capacity-building:** In addition to the distribution of cash and/or farm inputs such as seeds, farm machinery, and post-harvest facilities, capacity-building activities will also be helpful to strengthen the knowledge and skills of community members so that they can effectively manage the material inputs provided to them. These activities include:
 - Full training or at least a one-day orientation on integrated risk management (disaster risk reduction, climate change adaptation, and ecosystem management and restoration)
 - Facilitation of community risk assessment
 - Sustainable agriculture including organic farming
 - Project cycle management and financial management
 - Organization development and leadership training
- **Provision of livelihood assets towards the establishment of a community enterprise:** Acquisition of livelihood assets and establishment of community enterprises will be facilitated through the pooling of household resources, such as part of cash transfers. Acquisition of assets and establishment of community enterprises will be undertaken as a component of a community-agreed livelihood plan. Members will procure the assets themselves, with assistance from project staff. For farm, machinery and post-harvest facilities after-sales service and availability of repair parts will be ensured. Selected members will be trained to operate the assets that would be acquired. Community members will also adopt a management and sustainability plan such as the pricing of the service and/or commodity that the enterprise offers to members as well as non-members, and allocation of adequate budget for maintenance and repairs.
- **Community Organizing:** Organization is an essential component in resilient livelihoods. Every opportunity will take the community to strengthen organization. Strengthening resilience builds on this pervasive social capital.

In communities where members are not organized, they will be encouraged to form livelihood work groups that later on evolved into community enterprise groups, or full-fledged farmers' organizations. In some instances; if a farmer group has become formal, registered organizations; thus, it is qualifying them to access financial and technical support from mandated government agencies like the Department of Agriculture etc.

Engaging local government units in dialogue for support:

Local government authorities and national government agencies are key stakeholders in creating resilient livelihoods. The government has the mandate and resources that disaster-affected communities do not possess to make livelihoods more resilient. In all phases of the project cycle, government, especially local authorities, will be engaged to provide material, financial, technical, and policy support to community initiatives in resilient livelihoods.

The capacity of community members to engage government in dialogue will also be strengthened. This will give them confidence to approach government to seek assistance from a rights-based perspective. Many community members do not realize that they have the right to demand assistance from their government. Many government officials and employees also do not see service delivery as their constituents' human rights and the government's responsibility.

SESSION 15# CLIMATE RESILIENT/SMART FARMING PRACTICES:



Time: 90 minutes



Content:

- What is climate resilience farming
- Climate smart agriculture (CSA) an emerging approach
- Importance & benefits of CSA
- Various aspects of CS village/ farm (weather, water, energy, nitrogen, carbon, knowledge smart agricultural practices)
- Participatory discussion about different climate smart agriculture practices and chalking out best possible interventions at community level
- CS Push-pull crop technique
- Climate-smart push-pull addresses multiple constraints



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to define Climate resilient /smart farming.
- Participants will learn the importance of CSA.
- Participants will learn the CS push-pull crop concept.
- Participants will be able to identify the constraints that can be addressed by push-pull method



Objectives:

- Defining the concept of Climate resilient /smart farming.
- Explaining the importance of CSA.
- Explaining the available strategies for CRL.
- Explaining the CS push-pull crop concept
- Briefly describe the constraints that can be addressed by push-pull method



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- Climate smart agriculture concept note 2018 by concern world wide
- Climate smart agriculture source book- 2013 by FAO

What is Climate Resilient Farming/ Smart Agriculture?

Climate Smart Agriculture is a set of both new and old agricultural practices that are considered effective in helping farmers adapt to climate change and – among some groups – to mitigate climate change. FAO defines Climate Smart Agriculture (CSA) as “an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate” (FAO, 2017). CSA has three main objectives:

- Sustainably increase agricultural productivity and incomes
- Adapt and build resilience to climate change
- Reduce and/or remove greenhouse gas emissions where possible

Climate Smart Agriculture (CSA) an Emerging Approach:

CSA is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change. The magnitude, immediacy and broad scope of the effects of climate change on agricultural systems create a compelling need to ensure comprehensive integration of these effects into national agricultural planning, investments and programs. The CSA approach is designed to identify and operationalize sustainable agricultural development within the explicit parameters of climate change.

It is an integrated approach, responsive to specific local conditions. Coordination across agricultural sectors (e.g. crops, livestock, forestry and fisheries) as well as other sectors, such as with energy and water sector development is essential to capitalize on potential synergies, reduce trade-offs and optimize the use of natural resources and ecosystem services.

This approach also aims to strengthen livelihoods and food security, especially of smallholders, by improving the management and use of natural resources and adopting appropriate methods and technologies for the production, processing and marketing of agricultural goods. It maximizes the benefits and minimizes the tradeoffs. CSA takes into consideration the social, economic, and environmental context where it will be applied. Repercussions on energy and local resources are also assessed. A key component is the integrated landscape approach that follows the principles of ecosystem management and sustainable land and water use.

CSA is not a single specific agricultural technology or practice that can be universally applied. An approach requires site-specific assessments to identify suitable agricultural production technologies and practices. This approach:

- i. Addresses the complex interrelated challenges of food security, development and climate change, and identifies integrated options that create synergies and benefits and reduce trade-offs

- ii. Recognizes that these options will be shaped by specific country contexts and capacities and by the particular social, economic, and environmental situation where it will be applied
- iii. Assesses the interactions between sectors and the needs of different involved stakeholders
- iv. Identifies barriers to adoption, especially among farmers, and provides appropriate solutions in terms of policies, strategies, actions and incentives
- v. seeks to create enabling environments through a greater alignment of policies, financial investments and institutional arrangements;
- vi. Strives to achieve multiple objectives with the understanding that priorities need to be set and collective decisions made on different benefits and trade-offs
- vii. Should prioritize the strengthening of livelihoods, especially those of smallholders, by improving access to services, knowledge, resources (including genetic resources), financial products and markets
- viii. Addresses adaptation and builds resilience to shocks, especially those related to climate change, as the magnitude of the impacts of climate change has major implications for agricultural and rural development
- ix. Considers climate change mitigation as a potential secondary co-benefit, especially in low-income, agricultural-based populations
- x. Seeks to identify opportunities to access climate-related financing and integrate it with traditional sources of agricultural investment finance.

Importance & Benefits of CSA:

Climate change is manifested in a range of short-term weather events and long-term climatic trends that are deeply affecting agricultural systems, especially the rain-fed and subsistence ones. The most common changes we are witnessing are:

- Unreliable rainfall periods (delayed commencement or early cessation of rains)
- Erratic rains, leading to extended dry spells punctuated by intermittent rainfall events
- Heavier-than-usual rainfall events
- Above-average air and soil temperatures.

Resource-poor farmers are greatly affected by these changes that result in lower or failed agricultural production, higher incidence of pests and diseases, and an overall reduction in the efficiency and productivity of farming systems. There is an urgent need to adapt traditional agricultural system to these changes in order to make them more resilient to climatic shocks and stresses. Benefits of CSA are as following:

- increases productivity
- increases resilience (adaptation)
- reduces/removes GHGs
- enhances achievement of national food security and development goals
- Sustains the health of the land and increases productivity

- Does not pollute, degrade land or loss of forests and biodiversity
- Delivers food, fibre, fuel and incomes, carbon sequestration and reduce GHG emissions.

Various Aspects of CS Village/ Farm (Weather, Water, Energy, Nitrogen, Carbon, Knowledge Smart Agricultural Practices):

As we have already discussed that, climate smart agriculture is an integrated approach in which coordination across agricultural sectors (e.g. crops, livestock, forestry and fisheries), energy and water sectors, reduce trade-offs and the use of natural resources and ecosystem services have been applied in a synergy to achieve the climate resilience and wise use of resources to insure food security. According to this concept a village or farm that fulfills the given aspects, CSA can be called as climate smart village/farm.

Climate Smart Village/Farm					
Weather Smart	Water smart	Carbon smart	Nitrogen smart	Energy smart	Knowledge smart
<ul style="list-style-type: none"> • Seasonal weather forecast • ICT based agro-advisories • Index based insurance • Climate analogue 	<ul style="list-style-type: none"> • Aquifer recharge • Rain water harvesting • Community management of water • Laser leveling • On farm water management 	<ul style="list-style-type: none"> • Agro forestry • Conservation tillage • Land use systems • Livestock management 	<ul style="list-style-type: none"> • Site specific nutrient management • Precision fertilizers • Catch cropping • Legumes 	<ul style="list-style-type: none"> • Biofuels • Fuel efficient engines • Residue management • Minimum tillage 	<ul style="list-style-type: none"> • Farmer-farmer learning • Farmer networks on adaptation technologies • Seed and fodder banks • Market info • Off-farm risk management - Kitchen garden

Different Climate Smart Agriculture Practices:

There is a list of roughly thirty recommended CSA practices grouped into eight agricultural themes.

A. Crop Production Practices:

These are CSA practices at the farm/field level that are focused on crop production and aim to sustainably increase and diversify crop production to address the specific effects of climate change that cause moisture and / or heat stress in crops. CSA crop production systems and practices focus on preserving natural resources (soil and water) in order to sustain and increase production levels. This is done largely through practices that *protect the soil from degradation*

and erosion; enhance soil fertility; conserve soil moisture; strengthen seeds systems; control pests and diseases; and reducing harvest losses. See a list of recommended practices below.

- Crop diversification
 - i. Crop rotation
 - ii. Intercropping
 - Mixed cropping
 - Row intercropping
 - Relay cropping
- Reducing crop development periods
 - i. Cultivation of fast maturing crops
 - ii. Dry planting
 - iii. Seed priming
 - iv. Shocking
- Improved planting material (Seeds/cuttings)
 - i. Drought tolerance
 - ii. Flood tolerance
 - iii. Salt tolerance
 - iv. Bio-fortification
 - v. Disease resistance
- Seed systems and access to good quality seed
 - i. Collaborate with private and public stakeholders involved in the seed value chain
 - ii. Advocate for a policy environment that promotes diverse and inclusive seed systems
 - iii. Build farmers' capacities on improved practices of selection, saving and preservation of planting materials
 - iv. Promote seeds multiplication of improved varieties (OPV) at local level
- Integrated Pest Management (IPM)
 - i. Prevention and/or suppression of harmful organisms
 - ii. Harmful organisms monitoring system
 - iii. Use of pesticide
- Post-harvest management
 - i. Timing of harvest and grains moisture content
 - ii. Harvesting methodologies that minimize grain/pulse loss
 - iii. Transport of crops from field to households
 - iv. Crop drying methods
 - v. Crop shelling that reduces grain / pulse damage
 - vi. Grain / pulse storage
- System for Rice Intensification (SRI)

- i. Early and healthy plant establishment
 - ii. Minimize plant competition
 - iii. Build fertile soils rich in organic matter and soil biota
 - iv. Manage water carefully
- Small-scale mechanization
 - i. Hand-tool technology
 - ii. Animal-draught technology and Mechanical-power technology.
 - iii. Mechanical-power technology
- Agroforestry
 - i. Hedgerow/Alley cropping
 - ii. Improved fallows
 - iii. Biomass transfer
 - iv. Fodder banks
 - v. Woodlots
 - vi. Indigenous fruit tree production
 - vii. Farmer managed natural regeneration
 - viii. Windbreak
 - ix. Terrace stabilization/contour hedges
 - x. Home garden
- Index based insurance

B. Soil Management:

- Conservation Agriculture (CA)
- Integrated Soil Fertility Management (ISFM)
 - i. Residue retention
 - ii. Mulching (Biomass transfer)
 - iii. Cover cropping
- Reduced tillage
 - i. Zero tillage
 - ii. Minimum tillage
- Efficient use of organic/inorganic resources
 - i. Improved manure management
 - ii. Composting
 - iii. Micro-dosing
 - iv. Liming
 - v. Green manure
 - vi. Biochar

C. Water management:

- Blue water management
 - i. Increasing access to sources of water for irrigation
 - Rainwater harvesting
 - Manual pumps
 - Solar pumps
 - ii. Improving groundwater recharge (at farm and landscape level)
 - iii. High efficiency and modern irrigation systems
- Green Water Management
 - i. Slope catchment
 - ii. Micro-catchments
 - iii. Increase soil organic matter (SOM)
 - iv. Minimum tillage
 - v. System to capture divert and store excess water
 - vi. Reduce evaporation
 - vii. Supplementary irrigation
 - Drip irrigation
 - Gravity fed irrigation
 - Rooftop rain collection
- Multiple use of water services (MUS)

D. Livestock:

- Pastoralism and agro-pastoralism
 - i. Access to pasture and forage
 - ii. Access to water
 - iii. Access to mobile veterinary service
 - iv. Conflict resolution mechanism
 - v. Access to mobile services
- Animal health
 - i. Community Animal Health Workers (CAHWs)
 - ii. Veterinary treatment and drugs
 - iii. Support the public veterinary services
- Water for Livestock
- Livestock Feed
 - i. Ensure access to pastures
 - ii. Controlled and rotational grazing
 - iii. Conservation/storage of local natural
 - iv. Fodder production with highly nutritious/leguminous grass and shrubs species
 - v. Community fodder banks

- vi. Grazing in individual paddock
- vii. 7. Commercial feeds and concentrates, diet supplementation

- Livestock in Emergency

- **E. Natural Resources Management:**

- Sustainable Watershed/Catchment Management
 - i. Establishing community-managed forest lands
 - ii. Planting additional fast-growing multi-purpose trees
 - iii. Planting high-yielding perennial grasses along canal banks or water harvesting bunds on the rangelands
 - iv. Controlled grazing by negotiating community rights to grazing areas
 - v. Soil and Water Conservation (SWC) practices
- Sustainable Forest Management
- Woodlots/ plantations/ reforestation
- Farmer Managed Natural Regeneration (FMNR)

- **F. Energy:**

- Fuel Efficient Stoves (FES)
- Power generation: off-grid solar/wind power
- Biofuels

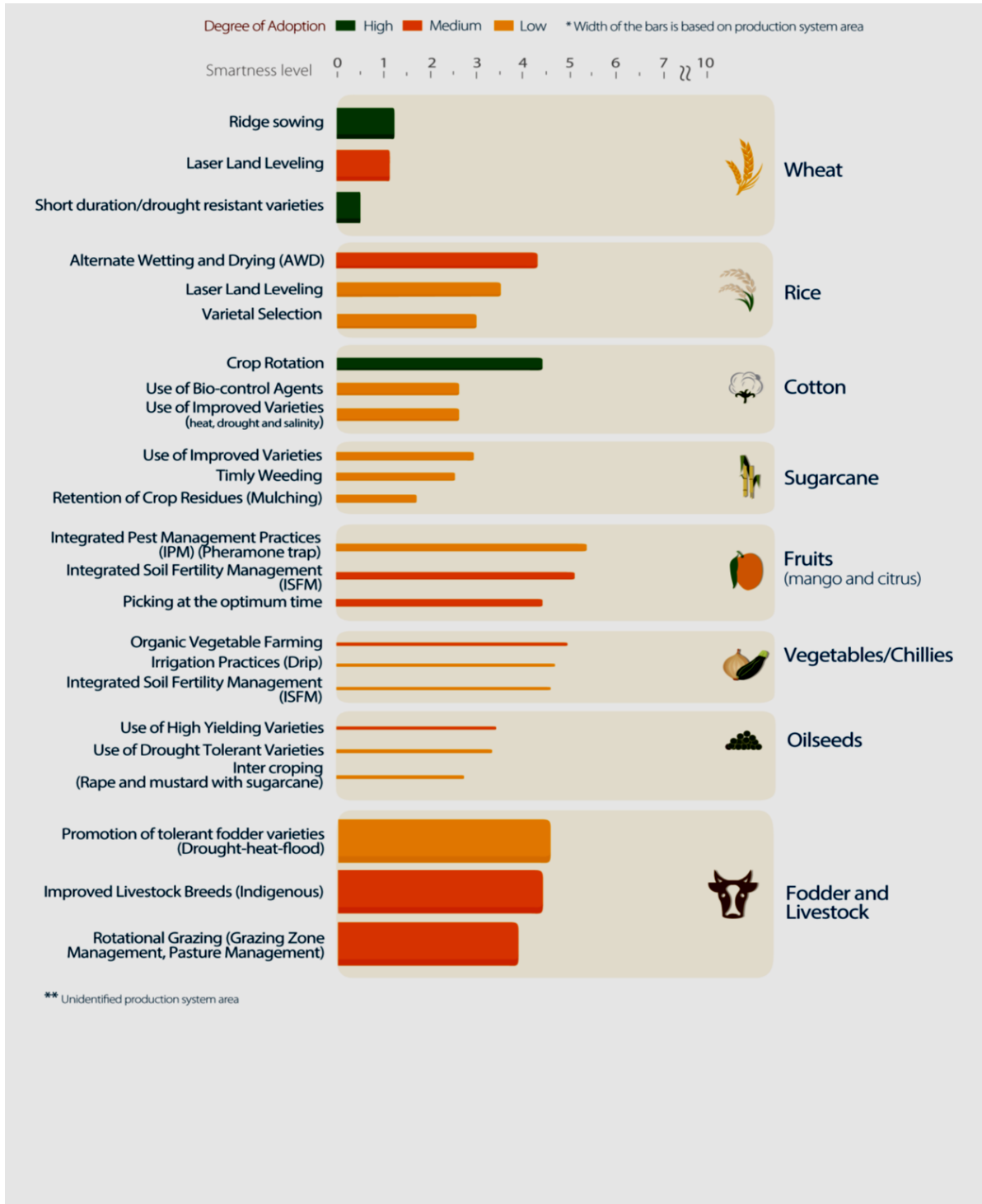
- **G. Coastal protection:**

- Reinforce and raise floods embankments
- Reinforce/build drainage systems
- Make raised beds or platforms on which to grow appropriate crops
- Practice fish farming in perennially-flooded areas
- Restore mangrove forests
- Divert river flow and sediments from the main rivers to areas flooded by rainwater
- Construct barriers across river mouths to prevent salt-water intrusion;
- Reinforce shelter and protection from hurricanes

- **H. Early warning system (EWS):**

- Provide timely and accurate climate information to farmers
- Provide weather forecasting to smallholder farmers
- Share national/regional Early Warning System information with local communities

Selected CSA Practices and Technologies for Production Systems Key for Food Security in Sindh:



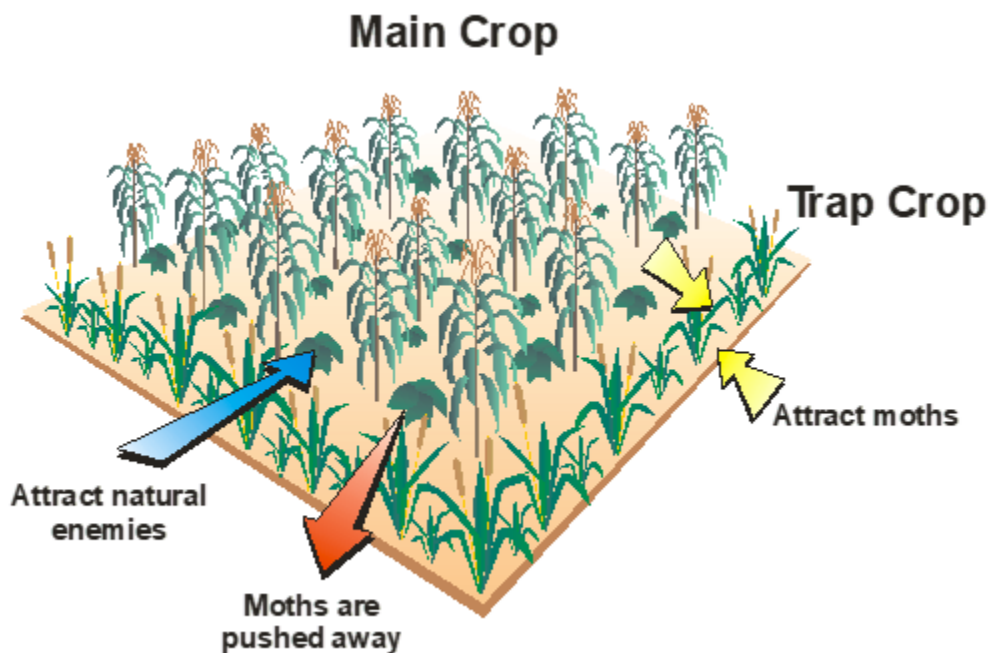
Source: CSA-profile- Sindh FAO-2019

CS Push-Pull Crop Technique:

Here we discuss just one example of climate smart cop technique for integrated pest management and analyse how much beneficial it is in various aspects of farming. A conservation of agriculture technology in food security and environmental sustainability.

What is 'Push-Pull' Strategy?

The 'Push-Pull' strategy is a novel approach in pest management which uses a repellent intercrop and an attractive trap plant. Insect pests are repelled from the food crop and are simultaneously attracted to a trap crop.



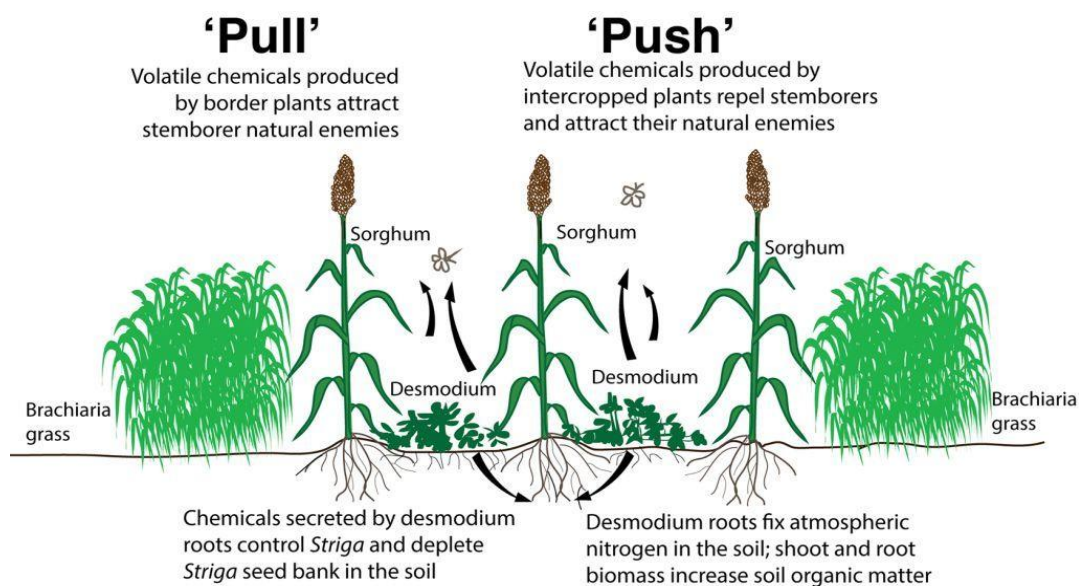
A healthy sorghum crop under climate-adapted push-pull. *Intortum* suppresses striga and stem borers by up to 100% and 70% respectively in sorghum, resulting in significant yield increases, from less than 1t/ha to about 3.2t/ha.

Pull: volatile chemicals produced by border plants attract stem borer natural enemies.

Push: volatile chemicals produced by intercropped plants repel stem borers and attract their natural enemies.

Chemicals secreted by desmodium roots control striga and deplete striga seed bank in the soil. Desmodium roots fix atmospheric nitrogen in the soil. Shoot and root biomass increase soil organic matter.





Benefits of Push-Pull technology:

- Farmers are technologically empowered
- Sustainable development Gender and social equity
- Stemborers and striga control
- Increased fodder production
- Nitrogen fixation and reduced soil erosion
- Increased forged seed production.
- Improved cattle health
- Increased household income
- Improved dairy production
- Improved FYM production
- Improved soil health
- Empowerment of women
- Improved human health
- Increased crop yield
- Conservation of biodiversity.

Climate-Smart Push-Pull Addresses Multiple Constraints:

Climate-Smart Push-Pull Addresses Multiple Constraints	
Major constraints	How Push-pull addresses Constraints
Low soil fertility	Increased nitrogen fixation by the intercrop
Degraded land	Control soil erosion; increased organic matter and soil physical properties
The parasitic striga weed	Striga control by the intercrop, striga seed depletion
Stemborer pests	Effective stemborer control by companion plants, and natural enemies
Moisture stress	Soil moisture conservation, improved water holding capacity by intercrops
Low crop yields	Increased cereal yields (maize from 1 to 3.5t/ha; sorghum 0.8t to 2t/ha; millet 0.4t to 0.8t/ha)
Shortage of livestock fodder	All year round quality fodder from the trap and intercrop plants leading to improved milk production
Loss of biodiversity	Increased abundance and diversity of beneficial organisms
Shortage of labour	Reduced labour requirement for land preparation and weed control

SESSION 16# CROP DIVERSIFICATION AND INTRODUCTION OF FLOOD AND DROUGHT RESISTANT CROPS:



Time: 60 minutes



Content:

- What is meant by Crop diversification
- Benefits/objectives of Crop diversification
- What is meant by Flood and drought resistant Crop
- Why do we promote resistant varieties
- Potential resistant varieties for target districts (Shikar pur, Kashmore)



Objectives:

- Defining the concept of crop diversification.
- Explaining the Flood and drought resistant Crop.
- Briefly describe the potential resistant varieties for target districts



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



Outcome:

- Participants will be able to define crop diversification.
- Participants will learn about drought and flood resistant varieties and its importance.
- Participants will be able to identify the potential resistant varieties for target districts.



References:

- Climate smart agriculture concept note 2018 by concern world wide
- <https://www.ctcn.org/technologies/crop-diversification-and-new-varieties>
- <https://agri.sindh.gov.pk>

What does Crop Diversification means?

Crop diversity is the variance in genetic and phenotypic characteristics of plants used in agriculture. The addition of different crops to farmers' fields helps to diversify risk away from partial or total crop failure attributable to climatic events, pest or disease infestations.

The amount of land a farmer can cultivate in a given season is often constrained by his or her access to land, inputs and labour. Therefore, crop diversification usually takes place in the following ways:

1. **Crop rotation:** The practice of growing different crops on the same area of land in subsequent and sequenced seasons;
2. **Intercropping:** When more than two crops are grown in complete spatial and temporal overlap with each other, it is referred to as intercropping. Intercropping is particularly useful in plots with limited land availability. Legumes are one of the most commonly intercropped crops, specifically legume-cereal mixtures. Legumes fix atmospheric nitrogen into the soil so that it is available for consumption by other plants in a process known as nitrogen fixation. The presence of legumes consequently eliminates the need for man-made nitrogen fertilizers in intercrops. The intentional cultivation of two or more crops simultaneously in the same field, which can take the following forms:
 - **Mixed cropping** – The cultivation of two or more crops on the same field without a row arrangement;
 - **Row intercropping** – The cultivation of two or more crops on the same field with a row arrangement;
 - **Relay cropping** – The cultivation of two or more crops on the same field after the first one has completed its vegetative or reproductive development.



Benefits/objectives of Crop diversification:

Crop diversification ideally involves balancing aspects of plant physiology (plant height and rooting depth), crop nutrient requirements (cereal crops following or associated with leguminous crops), and household economic and nutritional requirements to include protein or nutrient rich foods along with staple foods and / or cash crops. As a result, crop diversification helps farmers not only diversify risk, but also actually diversify the demands made on the soil leading to improved soil quality over time. Major driving forces for crop diversification include:

- Increasing income on small farm holdings
- Withstanding price fluctuation
- Mitigating effects of increasing climate variability

- Balancing food demand
- Improving fodder for livestock animals
- Conservation of natural resources
- Minimizing environmental pollution
- Reducing dependence on off-farm inputs
- Depending on crop rotation, decreasing insect pests, diseases and weed problems
- Increasing community food security

Few examples of crop diversification along with their benefits are as following;

Type of diversification	Nature of diversification	Potential benefit
Improved structural diversity	Make crops within the field more structurally diverse	Pest suppression
Genetic diversification in monoculture	Cultivation of mixture of varieties of same species in a mono culture	Disease suppression, increased production stability
Diversify field with fodder grasses	Growing fodder grasses alongside of food/pulse/oil seed/vegetables etc.	Pest suppression, opportunity to livestock farming
Crop rotation	Temporal diversity through crop rotations (sequential cropping)	Disease suppression increased production stability
Polyculture	Spatial and temporal diversity of crops (growing two or more crop species within the field)	Insect, pest disease suppression, climate change buffering and increased production
Agroforestry	Growing crops and trees together (spatial and temporal diversity)	Pest suppression and climate change buffering
Mixed landscapes	Development of large scale diversified landscapes through mixture of crops and cropping system with multiple ecosystems	Pest suppression and climate change buffering
Micro watershed based diversification	Integration of crop with other farming components for year round income and employment generation, besides sustaining soil and environmental health	Insect, pest and disease suppression, climate change buffering and increased production, employment and income

What Is Meant By Flood and Drought Resistant Crop?

A resilient agroecosystem will continue to provide a vital service such as food production if challenged by severe drought or by a large reduction in rainfall. In agricultural systems, crop biodiversity may provide the link between stress and resilience because a diversity of organisms is required for ecosystems to function and provide services

International and national agriculture research institutions are often key in developing seed varieties with traits that are resilient to non-typical climate events including. Drought tolerance in terms of yield distributions under different moisture stress conditions, and submergence tolerance in terms of number of days of submergence that crops can tolerate.

Drought tolerance is the ability to stand with limited or no supply of water. A crop variety is called drought tolerant/resistant when it has the capacity to cope with water stress. It is usually promoted via two strategies:

- a) **Early maturing varieties**, which are seeds that are developed to have a shorter germination-to-maturation period in the case of unreliable rainfall periods.
- b) **Reduced flowering / pollination varieties**, which are seeds that have a reduced flowering period, which is when plant production is most vulnerable to dry spells.

Flood tolerance is a trait most commonly associated with lowland rice production that reduces the yield loss due to excessive or extended submergence of rice plants. This is achieved by promoting seeds with either or both of the following characteristics:

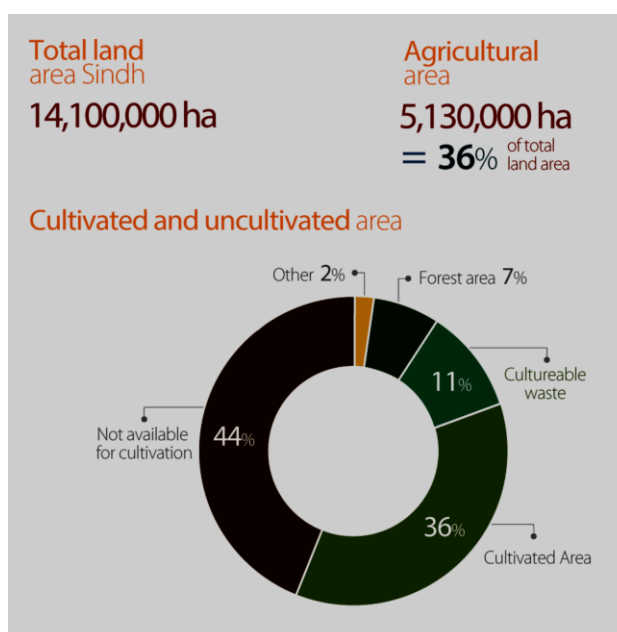
- a) **Anaerobic tolerance** - Flooded soils create often-low oxygen conditions that are harmful to germination and early-stage growth of rice. Anaerobic tolerant varieties overcome this condition, allowing for production that is more consistent independent of flood stages (Miro & Ismail, 2013)
- b) **Iron (Fe) tolerance** – Overabundance of iron cations (Fe^{2+}) under flood conditions in older, weathered soils can damage rice plant roots. Iron tolerant rice varieties can reduce damage to roots and subsequent damage to rice yields (International Rice Research Institute (IRRI), 2017)

Why Do We Promote Resistant Varieties?

In recent years, cycles of extreme drought and severe flooding have affected the country's water availability and crop production. The trend can be attributed to climate change. Exploration of drought and flood tolerant crop varieties to offset stress conditions that significantly constrain rice production, have been successful. With the development of new drought and flood-tolerant rice varieties, agriculturists hope to ease water constraints and ensure food security. New stress-tolerant technologies have the potential to reduce yield variability and help insulate farmers from the risks posed by these hazards.

Potential Resistant Varieties for Target Districts (Shikarpur, Kashmore):

Sindh is the third largest by area of the four provinces of Pakistan, occupying the lower Indus basin, covering 140,915km², 18 per cent of Pakistan's total land mass. The Indus Delta, the sixth largest delta in the world, is located at the mouth of the Indus River and covers almost the entire coast of Sindh. The province consists of six divisions: Karachi, Hyderabad, Sukkur, Mirpurkhas, Larkana, Nawab Shah and Shaheed Benazir Abad. Sindh's agricultural base is found along the Indus. The agricultural commodities produced in Sindh, namely cereal, fruits, and vegetables are used for both domestic consumption and export. The major production systems in Sindh are wheat, cotton, rice, and sugarcane, which occupy the largest cropped area in the province. The remaining production systems are considered minor crops and include bananas, mangoes, citrus, vegetables and oilseeds. Flowing are some approved varieties of major crops by Sindh agriculture department.



Major crop	Name of variety/ Approval year	Yield potential (mds/acre)
Cotton	Sindh-1 / 2010	42
	Malmal / 2010	40
	Mehran / 2017	56
	Bakhatwar / 2017	60
	Koonj / 2017	52
	Nusrat /2020	55
	Saami / 2020	56
	Shehzadi / 2020	60
Wheat	SKD-1/ 2006	70-75
	Imdad /2006	60
	Hamal-13 / 2013	70
	Benazir -13 / 2013	85
	Sindh / 2017	80
	I.V. 2 / 2020	80
Rice	Kanwal-95 / 1998	55
	Shahkar / 2006	78
	DR-16 / 2020	85
	DR-20 / 2020	80
	Sindh Sudhar / 2020	88
Sugarcane	Gulabi-95 / 1995	1200-1300
	Larkano-01 / 2006	1300-1400
	Q-88 / 2010	1200-1300
	Chandka / 2013	1300-1400
	Raja-14 / 2015	1300-1400

SESSION 17# PROMOTION OF LEGUMES IN CROP ROTATIONS:



Time: 45 minutes



Content:

- What are legumes?
- Benefits of legumes to increase soil fertility.
- Strategies to promote legumes in crop rotation.



Objectives:

- Explaining importance of legumes and its benefits.
- To orient the participants about the importance of crop rotation strategies.



Method:

PPT Presentation, Brainstorming, Discussion, and Group work.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers. Charts, Multi-color Markers, Masking tape.



Outcome:

- Knowledge of the participants will be enhanced about the legumes, its benefits to increase soil fertility, and strategies of crop rotation.



References:

- Climate smart agriculture a guidance note for country programs by Concern 2018
- Climate Smart Agriculture Policies, Practices and Financing for Food Security, Adaptation and Mitigation by FAO
- <https://www.saskatchewan.ca/business/-agriculture-natural-resources>
- <https://www.intechopen.com/books/legume-crops-prospects-production-and-uses/role-of-legumes-in-improving-soil-fertility-status>
- <http://www.parc.gov.pk/index.php/en/csi/137-narc/crop-sciences-institutue/712-national-coordinated-pulses-programme>

What are legumes?

Legumes, commonly known as beans and pulses, are plants of the family Fabaceae, also known as Leguminosae. Legumes are second to cereals in providing food for the world. In comparison to cereal grains, legume seeds are rich in protein, providing a highly nutritional food resource. The major staple foods such as beans, soya, lentils, peas and chickpeas are all legumes. Many legumes are used as food plants.

There are literally hundreds of varieties of different species of legumes, including beans and peas with different sizes, colours, shapes and growing habits. These represent a major component of the world's vegetables. In addition to those legumes cultivated for human consumption, many yield important fodders, green manures and forages, e.g. berseem, alfalfa, clover etc.



Legumes have a probably substantial position to play in enhancing soil carbon sequestration. They can also have considerable additional advantages beyond their significance involving nitrogen fixation and excessive protein feeds. These consist of advantageous impacts on biodiversity and soil quality. There is a great need for a strong focus on creating the role of legumes and their contribution to each the sustainable intensification of manufacturing and the livelihoods of small holder farmers in many components of the world.

Apart from their makes use of as food and fodder they have a very necessary position in retaining soil fertility by fixing atmospheric nitrogen and enhancing soil structures and adding organic matters. Moreover, it is generally used as an intercrop and covers plants, and sometimes, it is cultivated as emergency vegetation due to its brief life cycle. Since it requires low fertilizer and other inputs this crop is relatively profitable in a most economical point of view. It also improves environmental quality by sequestering carbon and mitigating other pollutants. Legumes are additionally a potential plant team in which some of the species having a capacity of remediating poisonous metals and organic pollutants.

Increased cultivation of legumes is integral for the regeneration of nutrient-deficient soils and for imparting wanted protein, minerals, and nutritional vitamins to human beings and livestock. Legumes can be an ability of improving the livelihoods of smallholder farmers round the world.

a) Legumes in human nutrition:

- As a supply of protein, grain legumes (such as pigeon pea, chickpea, soybean or mung bean) are a true supply of protein, with a protein content material ranging from 17 to 40%.

By combining cereal and grain consumption, farmers and their families can achieve protein stability and dietary improvement.

- As a supply of essential vitamins and minerals, legume seeds contain tremendous quantities of minerals (calcium, zinc, iron) and nutritional vitamins (folic acid and diet B).

b) Legumes for animal nutrition: Cereal crop residues supplemented with forage legumes notably increase normal animal productivity. For example, improved fowl egg production has been mentioned when pulse grains are protected in their feed. Adding the residue from legume flora into cattle forage can expand the digestibility and typical quality of cereal crop residues. For example, maize residues tend to be high in carbohydrates however low in protein; therefore, adding leguminous flora will make a contribution to multiplied livestock nutrition.



Legumes are the most important source of vegetable protein in Pakistan. They are cultivated on 5% of the total cropped area. Because of the population growth, demand for legumes is increasing day by day. There is a need to develop varieties with higher yield potential that respond to improved management practices so as to meet the increasing demand of legumes.

Major legume crops grown in the country are chickpea, lentil, mung bean, black gram or mash and soyabean. There are other summer and winter legumes such as peas, pigeonpea, cowpea (white lobia), moth bean, common beans and faba bean. These minor legumes are grown on small areas.

In Pakistan the legumes are grown mostly in rain-fed areas of marginal lands where soil fertility is low. The government all efforts are directed towards development of major cash crops but hardly any importance is given to grow more pulses and cereals. The total area under major legume crops in Pakistan is about 1.5m hectares. Among these legumes, peas and chickpea is the major winter food legume and mung is the major summer legume. Chickpea occupies 73% of the total legumes area with 76% contribution to the total production, whereas mung bean occupies 18% of total area devoted to legumes contributing 16% to the total legumes production. The black gram and lentil, each are cultivated on 5% of the total legumes area and each of them contributes 5% to the total legumes production.

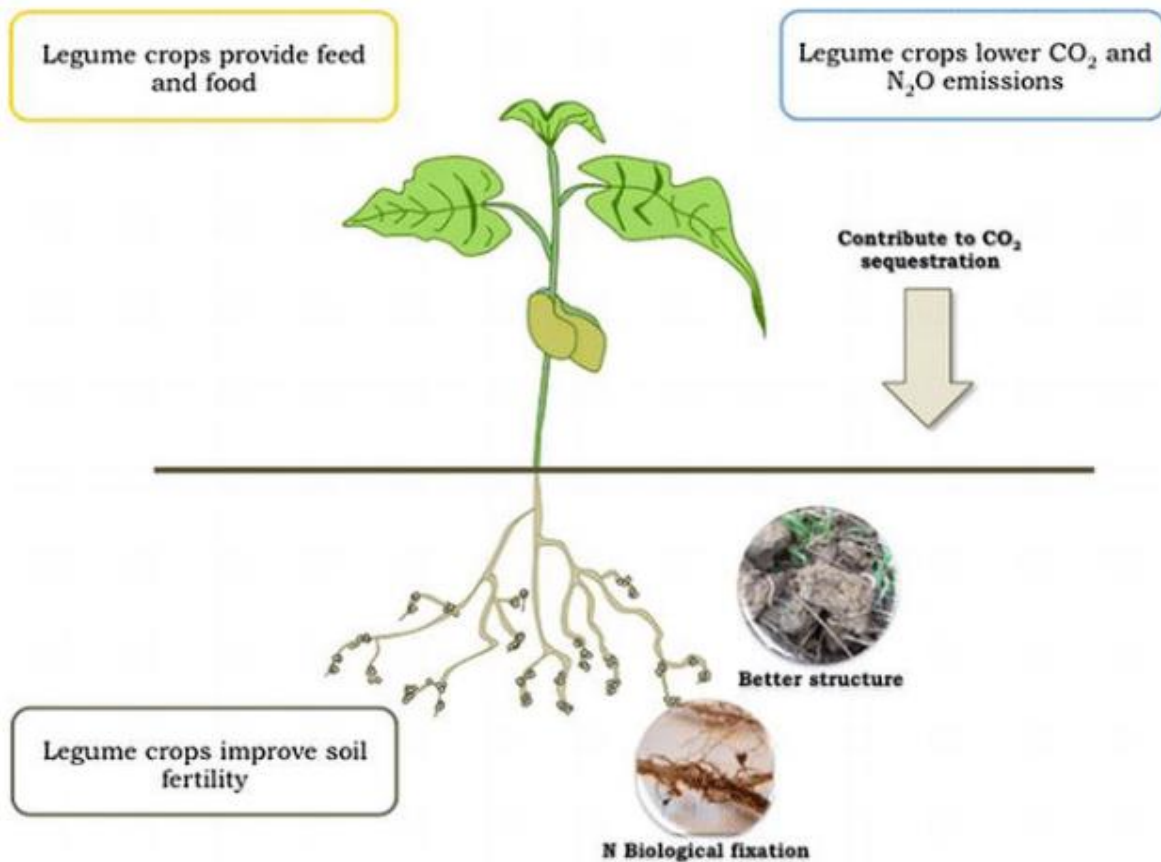


Benefits of legumes to increase Soil Fertility:

Apart from other plants, legumes have ability to fix atmospheric nitrogen making the land fertile for the next crop. As these are relatively high in protein which shows their ability to supply their own nitrogen needs. Legumes fix atmospheric nitrogen by small out growths or nodules on their roots. Nitrogen release from a legume plant occurs as the above ground plant residues and below

ground as roots and nodules which decompose gradually. After decomposition nitrogen become available to the next crop.

The amount of nitrogen fixed by an individual legume crop is strongly linked to their biomass productivity. Different legume crops have different ability to fix atmospheric nitrogen according to their biomass production and amount of nodules on their roots. For example, sweet clover, peas, lentil, soybean and chickpea can fix 105, 80, 60, 60 and 50 kg nitrogen per acre, respectively.



Legumes improve soil quality by adding organic matter to the soil with nitrogen and more carbon. Legumes facilitate decomposition of crop residues in the soil and their conversion to soil building organic matter through the soil microorganisms. Legumes are faster growers and produce greater biomass which ultimately adds organic matter to the soil. Legume plants help increase diversity of soil flora and fauna lending a greater stability to the total soil life. These provide additional nitrogen which helps soil microbes to break down carbon rich residues of different crops like wheat.

Legumes also improve physical properties of the soil. This improvement is attributed to increase in stable soil aggregates. Soil particles bind together into stable soil aggregates by the protein, glomalin secreted by legume roots which serve as binding agent. This aggregates stability increases soil pore space and improve soil tilth which reduces soil erosion and compactness.

Legumes root deeply into the soil and thus they have ability to recycle the plant nutrients from deeper soil profile. This makes possible for plants to use nutrients which are leached down beyond the root zone. This also increases the fertilizer use efficiency of the crop. By the penetration of legume roots deeper into the soil, soil porosity is also increased which increases air movement and water percolation in the soil.

Strategies to promote legumes in crop rotation:

Crop rotation is the practice of planting different crops sequentially on the same plot of land to improve soil health, optimize nutrients in the soil, and combat pest and weed pressure. A great advantage of crop rotation comes from the interrelationship of nitrogen-fixing crops with nitrogen-demanding crops. Legumes, like alfalfa and clover, collect available nitrogen from the atmosphere and store it in nodules on their root structure.

For example, say a farmer has planted a field of corn. When the corn harvest is finished, he might plant legumes, since corn consumes a lot of nitrogen and legumes return nitrogen to the soil.

Legumes can increase the yield of succeeding crops in the rotation and this benefit is called *rotation effect*. A **simple rotation** might involve two or three crops, and **complex rotations** might incorporate a dozen or more.

Legumes can be used efficiently in crop rotation. There are also substantial benefits for soil and the following crop. After harvesting of chickpea, about 42 kg of nitrogen is readily available for the sowing of the next crop.

Using in crop rotation, legumes reduce the grassy weed problems. The legume plants break the life cycle of many insects and diseases which is important for integrated pest management. Rotation of leguminous crops especially with grasses is very helpful for the control of soil erosion problems and for moisture conservation particularly in dry areas.

Supply of some nitrogen fertilizer may be advantageous with respect to fast growth and development. In addition to all other traits, many legumes are highly drought tolerant and grow well even in small amounts of water.

Types of Crop Rotation: Depending upon the duration, crop rotation may be of following three types:

1. **One year rotation:**
 - Maize – Mustard
 - Rice – Wheat
2. **Two years rotation:**
 - Maize – Mustard – Sugarcane – Methi (Fenugreek)
 - Maize – Potato – Sugarcane – Peas
3. **Three years rotation:**
 - Rice – Wheat – Mung – Mustard

- Sugarcane – Berseem
- Cotton – Oat – Sugarcane – Peas – Maize – Wheat

Selection of Crops of Rotation:

1. Source of moisture (through rain or irrigation).
2. Status of nutrients in the soil.
3. Duration of crop short or long.

Advantages of Crops Rotation:

1. Crop rotation helps in replenishment of soil fertility.
2. It prevents depletion of selective nutrients.
3. It prevents building up of diseases and pests of particular crop.
4. It enhances the production by increasing the soil fertility.

Crops Rotation Principles:

1. The crops with taproot should be followed by those, which have a fibrous root system. This helps in proper and uniform use of nutrients from the soil.
2. A shallow rooted grain crop, deep rooted cash crop and restorative crop (legume crop) should be included in the rotation for providing food, fodder, cash and maintaining the fertility and productivity of soil.
3. The leguminous crops should be grown after non-leguminous crops because legumes fix atmospheric nitrogen and add organic matter to soil. Apart from this, legumes need more phosphate and less nitrogen while non-legumes need more of nitrogen and relatively low phosphorus.
4. Selection of the crops should be based on soil and climate season.
5. More exhaustive crops should be followed by less exhaustive crops because crops like potato, sugarcane, maize, etc. need more inputs such as better tillage, more fertilizer higher number of irrigations, more insecticides, better care than crops like oil seeds, pulses, etc. which need little less care or little less inputs.
6. As per availability of irrigation water, two or three crops are taken in a year on same land under irrigated conditions. However a dry crop should be included in the rotation to avoid damage to the soil due to continuous irrigation.
7. In case of rain fed farming (assured rainfall) on moisture retentive soils after harvest of Kharif crop some minor crop requiring less moisture like pulses or cereals may be grown. e.g. Rice (Kharif) – Gram (Rabi).

8. The selection of crops should be problem based e.g. on sloppy lands which are prone to soil erosion, an alternate cropping of erosion promoting (erect growing crops like millet etc.) and erosion resisting crops like legumes, should be adopted.
9. Both wide spaced crop and thickly planted crops should be included in rotation for control of weeds. e.g. wide spaced crops like tobacco controls weeds due to frequent inter culturing and dense (thick) forage or legume crops control weeds and check soil erosion e.g. soybean.
10. Crops with different botanical relationship should be altered for control of weeds, pests and diseases, e.g. if crops of Wheat is grown, Rice crops should not be alternated.
11. Effect of previous crop on succeeding crop should be considered for obtaining maximum yield and harvest quality of produce.

SESSION 18# IMPROVED SOIL AND WATER MANAGEMENT AND IRRIGATION TECHNIQUES:



Time: 45 minutes



Content:

- What is water management at farm
- Defining soil management
- Objectives of water and soil management techniques
- Some most common Water and soil management techniques
- Potential water and soil management and irrigation techniques for target districts (Shikar pur, Kashmore)



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Outcome:

- Participants will be able to understand the concept of water and soil management
- Participants will learn about water and soil management.
- Participants will be able to identify the potential water and soil management for target districts.



Objectives:

- Defining the concept of water and soil management
- Explaining the common Water and soil management techniques.
- Briefly describe the Potential water and soil management and irrigation techniques for target districts



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts and Handouts.



References:

- Climate smart agriculture concept note 2018 by concern world wide
- <https://www.ctcn.org/technologies/crop-diversification-and-new-varieties>
- <https://agri.sindh.gov.pk>

What is water management at farm?

Global warming is speeding up the water cycle. The rate of evaporation is increasing overall, due to higher temperatures, from water bodies and wetlands, along with the rate of transpiration from vegetation. In addition, snow from glaciers and snow-covered areas is melting thus increasing sea levels. This means that this warmer air contains more moisture. Increased moisture results in changes such as floods, landslides, droughts, or more frequent, severe storms such as cyclones and hurricanes. Generally, wet areas will become wetter and dry areas drier, storms will come more often with heavier rain, and dry periods and droughts will happen more often or last longer.

Water that can be used for agriculture is categorized in *blue* and *green* water, the former is the water stored in lakes, rivers, streams and groundwater aquifers, while the latter is rainfall and water that is stored in the soil as soil moisture. Below you can find a list of recommended practices for a better utilization of both blue and green water. Some of the practices to increase the utilization of green water are similar to those of the *Soil Management*. Soil moisture retention is strongly linked to soil and plant management practices.

1. Blue Water Management

Blue water management, or managing water from lakes, rivers, streams and aquifers, generally falls into three categories of practice:

Increasing access to sources of water for irrigation:

A. Rainwater harvesting (field/farm/landscape):

- **Household level:** Small-scale rainwater basins/reservoir, roof-collection in plastic tank or underground cemented tanks, etc.
- **Community/Landscape level:** sand dam, pond, large reservoirs receiving water drainage (with or without aquaculture/fish production);

B. Manual pumps: Hip pumps and treadle pumps are basic pumps that can be operated by a single person, and can increase the distance from the source and the amount of water that can be moved from a shallow well, a stream or river to a garden or field.

C. Solar pumps: Though more expensive than manual pumps, solar pumps are nearly labour and cost free, and can be utilized to lift water into above ground storage for other use.

- **Improving groundwater recharge (at farm and landscape level):** Erosion control actions can increase the percolation of water from rainfall into the water table to better ensure supply of water for household and agriculture use during dry seasons.
- **High efficiency and modern irrigation systems:** Drip/micro irrigation systems that are hyper-efficient can achieve ‘more crops per drop’ by reducing the amount of water needed for irrigation whilst eliminating wastage of water. These systems can be enhanced with pumps to raised tanks.

2. Green Water Management

Green water management, or managing rainwater and soil moisture, can be categorized into seven categories of practices as follows:

A. Slope catchment: The following soil structures help to slow the speed of water moving across the land or down a slope. In this way, they prevent erosion and allow water infiltration down and to the sides, feeding plants during dry periods and recharging groundwater. Some of the water may percolate into the groundwater that supplies wells.

- Contour or stone bunds or strips or raised ridges often built on nearly flat to more steep lands in between crop areas to slow surface flow and trap rainfall. These are built at regular intervals along the contour of a field, perpendicular to the slope of the land. The distance between the bunds or ridges depends on the slope rate; closer bunds are built in more steep land. These structures prevent water from running downwards off the field by reducing the degree and length of the slopes. Bunds and strips can be greatly enhanced by the planting of perennial shrubs, grasses, or trees, which helps make the structures last longer and can provide additional benefits such as fruits, pest control, and the like.
- Infiltration ditches can be dug between the raised soil bunds/ridges to ensure water percolates to the crops root system downhill and also for supplementary irrigation. In addition, excess water percolates down through the profile and can recharge groundwater. Note that on steep or wide slopes, inclusion of diversion ditches should be considered to prevent catastrophic failure of contour structures in heavy rainfall events.
- Terracing is done in sloping piece of land and it's an adjustment of land profile by building steps and flat areas where farmers can grow crops

B. Micro-catchments: for crop establishment and dryland restoration. These are catchments built at field level and within the cropping area in order to collect water so that plants and trees can take advantage of the water above the ground before it runs off and/or sinks into the soil.

- For crops: planting basins, zai pits, demi-lune (half-moon) are all examples of small catchments that cause rainfall to gather and percolate into the soil directly at the base of crops. The Vallerani system is another system for micro-catchment of water through the use of a “dolphin”-type of plough that till the land by creating basins. More information on this can be found [here](#).
- For trees: through imprinting and net and pan system. This is a net of small basins designed to restore degraded land through small-scale catchment of water where the farmer can then establish pioneer trees or orchards. It is best for land that experienced overgrazing, over-cultivation or deforestation.

C. Increase soil organic matter (SOM): all practices that increase the amount of organic matter in the soil (for details see Soil Management section above) such as leaving crop

residues in the field, organic fertilization with manure or compost, cultivation of cover crops, etc., are all relevant to improve water retention in the soil. SOM improves soil structure and acts like a sponge in the soil and hence a soil rich of organic matter is better able to trap and retain more water for longer compared to degraded and sandy soils. It also promotes soil organisms in the soil that help in improving soil structures and soil aeration.

D. Minimum tillage: land preparation techniques that minimize the disruption of soil structures such as minimum or zero tillage are beneficial for water management and retention.

E. Systems to capture divert and store excess water: these are mainly to use water later when climate change brings periods of too much rain too quickly or to collect water outside the cropping areas.

- **Water harvesting** in basins and ponds that are dig nearby crop fields and where water can be used through a water distribution system (e.g. storing tanks and gravitational surface irrigation) and gravity-fed irrigation systems.
- **Rooftop collection** systems are usually done where roof gutters are installed that channel water into tanks or small reservoirs nearby the structure. The water can then be utilized for kitchen garden or other household uses.
- **Diversion ditches** are similar to contour ditches, but they are gradually sloping drainage ways that channel drainage water to contour ditches, basins, ponds or planted areas – pastures, gardens or wooded areas.
- **Improvement of soil infiltration** to slow runoff through use of vegetative cover, contour barriers or mixed tree-crop systems (see above). The use of Napier grass or elephant grass is also recommended to stabilize bunds or earthen dikes that can trap floodwaters. These are also fodder crops, which tolerates flooding, low amounts of water and infertile soils, withstands heavy grazing, and serves as a windbreak and firebreak.

F. Reduce evaporation: from the soil to reduce the amount of water loss due to high temperatures and wind. This can be achieved through:

- **Mulching:** by covering the soil as much as possible with crop residues and other plant materials so that the soil is not exposed to direct sunlight, reduce its temperatures and hence evaporation.
- **Shading:** by establishing small trees around and within the field to create a canopy layer and provide much-needed shade. Annual crops are grown within the protective microclimate of the trees. Few examples of drought resistant pioneer tree species used to regenerate drylands are, Acacia, Bauhinia spp., Cassia spp.
- **Wind barriers:** of stones or trees as live barriers, all reduce exposure to water loss and high temperatures.

G. Supplementary irrigation: This is a type of strategic irrigation that provides water for a short time during a dry spell or for a certain period in the dry season. It does use green water from rainfall, mainly through water harvesting techniques.

- **Drip irrigation:** this is one of the most water efficient irrigation system, ideal in areas where water is scarce and for small or medium plot size and for high value crops such as vegetables. Drip lines are placed on the surface of the soil near a row of plants and water drips slowly through the holes near the plants. There are different type of drip-irrigation systems, from more expensive to very cheap that use local materials. Some types are: 1) bamboo watering sticks 2) plastic bottle method with one or two bottles 3) clay pots near plants/trees 4) using buckets and a pipe system
- **Gravity-fed irrigation:** when the source of water is above the field to irrigate, gravity can work to move and distribute the water down to the crop. This system is usually cheap and easy to maintain, and best used for small areas. The main challenge of gravity-fed system is the insufficient pressure on the water from above can cause occasional low water flow.
- **Rooftop rain collection:** water from the roof that is sloped and made of metal or another non-permeable material can be collected in a tank or a barrel, and then used to irrigate a back-yard garden.

3. Multiple use of water services (MUS):

The MUS is a participatory approach that provides a framework for consultation between all the water users related to one specific watershed. It aims at rationalizing water use so as to secure its long term management and prioritize investments in it. The approach follows the same steps as a normal project cycle (analysis of the situation, prioritization, implementation, evaluation) with more time and resources allocated to the initial ones: thorough water needs and resources assessment and multiple consultations with water users to build a common, shared vision. Drinking, cooking, washing, sanitation, watering animals, growing food (agriculture, irrigation) and generating income (small business and industries that require water as an input) are the multiple uses of water. The overall idea is that by looking at all water needs and available water resources holistically, it is possible to make more cost-effective and sustainable investments that generate a broader range of health and livelihood benefits than is possible with single-use systems.

Achievements of the MUS approach are:

- **Resolving potential conflicts** of interest between different water users. Typically, between pastoralist and farmers.
- **Reducing risks for human health.** contamination of drinking water by animals
- **Increasing the sustainability of access to water services.** Rationalizing water use can reduce risk of water table depletion.
- **Offering new opportunities** of economic development

Soil Management:

CSA practices for soil management focus on preserving natural resources like soil and water, in order to sustain and even increase production levels through practices that protect the soil from degradation, enhance its fertility, and conserve soil moisture. These practices will ideally have both immediate and long-term benefits to soil resilience, usually through the increase in soil organic matter levels. There are two overall rubrics for soil management;

- Integrated Soil Fertility Management (ISFM) for improving soil fertility, and
- Conservation Agriculture (CA), which is aimed at building soil structure, and consequently, resilience.

It should be recognized that both concepts include multiple practices that often overlap with one another as well as field management concepts (e.g., cover cropping can build soil fertility, improve soil structure, and reduce pest / disease / weed infestations). The main practices comprised under CA and ISFM are presented below.

Conservation Agriculture (CA)	Integrated Soil Fertility Management (ISFM)
<p>CA is a set of soil management practices that minimize the disruption of the soil's structure, composition and natural biodiversity. CA has potential to improve crop yields, while improving the long-term environmental and financial sustainability of farming.</p> <p>This is achieved through the application of three key principles:</p> <ul style="list-style-type: none"> • Continuous minimum mechanical soil disturbance. • Permanent organic soil cover. • Diversification of crop species grown in sequences and/or associations. <p>Main benefits of CA:</p> <ul style="list-style-type: none"> • Increased soil organic matter and overall fertility • Increased soil moisture retention • Reduced soil erosion and runoff • Improved soil biodiversity • Increased productivity • Reduced farming costs <p>CA is considered one of the core CSA practices mainly for its ability to buffer the effects of dry-spell during plant growth due to its positive effects on soil fertility and soil moisture retention.</p>	<p>ISFM is defined as 'A set of soil fertility management practices that necessarily include the use of fertilizer, organic inputs, and improved germplasm combined with the knowledge on how to adapt these practices to local conditions in aim of maximizing the agronomic use efficiency of the applied nutrients and improving crop productivity. ISFM seeks that all inputs are managed following sound agronomic practices' (Vanlauwe et al. 2010).</p> <p>ISFM is based on the following principles:</p> <ul style="list-style-type: none"> • Practices neither based solely on mineral fertilizers nor solely on organic matter management are sufficient for sustainable agricultural production. • Well-adapted, disease- and pest-resistant germplasm is necessary to make efficient use of available nutrients. • Good agronomic practices - in terms of planting dates, planting densities, and weeding - are essential for ensuring the efficient use of scarce nutrient resources.

The maintenance of permanent or semi-permanent soil is cover to reduce erosion, prevent excessive soil evaporation, retain soil moisture, reduce weed growth and slowly build up soil organic levels.

- 1) **Residue retention** is maintaining the dead residues of crops and / or weeds on the field from the previous season;
- 2) **Mulching (bio-mass transfer)** is the act of physically covering the soil with a thick layer of dead organic matter, such as leaves, grass, dead crop residues, etc.;
- 3) **Cover cropping** is the practice of planting typically non-edible annual crops that produce large amounts of biomass after the existing crop has reached maturity. The intention of cover cropping is to grow the soil cover *in-situ*; subsequent crops are then seeded into the cover crop after it has been physically or chemically terminated, or has naturally died off. Leguminous cover crops will also biologically fix nitrogen in the soil, which will add to the organic nitrogen pool in the soil.

Crop Name	Cover crop tolerate
Cowpea	Drought, shade
Jackbean	Drought, low soil fertility, shade
Pigeon pea	Drought, low soil fertility
Velvet bean	Drought, low soil fertility

1) Reduced tillage:

Tilling (e.g., digging or ploughing) of the soil surface causes disrupts soil structure, and increase the oxidization of soil organic matter. These both lead to soil degradation as a result of wind and / or water erosion, as well as a loss of soil fertility through the loss of soil organic matter. Reducing tillage to what is required to plant the seed, and in some cases, incorporate organic fertilizers (e.g., manure, green tree leaves, ash, etc.) creates an environment in which soil biological processes can stabilize soil structure and develop higher soil organic matter levels.

- a) **Zero tillage** is absolute least amount of tillage used to plant seeds. Can be accomplished with the use of different levels of technology, such as dibble sticks, jab planters, Fitarelli planters, and the like. At best, zero tillage is carried out directly through a layer of dead surface organic matter.
- b) **Minimum tillage** is the practice of reducing the digging of the soil surface to that need to apply organic fertilizers, and in some cases, act as a catch basin for rains to maximize the

amount of moisture around the growing plants. Minimum tillage is carried out using basins or Zai pits at regularly spaced intervals.

2) Efficient use of organic/inorganic resources:

- a) **Improved manure management** – Aggregation and covering of animal dung to prevent loss (evaporation) of nitrogen, reduction of weed seeds, and availability of nutrients for plants.
- b) **Composting** - Heaping of organic materials such as leaves, grass, kitchen wastes, and where possible, animal dung, as means of creating a nutrient-rich organic fertility source for small farms.
- c) **Micro-dosing** – The placement of manure, compost or inorganic fertilizers to crops in such a way that those inputs are not wasted. For example, placing manure in a planting basin or Zai pit will benefit the crops later planted in that pit more than manure scattered across the soil surface.
- d) **Liming** – In soils with low pH levels, the application of lime to the soil will raise the soil's pH, which in turn makes other nutrients more readily available to plants.
- e) **Green manure** – A concept similar to cover cropping, except that rather than leaving the crop bio-mass on the soil surface, the crop biomass (leaves, vines, etc.) are incorporated into the soil before it reaches vegetative stage in order to provide a large quantity of green organic matter into the soil, thereby increasing both the organic matter and soil fertility.
- f) **Bio-char** – The addition of charcoal made from renewable resources such as reeds, ratoon or bamboo that has been mixed with compost or manure can improve the soil's capacity to hold moisture and nutrients.

Objectives of Water and Soil Management Techniques:

Objective of soil management is to increase organic matter and nutrients to a more healthy level for soil and plants when these factors are deficient, but not to a level that creates a risk for erosion or leaching of soluble nutrients. However, the objectives of water management techniques are to improve water productivity i.e. producing more crops per drop. The goal will be achieved through increasing delivery efficiency, adopting improved irrigation practices, promoting crop diversification, and effective application of non-water inputs. The project will have following key objectives:

- Improving productivity of irrigation water by efficient conveyance and its effective farm level use by adopting conservation agricultural practices.
- Production of more profitable crops through high efficiency irrigation systems (HEISs) for meeting increasing domestic demand and enhancing exports.

However, often **Water Resources Management objectives** can include promoting conditions for environmentally sustainable, economically efficient and equitably allocated use of **water**

resources. They also include increasing the benefits and reducing the risk related to existing hydraulic infrastructure.

Potential Water and Soil Management and Irrigation Techniques for Target Districts (Shikarpur, Kashmore):

Climate-Smart Agriculture technologies and practices present opportunities for addressing climate change challenges, as well as for economic growth and development of the agriculture sector. Hundreds of technologies and approaches around the world fall under the heading of CSA. Here we considered practices as CSA if they improve food security as well as at least one of the other objectives of CSA (adaptation and/or mitigation) in the site-specific context of Sindh.

DRR actions and measures may be used to complement CSA techniques and practices to reduce the impacts of natural hazards and climate extremes. While these may vary from one crop to another and in different locations, some generic categories of DRR actions or measures—both on and off-farm – include:

- **Preventive measures** – land use regulations; seasonal crop planning; improved building codes (for example, for animal and food storage facilities); operation and maintenance (of irrigation systems); and public awareness and public education specifically targeting both male and female farmers;
- **Emergency services** – improved short-term natural hazard warnings and emergency response of local government authorities;
- **Land and property protection** – possibly structural relocation; elevation of growing beds; flood proofing; insurance; shrub removal; and emergency response planning;

Practices and Technologies by Commodity:

1) **Wheat** production in Sindh is constrained by multiple hazards including droughts, high temperatures and flooding. Laser land levelling and ridge sowing were prioritized as best practices, improving risk management, water and nutrient use efficiency.

i) **Laser land levelling** is a suggested CSA practice for wheat. By employing this practice, farmers can achieve a uniform surface to their field, reducing pooling and the uneven distribution of water. The method relies on a laser beam situated at a fixed point at the side of the field, and a receiver fixed to the plough, regulating its height.

ii) **Ridge-furrow planting**, an efficient irrigation method in which water moves in a furrow and the wheat is planted on raised beds. Farmers have used this method for the last four years in Sindh.

2) **Rice** yields in Sindh are negatively impacted by water scarcity, salinity, submergence and high temperatures. Prioritized practices of laser land levelling and alternate wetting and

drying (AWD) were prioritized for their capacity to improve water use efficiency, ensuring high yields under drought conditions.

- i) **Laser land levelling** was proposed as a CSA technology in response to water stress in Sindh. The creation of an even field surface improves the water use efficiency of rice production, increases germination rates and decreases losses. It is, however, a relatively expensive practice that farmers can only afford every three to four years with the help of a service provider.
 - ii) **Alternate wetting and drying (AWD)** is another CSA practice with the potential to help rice growers in Sindh. AWD is a water management strategy which reduces the need for constant submergence of rice, which remains flooded during critical growing periods like flowering, but otherwise water levels can alternate between surface flooding and water levels falling below soil surface. The practice has proved to be an extremely effective water-saving technique.
- 3) **Cotton** cultivation in Sindh is heavily impacted by the pest and disease outbreaks along with extreme temperatures and flooding. Prioritized practices for cotton cultivation include the use of bio-control agents and crop rotation.

CSA has been proposed to mitigate the impacts of water scarcity, pest and disease outbreaks, salinity and extreme temperatures on cotton production, helping to build farmer's resilience to these common hazards. It has been observed that water-smart (planting in raised beds, laser land levelling, and the conjunctive use of water and drainage management), carbon-smart (reduced chemical use), and knowledge-smart (crop rotation and improved varieties, i.e. tolerant to drought, flood and heat stresses) practices are being adopted by cotton farmers in Sindh and elsewhere in the country.

Experts in Sindh prioritized **crop rotation**, bio-control agents and varietal selection as promising CSA practices for the province. Food security and health tend to increase with the introduction of crop rotation, specifically with pulses. Pulses and green manure crops are relatively input-efficient, enhancing soil health, biodiversity and food security. Studies in Pakistan found that dual rows of cotton planted 120 cm apart with maize, sorghum, rice bean and cowpea fodders planted in-between provided higher economic returns than cotton monocrops. This can be complemented with the use of organic fertilizers and applying a balanced mix of fertilizers to reduce GHG emissions while increasing productivity. The integration of biocontrol agents and forecasting systems for disease or pest can save on costs for pesticides, as well as bring environmental benefits. Farmers may use crop varieties that are tolerant to heat, drought, and salinity, which would reduce shedding and the need for irrigated water.

Another CSA practice currently being promoted for cotton in Sindh is the use of drip irrigation to improve water and nutrients use efficiency by delivering water slowly and directly to the roots of plants, either onto the soil surface or directly to the roots. Drip irrigation has been found to improve cotton yields while reducing water usage. Planting

cotton in raised ridges is also used as it offers effective control over irrigation, water drainage and transport of nutrients. Sowing cotton on raised beds or ridges also enables larger plant populations due to better seed germination and seedling emergence even during heavy rains. It further protects the crops from temporary waterlogging caused by flooding or heavy rains.

- 4) Sugarcane:** The practices promoted for sugarcane production targeted the primary hazards of pest and diseases, drought and high temperatures. Practices included the use of improved varieties and timely weeding.
- i)** During the winter season sugarcane is often intercropped with onion. September planting gives robust growth but is most vulnerable to lodging if there are high winds or excessive rains.
 - ii)** The Seed Certification Department in Sindh promotes the adoption of improved varieties, increasing sugarcane yields under a changing climate. In Sindh, the leading early maturing varieties are GULABI-95, NIA-2004 and LARKANA-2001 with yields ranging from 150 to 170 tonnes per hectare, and mid-maturing varieties of NIA-98 and TH-10 with yields of 150 to 180 tonnes per hectare.
 - iii)** Farmers need information on the most suitable varieties (drought, heat, pest and disease resistant, early maturing) for their region along with support in purchasing improved varieties through improved.
 - iv)** Timely weeding is encouraged as if left unattended; weeds will compete with the crop for water, light and nutrients.
 - v)** Another example of a CSA practice for sugarcane is to retain crop residues or applying the remaining residues from previous crops. They are then incorporated into the soil, resulting in increased organic matter, water retention capacity, and soil fertility. These residues also increase microbial activity in the soil.
 - vi)** Planting sugarcane using a method of sowing called '2 in 1' means two sugarcane set rows in a single trench gives a much better crop stand and higher yield than traditional methods. Seed is often treated with hot water at 52°C for 30 minutes and with fungicide to improve germination and the control of many sugarcane diseases.
- 5) Fruit:** yields and quality in Sindh are below their potential due to the high incidence of pest attack and poor soil quality leaving orchards highly exposed to the effects of droughts and salinization. Practices of Integrated Pest Management and Integrated Soil Fertility Management were prioritised for their ability to reverse this trend.
- 6) Vegetables** in Sindh are impacted by high temperatures, droughts, heavy rains and pests and disease outbreaks. Organic production and improved irrigation practices were proposed for their ability to improve soil health, water and nutrient use efficiency.

SESSION 19# ALTERATIONS IN CROPPING PATTERNS AND ROTATIONS:



Time: 60 minutes



Content:

- Defining the concept of alterations in cropping patterns and rotations
- Objectives of alterations in cropping patterns and rotations
- Potential techniques for alterations in cropping patterns and rotations in target districts (Shikarpur & Kashmore)



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the alterations in cropping patterns and rotations
- Participants will be able to identify the potential alterations in cropping patterns and rotations techniques for target districts.



Objectives:

- Defining the concept of alterations in cropping patterns and rotations.
- Explaining the Objectives of alterations in cropping patterns and rotations.
- Briefly describe the Potential alterations in cropping patterns and rotations techniques for target districts.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <https://www.saskatchewan.ca/business/>
- <http://hillagric.ac.in/edu/coa/agronomy>
- <http://pr.hec.gov.pk/jspui/bitstream/>
- <http://carolinafarmstewards.org/>
- <https://www.topperlearning.com>
- <https://repository.cimmyt.org/>
- CSA Sindh profile by FDO
- <https://seminisus.s3.amazonaws.com>

Defining the concept of Alterations in Cropping Patterns and Rotations:

The vulnerability of Pakistani farmers to the effects of climate change is expected to be most severe in province Sindh and Punjab. Climate change in province Sindh is increasing the frequency and severity of hydro-meteorological hazards within the province, specifically floods and drought, which have led to salinity, waterlogging and further crop loss. Repeated disasters have a severe long-term impact on livelihoods and food security.

Agriculture is the backbone of Sindh's economy and a significant employer, the current risks within the agriculture sector posed by climate change and emerging social and economic trends. In order to effectively mitigate these risks, smallholders have the potential to enhance Disaster Risk Reduction (DRR) at the farm-level through the systematic integration of climate-smart practices and technologies. So, the smallholders have to adapt climate-smart crop production practices. A climate-smart crop system requires smallholder farmers to use quality seeds adapted to local climate and pests, and diversify crop management systems and practices.

There is a significant role of cropping pattern in crop management systems and practices. The cropping pattern is influenced by the physical factors such as climate, soil, technological elements, availability of fertilizers, improved varieties of seeds, and plant protection chemicals. Climate plays a vital role in determining the cropping pattern. **Cropping pattern** refers to the proportion of land under cultivation of various crops at a particular period of time. A changing in cropping pattern means a change within the proportion of land under different crops.

The cropping patterns include; mono-culture, mixed-cropping, inter-cropping, and crop-rotation.

1. Mono Culture/Cropping:

- a. The repetitive growing of the one same sole crop on the same piece of land.
- b. Mono-cropping can reduce the fertility of the soil and destroy the structure of the soil.
- c. This practice allows the spread of pests and diseases.



2. Mixed Cropping:

- a. Growing two or more crops simultaneously on the same piece of land.
- b. Minimizes the risk of crop failure.
- c. Seeds of two crops are mixed before sowing.
- d. Pest control of individual crop is difficult.
- e. Separate harvesting and threshing of individual crops is not possible.
- f. Crops yield can be increased.



[Example: Wheat + Gram, Wheat + Mustard, Groundnut + Sunflower]

3. **Inter-cropping:** is the practice of growing quite one crop on an equivalent piece of land at an equivalent time during a definite row pattern.

- Growing two or more crops simultaneously in the same field in a definite pattern.
- Increases the productivity per unit area.
- Pesticides can be easily applied to individual crop.
- Both crops can be easily harvested and threshed.
- Soil erosion is reduced.
- Allows better use of natural resources such as light, soil air and water.

[Example: Soyabean + Maize, Finger millet (Bajra) + Cowpea (lobia)]

There are three types of intercropping i.e. row intercropping, strip intercropping, and relay intercropping.

I. Row Intercropping: It's the growing of two or more crops at the same time, and when the crops are arranged in alternate rows. This strategy is an efficient way of maximizing the use of farmland by utilizing vacant spaces while at the same time suppressing the growth of weeds during the early stage of the main crop.



II. Strip Intercropping: It's the growing of two or more crops together in strips wide enough to allow separate production of crops using mechanical implements, but close enough for the crops to interact. For example alternating strips of wheat, maize and soybean 6 rows wide each.



III. Relay Intercropping: It's a system in which a second crop is cultivated into an existing crop when it has flowered but before harvesting. There is thus a minimum temporal overlap of two or more crops. The relay crop should be fairly tolerant to shade and trampling.



4. Crop Rotation:

- Growing of different crops on the same land in pre-planned succession.
- Allows soil to recover its lost nutrients.
- Helps to control pests, weeds and diseases.
- Helps to reduce the use of chemical fertilizers.



Types of Crop Rotation: Crop rotations have following three types:

I. One year rotation:

- Maize – Mustard
- Rice – Wheat

II. Two years rotation:

- Maize – Mustard – Sugarcane – Methi (Fenugreek)
- Maize – Potato – Sugarcane – Peas

III. Three years rotation:

- Rice – Wheat – Mung – Mustard
- Sugarcane – Berseem
- Cotton – Oat – Sugarcane – Peas – Maize – Wheat

Alteration of the cropping pattern, such as manipulation of sowing date, increasing crop sowing rate, alteration in population density and row spacing, the use of cultivars that are more competitive and proper fertilization, and particularly nitrogen application. Modifications in sowing date might have tremendously influence on plants growth, but also have a prominent influence on weed infestation, crop development and yield. Changes in sowing dates are important to prevent the durations of considerable weed risks and consequently raise crop yield. High sowing rates increase the capacity of crops to overcome weeds and preserve yield loss under moderate weediness of the crop.

Further, increased crop density, crop uniformity with alteration in row spacing had powerful and constant depressing outcomes on weed biomass and affirmative outcomes on biomass and yield of the crop. Competing varieties might be more efficient in the reduction of the capability of weeds throughout competitiveness for restricted sources. Finally, nutrient balance is frequently essential for crop-weed competition, and controlling the fertilizer applications in space and time might be a technique for useful weed suppression. Hence, the manipulation of certain agronomic integrated with competitive cultivar is a promising way to reduce weed interference in crops and to improve the sustainability of cropping systems through less reliance on herbicides.

Objectives of Alterations in Cropping Patterns and Rotations:

The objectives of alteration of any cropping pattern are efficient utilization of all resources i.e. land, irrigation, maintaining stability in production and obtaining higher yield in return. The alteration efficiency is measured by the quantity of produce obtained per unit resource used in a given time. Altering crops through breeding practices changes the genetic make-up of a plant to develop crops with more beneficial characteristics for humans. Crops with different botanical relationship should be altered for control of weeds, pests and diseases.

1. To prevent the built up of soil borne diseases.
2. To maintain soil fertility for the next crop and for a prolonged period.
3. To conserve soil erosion this may cause from wind or water.
4. To conserve soil moisture from one season for the next.
5. Insurance against main crop failure under unusual weather conditions or pest epidemics.
6. Increase in total productivity per unit land area.
7. Careful utilization of resources such as land, labour and inputs.
8. A lot of chemical fertilizers are not required.
9. The physical and chemical nature of the soil remains unaltered.

10. Maximum utilization of nutrients present in the soil.
11. The crop yield increases.
12. Reduction in the risk of crop failure.
13. More than one variety of crops can be harvested at the same time.

Potential Techniques for Alterations in Cropping Patterns and Rotations in target districts (Shikarpur, Kashmore):

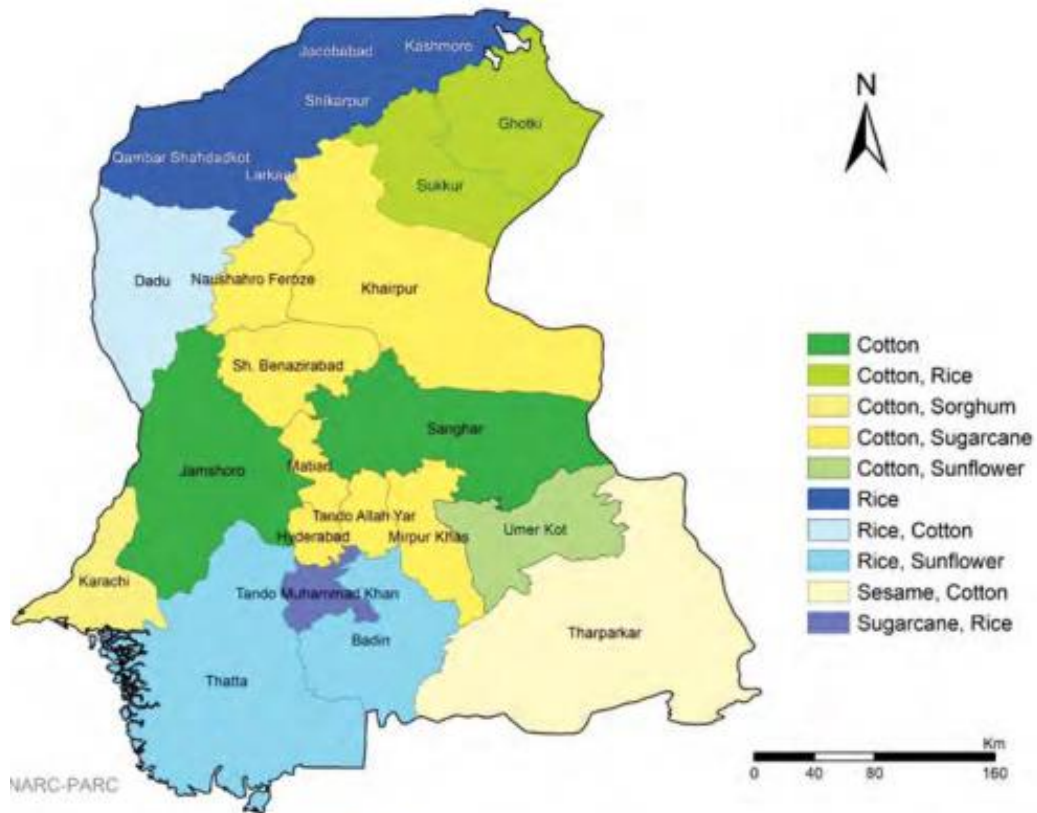
The upper Sindh on either side of the River Indus had its own long-established crop patterns. The right bank zone is a fertile tract with a pattern of highly intensive crop production. Its principal crops are wheat, rice, cotton, oilseeds, sugarcane, vegetables and fruits. The target districts Shikarpur and Kashmore are piedmont soil region of Sindh. The both districts have two cropping seasons, as is all over Pakistan have, Kharif (summer season) and Rabi (winter season). The first sowing season is Kharif starting from April – June and is harvested during October – December, and the second sowing season is Rabi begins in October – December and is harvested in April – May.



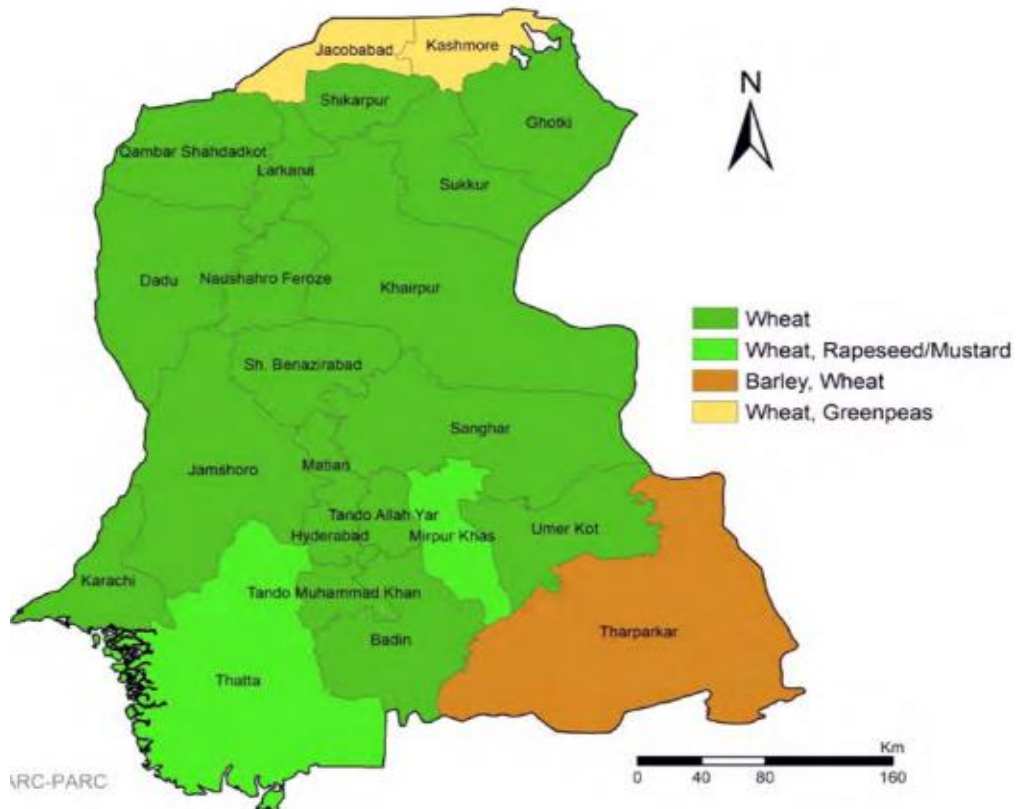
On the right bank of Indus river in both districts Shikarpur and Kashmore **rice** is predominated crop of Kharif and is followed by dobari crops (crops grown on soil moisture left after paddy harvest) mainly gram, peas (matar), sunflower, mustard and rapeseed. **Wheat** is a secondary food crop of this area, grown in Rabi.

The potential techniques for alterations in cropping patterns and rotations in target districts Shikarpur and Kashmore are:

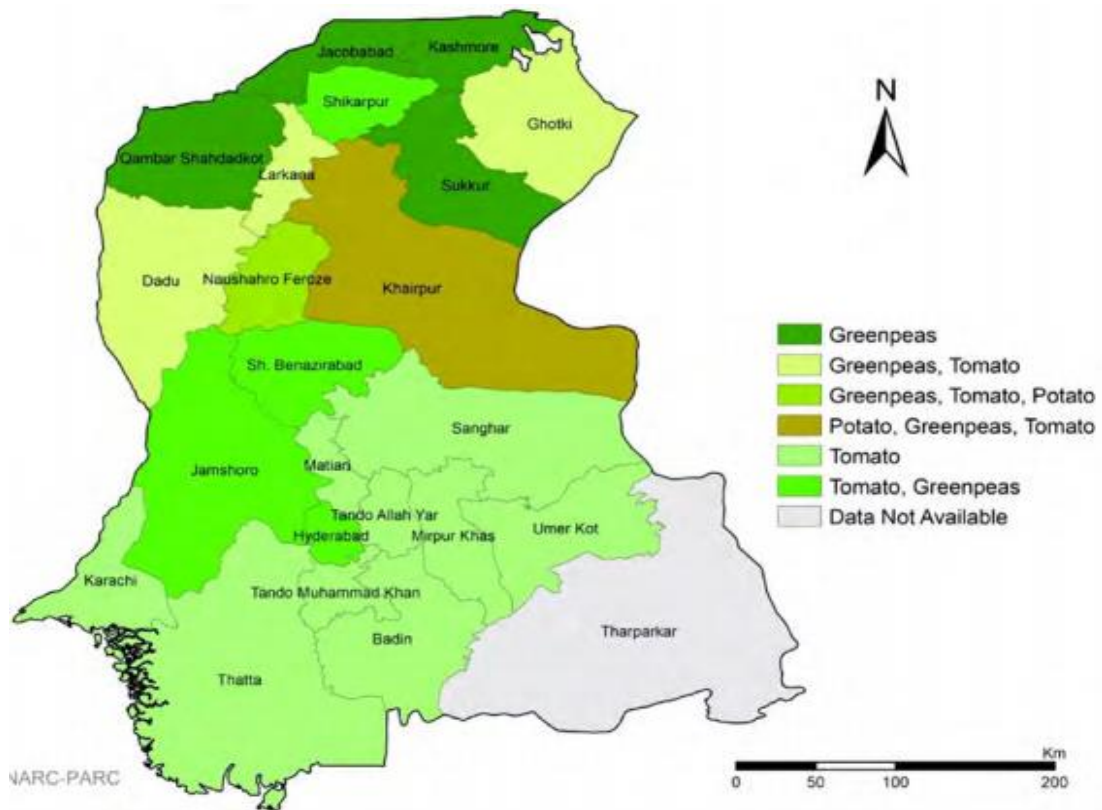
District	Cropping Pattern		
		Kharif (Summer) Season	Rabi (Winter) Season
Kashmore	Crops	Rice, Cotton, Sugarcane, Mung, Mash, Maize, Groundnut, Sunflower	Wheat, Sunflower, Gram, lentil, Mustard, Barley,
	Vegetables	Chilies, Tomato, Okra, Bottle Gourd, Sponge Gourd, Bitter Gourd, Tinda Gourd, Pumpkin,	Peas, Tomato, Onion, Cucumber, Spinach, Beans, Coriander, Radish, Carrot, Cauliflower, Turnip, Brinjal, Fenugreek,
	Fruits	Mango, Dates, Musk Melon,	Dates, Guava, grapes, Banana
Shikarpur	Crops	Rice, Cotton, Sugarcane, Mung, Mash, Maize, Groundnut, Sunflower	Wheat, Sunflower, Gram, lentil, Mustard, Barley,
	Vegetables	Chilies, Tomato, Okra, Bottle Gourd, Sponge Gourd, Bitter Gourd, Tinda Gourd, Pumpkin,	Peas, Tomato, Onion, Cucumber, Spinach, Beans, Coriander, Radish, Carrot, Cauliflower, Turnip, Brinjal, Fenugreek,
	Fruits	Mango, Dates, Musk Melon,	Dates, Guava, grapes, Banana



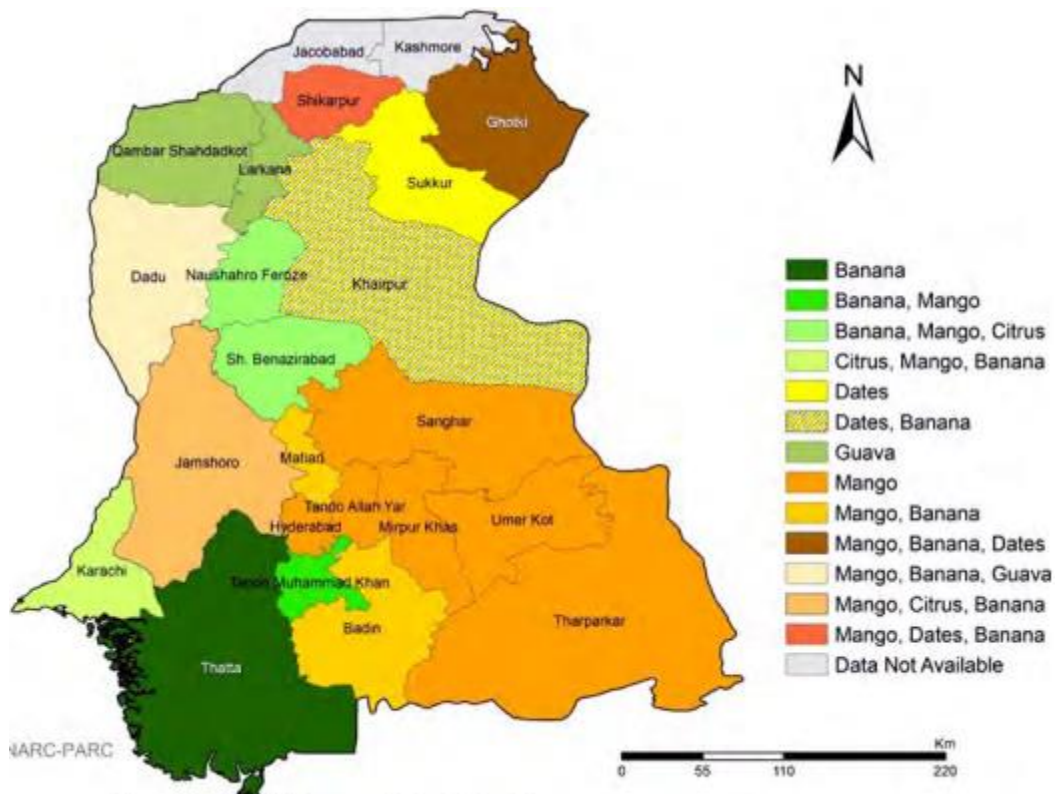
2c. Map of major Kharif crops in Sindh Province.



Map of major Rabi crops in Sindh Province.



Map of major vegetable crops in Sindh Province.



Map of major fruit crops in Sindh Province.

SESSION 20# HOME BASED KITCHEN GARDENING:



Time: 60 minutes



Content:

- Introduction to kitchen gardening
- Initial planning
- Choice of vegetables (winter & summer varieties)
- Land preparation & Method of sowing
- Fertilizer recommendations
- Irrigation, weeding, Insect and diseases
- Harvest and yield
- Vegetables preservation methods



Method:

PPT Presentation, Brainstorming, Discussion, and Group work.



Outcome:

- Knowledge of the participants will be enhanced about the kitchen gardening, its planning and vegetables preservation methods.



Objectives:

- Explaining importance of kitchen gardening and its planning.
- To orient the participants about the methods of vegetables preservation.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers. Charts, Multi-color Markers, Masking tape.



References:

- Climate smart agriculture a guidance note for country programs by Concern 2018
-

Introduction to kitchen gardening:

A kitchen garden is a place where vegetables are grown around the house or on roof top for household use. In this era of increasing population, urban life and industrialization, the land for cultivation is continuously decreasing and farmers have adapted new techniques to increase per unit vegetables production. This involves use of chemical fertilizers and pesticides. Although, production of vegetables has increase at farm level, but quality of vegetables is seriously affected. Moreover, irrigation of vegetables with sewage water in peri-urban areas have arisen serious health concerns for consumers, and getting fresh vegetables are more critical. But to cope with this situation, the concept of kitchen gardening has been introduced.



In kitchen gardening organic vegetables free of any pesticides and chemicals for domestic use are grown in home. Family members can utilize their leisure time working in the kitchen garden. It is a sort of exercise as well as quick source of healthy food. Working together in the kitchen garden is really pleasure and recreational to the family members.



Also the properly managed gardens enhance the beauty of house. In Pakistan very few people are kitchen gardeners; vegetable consumption is also very low in country (only 50 grams/day/person) as compared to international standard of 300-350 grams/day/person. Kitchen gardening has a vast potential for addressing the food and health issues of the urban, peri-urban and also village population.

Initial Planning for Kitchen Garden:

To make and manage a kitchen garden easily, and to get best production, the following points are important to be remembered like any other form of cultivation;

1. Availability to the light is very important to vegetables so keep in mind the place to sow must receive at least 7-8 hours of direct sunlight.
2. Different types of vegetables should not be mixed. This is helpful to prepare the land each time for sowing new seeds.
3. The vegetables like cucurbits, bitter gourd, bottle gourd etc which have growing habit of vines should be kept separate from other vegetables without vine. These vines should be separately grown near some support like wall or support can also be provided with sticks.
4. Proper time should be required to look after vegetables in garden.

Tools required for Kitchen Gardening:

There is always bigger and better in kitchen gardening, but buying the best quality and appropriate tools that your budget will allow, and maintaining them, can go a long way in getting the most out of your investment. Here are some essential gardening tools for your kitchen garden:

1. Pruning shears Small & Large.
2. Garden Fork.
3. Hand trowel set.
4. Spade.
5. Rake.
6. Hoe.
7. Garden Hose with Adjustable Nozzle
8. Water Shower Can – two handle
9. Gloves – should be durable but not too bulky, especially for working with seeds or transplanting seedlings. Its fabric should be water resistant,
10. Wheelbarrow (if required)



Soil / Land Preparation:

Land preparation is the key to successful crop stand.

1. The land selected for kitchen gardening should have good drainage and aeration properties.
2. Organic matter should be mixed 1-2 months before seed sowing so that it can mix well with the soil. Leaf litter or animal dung is a good natural source of organic matter.
3. Land should be prepared by hoeing with manual tools or any other relevant method.
4. Land should be loosened up to 10 – 12 inches deep.
5. Avoid working with soil when it is too wet.
6. Prepare fine beds for seed planting.

Choice of Vegetables (Summer and Winter):

The vegetables in kitchen gardening can be selected on the choice of the farming family. The time of the year or season should be kept in mind because some vegetables grow well in summer and others are winter vegetables (see below calendar).

1. **Winter vegetables:** pea, spinach, fenugreek, cabbage, cauliflower, radish, carrot, turnip, sugar beet, onion, garlic, coriander and salad leaves etc.

2. **Summer vegetables:** chilies, cucurbits, bitter gourd, giant gourd, bottle gourd, okra, eggplant and tomato etc.

Method of Sowing:

The time and method of sowing differs from vegetable to vegetable. Use recommended plant to plant and row to row distance should be maintained for getting a healthy vegetable crop. (see table-1)

Table-1

Crops	Sowing Time	Yield/ Plant	Rows X Rows (inch)	Plants X Plants (inch)
Bitter Gourd	Feb – Mar, Jun – Jul	3 kg	36	12
Bottle Gourd	Feb – Mar, Jun – Jul, Oct	4 kg	36	18
Brinjal	Feb – Mar, Jun, Nov	2 kg	24	18
Broccoli	Aug – Nov	0.75 kg	24	12
Cabbage	Aug – Nov	0.75 kg	24	12
Carrot	Sep – Oct	130 gm	18	2
Cauliflower	Jun – Oct	850 gm	24	12
Celery	Sep – Oct	100 gm	12	4
Coriander	Jul – Nov, Feb – Apr.			
Cucumber	Feb – Jul	2.5 kg	36	18
Fenugreek (Methi)	Sept – Oct			
Garlic	Sept – Oct	50 gm	8	4
Ginger	Feb – Mar		12	8
Chili/Peppers	Sept – Oct, Feb.	1.5 kg	30	18
Lettuce	Sept – Dec.		12	6
Mint	Jul – Nov, Feb – Apr.			
Mustard	Sept – Oct			
Okra	Feb – Mar, Jun – Jul	2 kg	24	18
Onion	Feb – Mar, Sep – Oct	100 gm	12	4
Peas	Sept - mid Nov.	600 gm	24	2
Potato	Feb – Mar, Sep – Oct	1 kg	24	8
Salad Leaves	Sept – Oct.		6	4
Beans	Mar.	3 kg	12	6
Radish	Aug – Dec.		18	2
Turnip	Aug – Dec.		18	2
Spinach	Sept – Oct.		6	4
Tomato	Jan.	4kg	24	18
Melon	Jan.		36	36
Pumpkin	Jan.		36	36

Note:

1. Garlic should be sown on leveled soil.
2. Nursery should be raised for cauliflower, cabbage, salad leaves and onion. Transfer the seedling of 30-35 days to the furrows made in the field.
3. Carrot, radish, turnip, salad, spinach, coriander, fenugreek and onion should be planted on both sides of the furrows.

Fertilizer Recommendations:

The nutrient sources most often used in organic production are: compost, green manure (clover, beans, peas, oats, & beans etc.), manure (animal dung etc.) and sludge. Organic materials such as manure can be good fertilizers. Not only that they supply nutrients, but also they add organic matter to the soil to increase its water-holding capacity.

The chemical fertilizers can also be used but it is not recommended. It should be used @ 700 grams DAP, 250 grams urea, and 300 grams Potash per marla of land. Urea should also be applied @ 100 grams per marla after flowering and similarly 100 grams per marla, after taking 2-3 harvests.

Irrigation of Kitchen garden:

Fresh clean water should be used for irrigation according to the requirement of the field. The field should be irrigated on completion of sowing of seeds or transferring of nursery seedlings. The water level in the field should be below furrows otherwise it will affect the germination and it also makes a compact layer of soil over the seed which hampers its germination. Weekly irrigation should be given in summer season but in winter season, irrigate according to the requirement only.



Weeding:

Usually manual weeding is recommended for the soil/land of kitchen garden. Continuous hoeing of the land will result in control of weeds, more aeration and drainage from the field, and also an exercise for family members.

Insects and Diseases Control:

The chances for pest or disease attack are very low if the proper weeds are eradicated from the field because weeds serve as the primary source of inoculum for fungi and breeding grounds for eggs and larvae of insects. One of the safe ways to control insect pest attack is the use of bio pesticides which is the key to safe healthy and nutritious vegetable production. Extracts of neem seeds, neem leaves and tobacco leaves can be effectively used in this regard.

Other recommended remedies for the control of insect pest are the use of ash, and practicing crop rotation. Also, ladybugs are natural enemies of many insect pests, and it has been demonstrated that a single ladybug may consume as many as 5,000 aphid insects in its lifetime, and it is your garden's natural pesticide.



In case of severe infestation use of chemical pesticides are recommended, having negligible harmful effects on human health. Before spraying mature and ripen fruit should be harvested. Vegetables should be picked and consumed after 8 – 10 days of spray.

Harvest and Yield:

Harvest can be taken in any quantity at any time. This provides fresh and reliable vegetable for home cooking (for yield see above table-1).

Vegetables Preservation Methods:

It is also easy to preserve different kinds of vegetables, when there is a bumper harvest. Vegetables should be prepared for preservation as soon as possible after harvesting, in any case within 4 to 48 hours. The likelihood of spoilage increases rapidly as time passes. Making pickles, juices, jams and pastes of different vegetables. These pickles, juices, jams and pastes can last for many months without refrigeration. Other items are dried onion, dried tomato, dried spinach, fenugreek, carrot juice or jams, garlic paste, tomato ketchup etc.

There are two main home based methods for vegetables or food preservation;

1. Natural Drying.
2. Artificial Drying.

Note: Storage and consumption of preserved food/vegetables:

Always store the preserved food in a cool place, at a temperature preferably below 20°C. Keep glass bottles and jars out of the light. Label the containers so that you know what they contain and the date they were preserved. Always consume the older products first. The storage area has to be dry and have a consistent temperature. Moisture will make tins rust. Pay close attention when opening preserved food. A bulging lid or tin indicates gas formation by bacteria and thus food spoilage. Look carefully at the food and smell it. Heat the food if necessary and never eat anything you suspect may be spoilt.

SESSION 21# WATER HARVESTING, CONSERVATION, & MANAGEMENT:



Time: 60 minutes



Content:

- Concept of water conservation and management
- What is meant by water harvesting
- Objectives/benefits of water harvesting, conservation and Management
- Potential techniques for Water harvesting, conservation, and management in target districts (Shikar pur, Kashmir)



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the Water harvesting, conservation
- Participants will be able to identify the potential Water harvesting, conservation, techniques for target districts.



Objectives:

- Defining the water conservation and management
- Explaining the Objectives of alterations in cropping patterns and rotations.
- Briefly describe the Potential Water harvesting, conservation, and management techniques for target districts



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <http://www.fao.org/3/y4263e/y4263e08>
- Water conservation: strategies and solutions. IJARR, 1(4), 2016; 75-79
- https://en.wikipedia.org/wiki/Rainwater_harvesting

Concept of Water Conservation and Management:

Although the earth is rich in water, only one percent is liquid fresh water, the form we require for our highest priority needs. The demands on this liquid fresh water are growing, and many scientists feel that a future shortage of fresh water will be eminent. Water conservation and management emphasizes water quality protection, a growing area of employment and environmental concern. Water conservation and management encompasses the policies, strategies and activities made to manage water as a sustainable resource, to protect the water environment, and to meet current and future human demand. Population, household size, and growth and affluence all affect how much water is used. Factors such as climate change will increase pressures on natural water resources especially in industrial and agriculture.

98% of water on this planet is salty and is not fit for human consumption. Out of the 2% of fresh water reserves, 1% is locked up in form of ice in various regions around the world. Hence, only 1% of total water reserves are available for our domestic & industrial use. Better water conservation and management has economic benefits and helps protect the environment. The more water you use, the more you pay for water and sewer service on a municipal water and sewer system. Excessive water use can overload both individual septic systems and municipal sewer systems, thereby resulting in untreated sewage contamination of fresh water supplies. Water conservation can extend the useful life of both community and individual household sewer systems. Excessive withdrawals of ground water can lead to salt-water intrusion, a subtle environmental impact with long-lasting effects. These areas are usually associated with large population centers or agriculture, where water use is high. Agriculture is our most essential industry, but it is also our largest consumer of fresh water. Water conservation and management will become bigger issues for agriculture and metropolitan areas as they compete for limited fresh water resources in the future.

Water conservation can be defined as:

- i. Any beneficial deduction in water loss, use, or waste.
- ii. A reduction in water use accomplished by implementation of water conservation or water efficiency measures;
- iii. Improved water management practices that reduce or enhance the beneficial use of water a water conservation measure is an action, behavioral change, device, technology, or improved design or process implemented to reduce water loss, waste, or use. Water efficiency is a tool of water conservation. That results in more efficient water use and thus reduces water demand. The value and cost-effectiveness of a water efficiency measure must be evaluated in relation to its effects on the use and cost of other natural resources.(e.g. energy or chemicals)

What is meant by water harvesting?

Water harvesting is the capture and storage of water for beneficial reuse. It can be accomplished anywhere a water supply is available for collection-and a water source is desired or required. To understand the process fully, it is important to understand water harvesting terms.

- **Rainwater harvesting** is the capture and storage of rainwater and is considered the cleanest form of harvested water.
- **Greywater harvesting** is the capture and storage of water that has already been used for non-sewage purposes-from baths and showers to washing machines, sinks, and vehicle washing run-off.

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation, so that it seeps down and restores the ground water. Dew and fog can also be collected with nets or other tools. Rainwater harvesting differs from storm water harvesting as the runoff is collected from roofs, rather than creeks, drains, roads, or any other land surfaces. Its uses include watering gardens, livestock, irrigation, domestic use with proper treatment, and domestic heating. The harvested water can also be committed to longer-term storage or groundwater recharge.

Examples of Rainwater harvesting: It is one of the simplest and oldest methods of self-supply of water for households, and residential and household-scale projects, usually financed by the user. However, larger systems for schools, hospitals, and other facilities can run up costs only able to be financed by owners, organizations, and governmental units.

Domestic use

Rooftop rainwater harvesting is used to provide drinking water, domestic water, water for livestock, water for small irrigation, and a way to replenish groundwater levels.



Agriculture

In regards to Urban agriculture, rainwater harvesting in urban areas reduces the impact of runoff and flooding. The combination of urban ‘green’ rooftops with rainwater catchments has been found to reduce building temperatures by more than 1.3 degrees Celsius. Rainwater harvesting in conjunction with urban agriculture would be a viable way to help meet the United Nations Sustainable Development Goals for cleaner and sustainable cities, health and wellbeing, and food and water security. The technology is available; however, it needs to be remodeled in order to use water more efficiently, especially in an urban setting.



Objectives/benefits of water harvesting, conservation and Management:

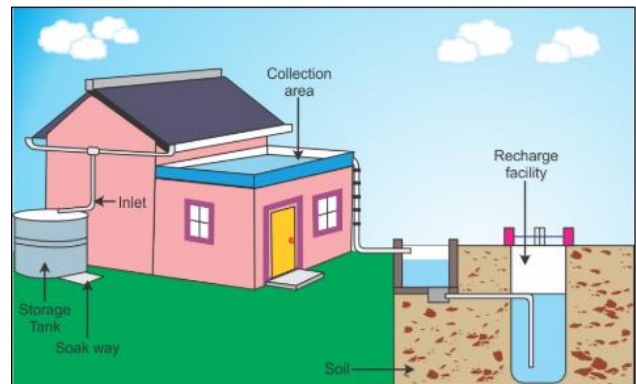
- **Sustainability:** To ensure availability for future generations, the withdrawal of fresh water from an ecosystem should not exceed its natural replacement rate.
- **Energy conservation:** Water pumping, delivery, and wastewater treatment facilities consume a significant amount of energy. In some regions (e.g. California) of the world over 15% of total electricity, consumption is devoted to water management.

- Habitat conservation: Minimizing human water use helps to preserve fresh water habitats for local wildlife and migrating waterfowl, as well as reducing the need to build new dams and other water diversion infrastructure.
- Reduced water and sewer costs: Low flow water conservation devices reduce water usage and costs as well as sewer costs.
- Weather-based irrigation controls: This type of control system saves water usage and cost especially during the hot summer months.
- Reduced energy usage: Low flow water devices reduce the amount of hot water used which, in turn, reduces the amount of energy used to heat the water.
- Reduction of unbilled water: Replacing old, inaccurate water meters and distribution piping can result in increased revenues for the water district.
- Wastewater treatment energy usage: Wastewater treatment plants are one of the largest users of energy within a city. Plant upgrades and aeration optimization can dramatically reduce energy usage and save money.

Potential techniques for Water harvesting, conservation, and management in target districts (Shikarpur, Kashmore):

Process of conservation may be synonymous of preservation against loss or waste. Briefly stated it means putting the water resources of the country for the best beneficial use with all the technologies at our command. Water conservation basically aims at matching demand and supply. The strategies for water conservation may be demand oriented or supply oriented and/or management oriented. The strategies may vary depending upon the field of water use, domestic, irrigation or industrial use.

1. Rainwater harvesting- Rainwater harvesting essentially means collecting rainwater on the roofs of building and storing it underground for later use. Not only does this recharging arrest groundwater depletion, it also raises the declining water table and can help augment water supply. Rainwater harvesting and artificial recharging are becoming very important issues. It is



essential to stop the decline in groundwater levels, arrest seawater ingress, i.e. prevent seawater from moving landward, and conserve surface water run-off during the rainy season.

A **rainwater harvesting system** consists of;

- i. Roof catchment
- ii. Gutters
- iii. Down pipes
- iv. Rain water/storm water drains
- v. Filter chamber

- vi. Storage tank/ Pits/ Sumps
- vii. Ground water recharge structures like pit, trench, tube well or combination of above structures.

Advantages

- i. Provides self-sufficiency to water supply
- ii. Reduces the cost for pumping of ground water
- iii. Provides high quality water, soft and low in minerals
- iv. Improves the quality of ground water through dilution when recharged
- v. Reduces soil erosion & flooding in urban areas
- vi. The rooftop rainwater harvesting is less expensive & easy to construct, operate and maintain. In desert, RWH only relief.
- vii. In saline or coastal areas & Islands, rainwater provides good quality water

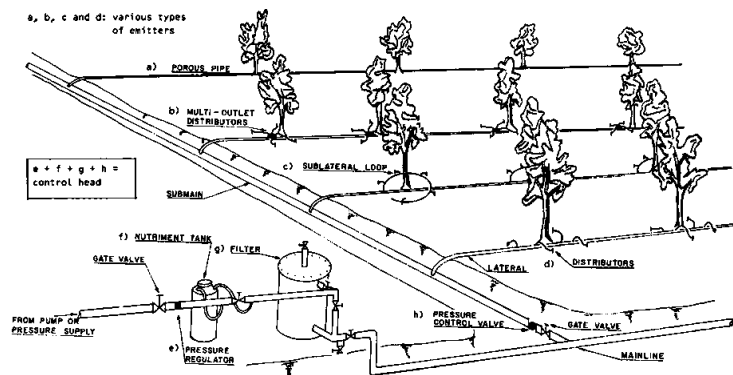
2. Better Irrigation Practices- Conservation of water in the agricultural sector is essential since water is necessary for the growth of plants and crops. A depleting water table and a rise in salinity due to overuse of chemical fertilizers and pesticides has made matters serious. Various methods of water harvesting and recharging have been and are being applied all over the world to tackle the problem. In areas where rainfall is low and water is scarce, the local people have used simple techniques that are suited to their region and reduce the demand for water. For crop irrigation, optimal water efficiency means minimizing losses due to evaporation, runoff or subsurface drainage. An evaporation pan can be used to determine how much water is required to irrigate the land. Flood irrigation, the oldest and most common type, is often very uneven in distribution, as parts of a field may receive excess water in order to deliver sufficient quantities to other parts. Overhead irrigation, using center-pivot or lateral-moving sprinklers, gives a much more equal and controlled distribution pattern.



Drip irrigation is the most expensive and least-used type, but offers the best results in delivering water to plant roots with minimal losses.

A typical drip irrigation system consists of the following components:

- i. Pump unit
- ii. Control head
- iii. Main and sub main lines
- iv. Laterals
- v. Emitters or drippers.



3. **Use of Saline Water for Irrigation-** Saline water is widely available but rarely used for agriculture because it restricts plant growth and yield. Salt resistant varieties of crops have also been developed in recent times.
4. **Mulching**, i.e., the application of organic or inorganic material such as plant debris, compost, etc., slows down the surface run-off, improves the soil moisture, reduces evaporation losses and improves soil fertility.
5. **Fog and dew** contain substantial amounts of water that can be used directly by adapted plant species. Artificial surfaces such as netting-surfaced traps or polyethylene sheets can be exposed to fog and dew. The resulting water can be used for crops.
6. **Contour farming** is adopted in hilly areas and in lowland areas for paddy fields. Farmer recognize the efficiency of contour-based systems for conserving soil and water.
7. **Tippy Tap for water conservation:** - Tippy Tap is a simple device which dispenses a limited amount of water slowly and facilitates a thorough hand wash. In case of piped water supply, every time the tap is opened for a hand wash, an average of 300 - 500 ml of water is utilized. Using Tippy Tap it is possible to have a good hand wash with only 60 to 80 ml of water.
8. **Propagation of Dry Garden / Eco Lawns-** As a step towards water conservation and propagation of native plant species, drought resistant plantation (plants requiring less water) should be carried out.
9. **Soak pit construction-** Water run offs and water logging are combated by constructing soak pits near water points like hand pumps. This is a sanitation measure and also helps in recharge of ground water.
10. **Tree plantation** in water catchments area/riverbanks and clean-up drives near water bodies are some of the other initiatives taken up to preserve our water resources.
11. **Desalination-** To augment the depletion of fresh water resources in coastal areas due to excessive abstraction, desalination like distillation, electro-dialysis and reverse osmosis are available. Selection and use of these processes is site specific.
12. **Long Distance Transfer of Water-** Transfer of water from surplus basins by creating storage at appropriate locations and inter-linking various systems is yet another strategy for increasing the benefits considerably.

Measures of Water Conservation

Water conservation measures in industries should include:

- (i) review of alternate production processes and technologies from water consumption point of view;
- (ii) ensuring sound plant maintenance practices and good housekeeping, minimizing spills and leaks; and
- (iii) Optimization of treatment to achieve maximum recycling.

- (iv) Another established technique for maximum water recovery is the water pinch analysis technique. However, this technique only focuses on maximizing freshwater and wastewater reduction via reuse and regeneration.

What We Can Do To Conserve Water?

- Use only as much water as you require. Close the taps well after use. While brushing or other use, do not leave the tap running, and open it only when you require it. See that there are no leaking taps.
- Use a washing machine that does not consume too much water. Do not leave the taps running while washing dishes and clothes.
- Install small showerheads to reduce the flow of the water. Water in which the vegetables & fruits have been washed - use to water the flowers & plants.
- At the end of the day if you have water left in your water bottle do not throw it away, pour it over some plants.
- Re-use water as much as possible
- Change in attitude & habits for water conservation
- Every drop counts!

Improve Water Management:

- The close link between forests and water, and the traditional relationship between agriculture and water, need to be recognized and protected to ensure sustained productivity.
- National water management policies should take account of the impact of trade in water-intensive goods on water availability and ecosystems integrity. For example, in water scarce regions, people should grow crops with low water requirements, or of high value compared to the water used. Options for improving the water balance by importing water intensive goods from water-rich regions should be explored, where appropriate and cost-effective.
- The potential of rainwater harvesting for augmenting rural and urban water supply is increasingly becoming recognized. This alternative should be further explored and utilized.
- Proper water pricing must be an integral part of water policies. However, care must be taken to ensure that the poor and socially disadvantaged are not denied access. Moreover, there must be adequate monitoring and control of market mechanisms.
- It is necessary to study and analyze the impacts of subsidies (on water, energy, and other relevant inputs) on water use. Subsidies that inhibit water use efficiency or cause negative effects on the environment should be reduced.

- Our traditional water management approaches and systems were both sustainable and accountable. These need to be revived and invigorated. Policies must recognize and build on these.
- Principles of reuse and recycling of water resources must be incorporated into water management plans and strategies. There must be incentives for water conservation.

Public Education and Awareness

- Public awareness and education on the importance of protection of the coastal and ocean environment helps to meet social and economic needs and aspirations of the country in the long run.
- Awareness campaigns on existing regulations for management of coastal areas need to be conducted. Education and communication material on the need for conservation and protection of rare and endangered species need to be developed.
- Research findings on marine resources, their development and management have to be clarified. The educational and communication material targeted at the public has to be developed in local languages.
- Opportunities for interactions between communities, policy makers, regulating agencies, NGOs, scientists, etc. need to be increased.
- Appropriate strategies and decision making tools that would enhance the capabilities of professionals, government, and non-government organizations to take up local and community level action programs need to be developed.

Water problems will not go away by themselves. On the contrary, they will worsen unless we, as a global community, respond and use water responsibly. So, before it is too late, let us all, as individuals, families, communities, companies & institutions, pledge towards using water wisely. Intelligence is not in lavishness but in conservation, so that our future generations can continue to enjoy the blissful feeling and touch of water.

SESSION 22# INCREASED FORESTATION/PLANTATION TO MITIGATE THE IMPACT OF CLIMATE CHANGE:



Time: 105 minutes



Content:

- Impacts & role of deforestation in climate change
- Why need to increase forestation/plantation
- How to increase forestation
- Recommendation on increased forestation in target districts (Shikarpur, Kashmir)



Method:

PPT Presentation, Brainstorming, Discussion, Group work, Constant interaction with participants, and Question answers.



Outcome:

- Participants will be able to understand the role of deforestation in climate change
- Participants will learn about the need to increase forestation/plantation
- Participants will be able to grasp Recommendation on increased forestation, techniques for target districts.



Objectives:

- Explaining the role of deforestation in climate change
- Explaining the need to increase forestation/plantation
- Briefly describe the recommendations on increased forestation techniques for target districts



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.

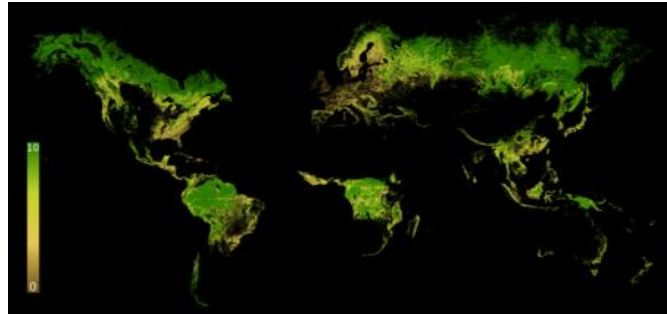


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- <http://www.fao.org/3/y1997e/y1997e08.htm>
- climate smart agriculture guidance notes 2018 by Concern world wide
- National forest policy 2015 by MOCC
- Forest sector review: Pakistan 2019 by FAO
- <https://sindhforests.gov.pk>

Impacts & Role of Deforestation in Climate Change

Deforestation is a primary contributor to climate change. Land use changes, especially in the form of deforestation, are the second largest anthropogenic source of atmospheric carbon dioxide emissions, after fossil fuel combustion. Greenhouse gases are emitted during combustion of forest biomass and decomposition of remaining plant material and soil carbon.



Forest Landscape Integrity Index showing anthropogenic modification of remaining forest.

Global models and national greenhouse gas inventories give similar results for deforestation emissions. Deforestation comes in many forms: wildfire, agricultural clearcutting, livestock ranching, and logging for timber, among others. Forests cover 31% of the land area on Earth and annually 75,700 square kilometers (18.7 million acres) of the forest is lost. Trees absorb and store CO₂ throughout their lives. If we speak about tropical forests, they hold more than 210 gigatons of carbon, according to WWF. Taking down trees means they will release back into the atmosphere the CO₂ they were keeping. Fewer trees available means reducing the planet's overall ability to capture and store CO₂. Both these effects negatively contribute to the greenhouse effect and to climate change. As a matter of fact, while food and agriculture account for 24% of greenhouse gas emissions, deforestation is estimated to be responsible for 10-15% of all anthropogenic CO₂ emissions. This increase in GHG emission ultimately result in increased temperature, heat waves, high precipitations, heavy rains, extreme floods, melting of ice on poles and glaciers, increase in sea level, desertification and increased salinity of cultivated land.

Effects of deforestation:

- i. **Soil Erosion:** The soil is washed away with rainwater on slopply area in the absence of trees leading to soil erosion.
- ii. **Expansion of Deserts:** Due to action of strong wind, mass of land gradually gets covered to sand deserts.
- iii. **Decrease in Rainfall:** In the absence of forest, rainfall decreases considerably because forests bring rains and maintains high humidity in atmosphere.
- iv. **Loss of Fertile Land:** Less rainfall results into the loss of fertile land owing to less natural vegetation growth.
- v. **Effect on Climate:** Deforestation includes regional and global climate change. Climate has become warmer due to the lack of humidity in deforestation regions and patterns of rainfall has changed. Droughts have become common.
- vi. **Economic Losses:** Deforestation will cause loss of industrial timber and non-timber products and loss of long term productivity on the site.

- vii. **Loss of Bio-diversity:** Deforestation cause the biodiversity leading to disturbances in ecological balance world wild.
- viii. **Loss of medical Plants:** There are many species of plants, which have been used in India for centuries as insecticide, fungicide, in medicine and in bio-fertilizers. Deforestation may lead to the extinction of these valuable plants.
- ix. **Environmental Changes:** It will lead to increase in carbon dioxide concentration and other air pollutants. This would result in Global Warming.
- x. **Change in living Habits:** This may force indigenous people to live a new life which they are not prepared. Disturbance in forest eco-system may result in other eco-systems that may be separated by great distances.

Why need to increase forestation/plantation:

Reforestation is the natural or intentional restocking of existing forests and woodlands that have been depleted, usually through deforestation. It is the reestablishment of forest cover either naturally or artificially. Similar to the other methods of forestation, reforestation can be very effective because a single tree can absorb as much as 22 kilograms (48 lb) of carbon dioxide per year and can sequester 0.91 tonnes (1 short ton) of carbon dioxide by the time it reaches 40 years old.

Afforestation is the establishment of a forest or stand of trees (forestation) in an area where there was no previous tree cover. Many government and non-governmental organizations directly engage in afforestation programs to create forests and increase carbon capture. Afforestation is an increasingly sought-after method to fight climate concerns, as it is known to increase the soil quality and organic carbon levels into the soil, avoiding desertification.

Benefits of reforestation/afforestation:

- Well-managed forests will have an appropriate natural amount of regeneration to maintain an adequate above-ground tree biomass density.
- The greater the above-ground tree biomass density, the greater the amount of Carbon (C) that the forest is able to sequester and store.
- The most efficient and cost-effective way to combat this is through sustainable forest management practices, afforestation, reforestation, and forest conservation;
- Taken together these practices may provide Carbon (C) emissions reductions of up to 25% which will effectively curb climate change.
- If we can reduce deforestation, this would have reduced the 1.1 billion tons which are released from it to the atmosphere every year

How to increase forestation:

Pakistan is one of the low forest cover countries with only 5% of land area under forests and tree cover. Provincial governments, within their jurisdiction make efforts for protection and development of forests. However the federal support to federating units for meeting international obligations and filling their financial gaps is widely acknowledged. In view of Pakistan's high vulnerability to adverse impacts of climate change, in particular to extreme events, mitigation and adaptation measures are focused. Tremendous role of Forestry in climate change mitigation has been overwhelmingly recognized at international level. In the 21st century, scope of Forestry has been expanded tremendously because it offers the most effective solution to the global issue of climate change, loss of biodiversity, desertification together with air and water pollution. Major forest types include coastal mangroves, riverine forests, sub-tropical scrub forests, moist temperate conifer forests, dry temperate conifer forests and irrigated plantations including linear plantations. Pakistan is home to some of the world's most unique forests including juniper, deodar and chalthoza forests.

The climatic, water and soil conditions in most parts of the country are not conducive for afforestation on large scales. Existing forest resources are inadequate for meeting domestic demands for wood for the increasing population of the country. Actual demand for wood is 3 times higher than the annual increment of forests or potential sustainable supply. In recognition of the minimal government capacity in many contexts to enforce sustainable management practices, and that the perception of forest and rangeland being under "communal ownership" encourages users to maximize exploitation without consideration of investment in management, **community/participatory forest management** are highly encouraged. This approach highlights the importance of land user rights to encourage conservation and management of natural resources and decision-making.

Sustainable natural resource management practices comprise of;

- **Establishing community-managed forest lands**, socially protected and managed and equitably available for use by all households
- **Planting additional fast-growing multi-purpose trees**, along canals and on community land allocated for joint use and management. These would include species that provide fuel, fodder and income;
- **Planting high-yielding perennial grasses** along canal banks or water harvesting bunds on the rangelands;
- **Controlled grazing** by negotiating community rights to grazing areas and social fencing, to enable rotational grazing;
- **Soil and Water Conservation (SWC) practices** (soil bunds, stone bunds, bench terraces, trenches and check-dams, etc.) and water harvesting.

Sustainable Forest Management

Forest degradation and deforestation are threatening natural ecosystems and the valuable services they provide. It is therefore important to protect and preserve natural forests; Sustainable Forest Management that could be helpful to reforestation.

Woodlots/ plantations/ reforestation

This is the plantation of trees species for different purposes (soil and water conservation, firewood and poles for construction, food and fodder, medicinal products, etc.) It is implemented through participatory planning with the engagement of communities. Farmer or herder-led reforestation can create opportunities for income generation. Agroforestry provides some techniques and practices for woodlots and plantations management.

Reforestation includes the process of planting (or otherwise regenerating) and establishing a desired forest community on a given site. An important part of reforestation is the selection of an appropriate tree species or forest community to manage. Common reforestation techniques include both natural and artificial methods:

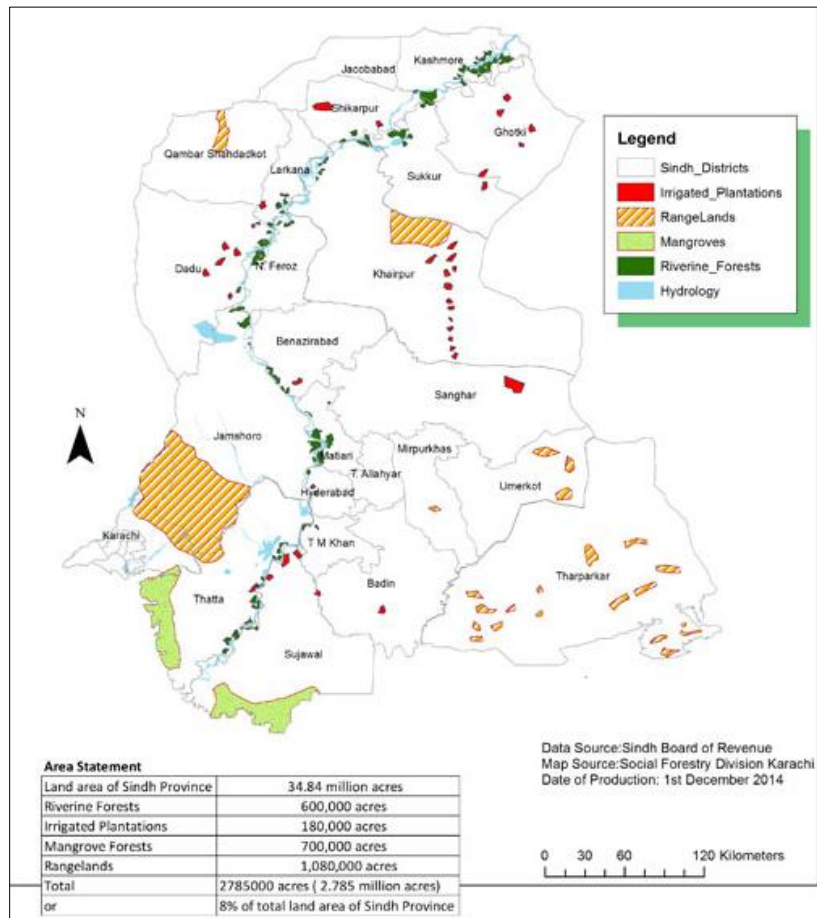
- **Natural regeneration** methods include root suckering, stump sprouting or natural seeding.
 - **Using existing trees and roots**
Planting new trees often leads to up to 90% of seedlings failing. However, even in deforested areas, existing root systems often exist. Since new seeds are not planted, it is cheaper. Additionally, they are much more likely to survive as their root systems already exist and can tap into groundwater during harsher seasons with no rain. While this method has existed for centuries, it is now sometimes referred to as Farmer-managed natural regeneration.
- **Artificial regeneration** methods include aerial and ground seeding, machine planting and hand planting.

Recommendation on increased forestation in target districts (Shikarpur, Kashmore):

The forestry resources of Sindh are classified in four different categories;

- i. Riverine Forests
- ii. Irrigated Plantations
- iii. Protected Forests
- iv. Mangrove Forests

The Riverine Forests of Sindh are confined to riverine tract of Indus within the protective embankments on both sides of the river. They are stretched from Northeast of the province to South near Arabian Sea where Indus falls in the sea. Irrigated Plantations are the main features of manmade plantations raised on canal irrigation system of river Indus. These plantations were raised mainly to meet the ever increasing demand of wood and wood products in the country in general and the province in particular. The grazing fields and unclassified wastelands of the province were declared as Protected Forests where the rights of the people are allowed more than that of reserved forests. The Indus delta mangroves, also categorized as protected forests, have great environmental value as they protect the coastal population from sea intrusion and serve as shield against cyclones which hit the coasts of Sindh occasionally.



Map of Sindh showing various forest types
(Source Forest department Govt. of Sindh)

Forests of Sindh are rather unique because of low rainfall and subtropical location. The inundation of the river Indus as an annual recurring phenomenon was the only source for providing irrigation to the forests of Sindh, as most of the productive forests are located in the protective embankments of river Indus. After the construction of the barrages and dams, this source of water supplies considerably diminished depleting the riverine forests.

Type	Area (Million ha.)	% of total land area of Sindh
Riverine Forests	0.241	1.71
Irrigated Plantations	0.082	0.58
Mangroves	0.345	2.45
Rangelands	0.457	3.25
Grand Total	1.125	8.00

Our target districts Kashmore and Shikarpur are located in north upper zone of Sindh and having forest resources of Riverine type and Shikarpur have some irrigated plantation as well. Sindh forest department is directed towards increasing tree cover of the province, which means reforestation of all areas that are still un-stocked particularly state lands.

To promote sustainable development of forestry resources and to increase tree cover of the province is promotion of forestry among the farming community through incentives so as to improve their own economic lot in addition to bridging the gap between supply and demand. This goal can be achieved through agroforestry practices. The department is using genetically superior seedlings under agroforestry on farmlands to increase productivity. In this regard the recommended plantation for target districts include; Shisham, Siras, Neem, Moringa etc. In fact, agroforestry should become a national mandate and a people's movement, as it is most economical, sustainable and stable alternative for ensuring ecological security of the country.

Annually SFD is distributing millions of saplings among the farmers on subsidized rates. The farmers have adopted this practice as an income generation activity. A great emphasis has been given to farm forestry which resulted in a considerable enhancement in tree cover of the province and it is expected that in future the tree cover outside state forests will increase considerably with full technical and material support to the progressive farmers from the department.

Furthermore, the planting of canal banks and roadsides would be necessary for amenity purposes besides environmental protection. An overall broad based plan of SFD is to arrest degradation of environment and biodiversity that would necessitate conservation of wildlife habitat.

The tasks briefly outlined above may appear stupendous yet the fact remains that the challenge has to be faced and must be tackled. The department has the capacity and ability to accomplish the task. Nothing could, however, be achieved unless the government asserts its will and determination to take up forestry with a total commitment for its development.

SESSION 23# CLIMATE RESILIENT LIVESTOCK MANAGEMENT STRATEGIES:



Time: 60 minutes



Content:

- Impacts of CC on live stock.
- Impacts of livestock on CC.
- Summarizing adaptation and mitigation practices.



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the climate change impacts on livestock and livestock on Climate Change.
- Participant's knowledge will be enhanced on adaptation and mitigation practices.



Objectives:

- Explaining the Impacts of Climate Change on livestock and vice versa.
- Briefly describe the adaptation and mitigation practices.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <https://www.ncbi.nlm.nih.gov/pmc/article/>
- <https://www.saskatchewan.ca/business/>
- <http://www.fao.org/climate-smart-agriculture-sourcebook>
- Climate change and livestock: Impacts, adaptation, & mitigation- by Melissa Rojas
- Livestock production and climate change- FAO

Impacts of Climate Change on livestock:

The term 'livestock' is used in a broad sense to cover all grown animals regardless of age, location or purpose of breeding. Non-domesticated animals are excluded under this definition unless they are kept or raised in captivity. Domestic animals included are large and small quadrupeds, poultry, and bees.



Livestock is commonly defined as domesticated animals raised in an agricultural setting to produce labor and commodities such as meat, eggs, milk, fur, leather, and wool. Livestock includes cattle, sheep, goats, buffalo, oxen, cows, camels, horses and donkeys.

In Pakistan livestock is an integral part of rural people's livelihoods, contributing to household income, food security and nutrition. They can provide quality food (meat, milk, and eggs); capital (sale, barter and hire); fertilizer (manure); draught power for cultivation and transport; and building materials (wool, fibers and hides). Pakistan is third largest livestock rearing country having population of 176.4 million domestic animals.

Efficient and sustainable livestock production relies on good agricultural practices, including appropriate feeding, breeding, and health care as well as a value chain approach and market-oriented production. Livestock also makes a key contribution to our food security. Climate change has substantial impacts on ecosystems and the natural resources upon which the livestock sector depends. The potential impacts on livestock include changes in production and quality of feed crop and forage, water availability, animal growth and milk, diseases, reproduction, and biodiversity. Increased temperatures, shifts in rainfall distribution, increased frequency of extreme weather events and consequent increased heat stress and reduced water availability are expected to adversely affect livestock.

1. Quantity and quality of feeds:

- a. Quantity and quality of feed will be affected mainly due to an increase in atmospheric CO₂ levels and temperature.
- b. The effects of climate change on quantity and quality of feeds are dependent on location, livestock system, and species.
- c. Impacts on fodder quantity and quality depend on the region and length of growing season.
- d. The length of growing season is also an important factor for fodder quality and quantity because it determines the duration and periods of available fodder.
- e. Extreme climate events such as flood, may affect form and structure of roots, change leaf growth rate, and decrease total yield.

2. Water Availability:

- a. Global agriculture uses 70% of fresh water resources, making it the world's largest consumer of fresh water.
- b. Pakistan uses over 90% of national fresh water resources in agriculture and livestock.
- c. Global water demand is moving towards increased competition due to water scarcity and depletion, where 64% of the world's population may live under water-stressful conditions by 2025.
- d. Water availability issues will influence the livestock sector, which uses water for animal drinking, feed crops, and product processes.
- e. The livestock sector water consumption will increase because an increase in temperature will result an increase in animal water consumption.
- f. To address this issue, there is a need to produce crops and raise animals in livestock systems that demand less water.

3. Livestock diseases:

- a. The effects of climate change on livestock diseases depend on the geographical region, land use type, disease characteristics, and animal susceptibility.
- b. Animal health can be affected directly or indirectly by climate change, especially rising temperatures:
 - i. The direct effects are related to the increase of temperature, which increases the potential for morbidity and death.
 - ii. The indirect effects are related to the impacts of climate change on microbial communities (pathogens or parasites), spreading of vector-borne diseases, food-borne diseases and host resistance.
- c. Temperature increases could accelerate the growth of pathogens and/or parasites that live part of their life cycle outside of their host, which negatively affects livestock.

4. Heat stress:

- a. All animals have a thermal comfort zone, which is a range of ambient environmental temperatures that are beneficial to body functions.
- b. When temperature increases the animals begin to suffer heat stress, which results in increased water intake.
- c. Heat stress on livestock is dependent on temperature, humidity, species, genetic potential, life stage, and nutritional status.

- d. Livestock in hilly areas will be more affected by the increase of temperatures than livestock located in plains, because livestock in lower latitudes are usually better adapted to high temperatures and droughts.
- e. Warm and humid conditions cause heat stress, which decreases fodder intake, milk production, the efficiency of feed conversion, health and mortality.

5. Biodiversity:

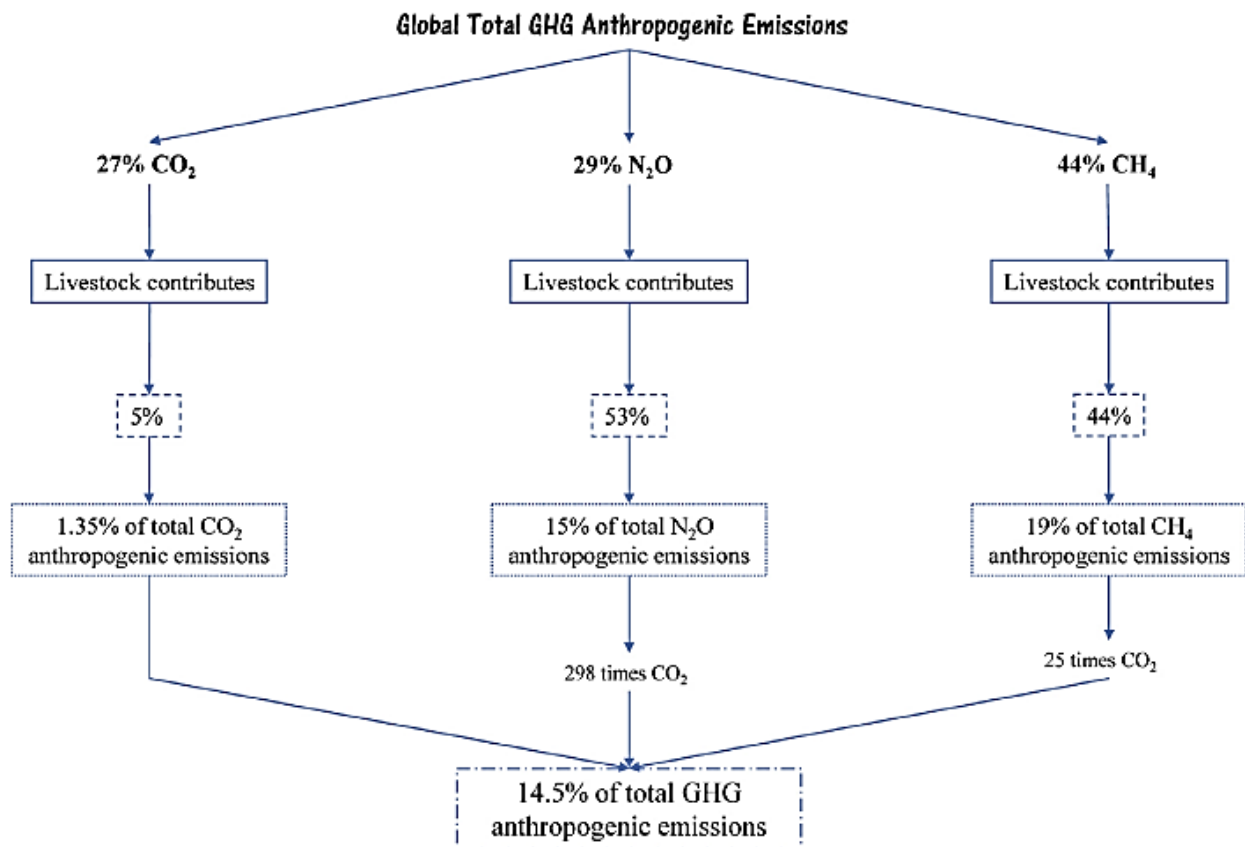
- a. Biodiversity refers to a variety of genes, organisms, and ecosystems found within a specific environment and contribute to human well-being.
- b. Climate change may eliminate 15% to 37% of all species in the world.
- c. Temperature increases have affected species reproduction, migration, mortality, and distribution.
- d. Livestock and plants will be highly affected by climate change and biodiversity loss.

Impacts of climate change on livestock production

	Grazing systems	Grazing systems
Direct impacts of climate change	<ul style="list-style-type: none"> • Increased frequency of extreme weather events. • Increased frequency and magnitude of droughts and floods. • Productivity losses resulting from physiological stress due to higher temperatures. • Change in water availability, which may increase or decrease depending on the region. 	<ul style="list-style-type: none"> • Change in water availability, which may increase or decrease depending on the region. • Increased frequency of extreme weather events, with impact being less acute than for extensive systems.
Indirect impacts of climate change	<p>Agro-ecological changes and ecosystem shifts leading to:</p> <ul style="list-style-type: none"> • Alteration in fodder quality and quantity. • Change in host-pathogen interaction resulting in an increased incidence of emerging diseases. • Disease epidemics. 	<ul style="list-style-type: none"> • Increased resource prices (e.g. feed, water and energy). • Disease epidemics. • Increased cost of animal housing (e.g. cooling systems).

Impacts of livestock on Climate Change:

1. The livestock sector is a major contributor to climate change, generating significant emissions of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (H₂O).
2. Livestock contribute to climate change by emitting greenhouse gases (GHG) either directly (e.g. from dung/manure management) or indirectly (e.g. from fodder activities, the conversion of forest into pasture).
3. Livestock contribute 14.5% of the total annual anthropogenic GHG emissions globally.
4. Livestock influence climate through products processing and transport.
5. The livestock sector is often associated with negative environmental impacts such as land degradation, air and water pollution, and biodiversity destruction.
6. Forests and natural habitats have been steadily converted to pasture.
7. Carbon dioxide emissions in manufacturing chemical fertilizer and pesticides for feed crops.
8. Nitrous oxide emissions from chemical fertilizer application on feed crops (grasses and legumes).



Contribution of livestock to the total GHG anthropogenic emissions.

Summarizing adaptation and mitigation practices of livestock:

There are several climate change recommendations, adaptation strategies which can improve the resilience of crop and livestock productivity to climate change, and mitigation measures that could significantly reduce the impact of livestock on climate change.

1. **Adaptation measures:** Adaptation measures involve production and management system modifications, breeding strategies, institutional and policy changes, science and technology advances, and changing farmers' perception and adaptive capacity.
 - a. **Livestock production and management systems:** An adaptation such as the modification of production and management systems involves;
 - i. Diversification of livestock animals and crops.
 - ii. Integration of livestock systems with forestry and crop production.
 - iii. Changing the timing and locations of farm operations.
 - iv. Diversification of livestock and crop varieties can increase drought and heat wave tolerance, and may increase livestock production when animals are exposed to temperature and precipitation stresses.
 - b. **Breeding strategies:** Changes in breeding strategies can help;
 - i. Animals increase their tolerance to heat stress.
 - ii. Animals increase their tolerance to diseases.
 - iii. Improve their reproduction and growth development.
 - c. **Farmers' perception and adaptive capacity:** One of the limiting factors for these changes to succeed is the disposition and capability of farmers to recognize the problem and adopt climate change adaptation and mitigation measures. Risk perception within farmer decision-making can be increased through education, family farm succession, and social interaction among farmers and farming communities.
2. **Mitigation measures:** There is potential to reduce livestock sector GHG emissions through the implementation of different technologies and practices. However, they are not widely used. Some of the technical options for mitigating the impact of livestock on climate change are carbon sequestration, improving diets to reduce enteric fermentation, improving manure management, and more efficient use of fertilizers.
 - a. **Carbon sequestration:** Carbon sequestration can be achieved through;
 - i. Decreasing deforestation rates.
 - ii. Reversing of deforestation by replanting.

- iii. Targeting for higher-yielding crops with better climate change adapted varieties.
 - iv. Improvement of land and water management.
 - v. Soil organic carbon can be restored through conservation tillage, erosion reduction, soil acidity management, double-cropping, crop rotations, and higher crop residues.
 - vi. Improving pasture management can also lead to carbon sequestration by incorporating trees, improving plant species, legume interceding, introducing earthworms, and fertilization.
- b. **Enteric fermentation:** Enteric fermentation is a source of methane emissions that can be reduced through practices such as improvement of animal nutrition and genetics.
- c. **Manure management:** Most methane emissions from manure management are related to storage and anaerobic treatment. Although manure deposited on pasture can produce nitrous oxide emissions, the mitigation measures are often difficult to apply because of the manure dispersion on pasture.
- d. **Fertilizer management:** Fertilizer application on animal feed crops increases nitrous oxide emissions. Therefore, mitigation measures such as increasing nitrogen use efficiency, plant breeding and genetic modifications, using organic fertilizers, and combining legumes with grasses in pasture areas may decrease GHG emissions.

SESSION 24# IMPROVED FEEDING TECHNIQUES AND FODDER MANAGEMENT:



Time: 45 minutes



Content:

- Modern trends in fodder production
- Introduction of climate resilient multi cut fodder varieties
- Fodder preservation
- Benefits of fodder preservation
- Techniques for fodder preservation
- Recommendation on Improved feeding techniques and fodder management in target districts (Shikarpur, Kashmore)



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the modern trends in fodder production, climate resilient fodder varieties, and fodder preservation and its techniques.
- Participant's knowledge will be enhanced on feeding techniques and fodder management in target districts.



Objectives:

- Explaining the modern trends in fodder production, climate resilient fodder varieties, and fodder preservation and its techniques.
- Briefly describe the feeding techniques and fodder management in target districts.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <https://www.ncbi.nlm.nih.gov/pmc/article/>
- <https://www.saskatchewan.ca/business/>
- <http://www.fao.org/climate-smart-agriculture-sourcebook>
- Climate change and livestock: Impacts, adaptation, & mitigation- by Melissa Rojas
- Livestock production and climate change- FAO

Modern trends in fodder production:

Pakistan is third largest livestock rearing country. Most of national livestock is being reared by small animal holders. Pakistan is blessed with diversified type of livestock. It not only provides food security through supply of milk, meat and self-employment of both men and women but also plays an important role for poverty alleviation of small holder livestock farmers.

There are many problems associated with fodder production in Pakistan due to a poor seed supply chain, the arid climate and a lack of technical information. However, with some basic knowledge and careful planning these problems can be overcome with ease. The constraints of fodder production in Pakistan lead to the fodder shortages that occur during the lean periods of feed in Pakistan. At these times the previous fodder has been harvested and the next seasons fodders is not at a stage appropriate to be fed as animal feed. Due to this, planning should be done in winter and summer fodder cultivation so that there will ample amount of quality fodder in shortage days.



The livestock population is increasing at the rate of 4.2% per year and accordingly its feed requirements are also increasing. Regular supply of adequate and nutritious fodder is essential for the promotion and development of livestock. However shortage of fodder production is the major limiting factor for livestock production in our country.

Importance of Fodder:

- Fodder crops are the main and cheapest source of feed for livestock.
- Fodder provides a variety of important nutrients.
- Fodder provides animals their favorite feed, throughout the year.
- Excessive fodder can be easily stored for seasons when there is a shortage of fodder

About 2% reduction in fodder area in each decade along with two important fodder scarcity periods one in winter months (November to January) and other in summer (May-June) further worsening the situation.

- **Legumes:** Legumes are a group of nitrogen fixing plants and are richer in proteins than grasses and other fodder crop. The plants have relatively more leaves than stems and leaves contain approximately 80% of the protein.

- **Annuals:** Annual plants are plants with a one year life cycle. They grow from seed, bloom, produce seeds and die in one growing season. They then need to be replanted each year.
- **Perennials:** A perennial plant or simply perennial is a plant that lives for more than two years. The term is also widely used to distinguish plants with little or no woody growth from trees and shrubs, which are also technically perennials.
- **Multicut:** A cultivated crop is harvested two or more times in one season before dying out or becoming dormant.

What is Good Fodder?

The growth and production of animals depends on the fodder they eat. Fodder includes hay, straw, silage, compressed and pelleted feeds, oils and mixed rations, and sprouted grains and legumes. Only the best fodder can guarantee their growth and maximum production. Fodder must be palatable, nutritious, digestible, and preservable. So fodders which fulfill the following criteria should be given to the animals.

1. Fodder according to the animals liking, that it consumes happily.
2. There should be a reasonable amount of dry matter in the fodder.
3. There must be an appropriate amount of raw proteins to meet the requirements of the body.
4. There should be enough digestible energy in the fodder so that the animals' digestive system remains healthy, and fodder should be completely digested.
5. It must have the quality to be preserved so that the farmer knows how much of the nutritional requirements of his animals are being fulfilled.

Modern Trends in Fodder Production:

1. Selection of fodder with higher yield/acre.
2. Selection of fodder varieties with higher nutritional value.
3. Preference of multi cuts and perennial fodders.
4. Preference for fodders which can be easily preserved/stored easily ensuring food security for livestock.
5. Fast Growing fodder Production Techniques;
 - a. Intercropping with friendly fodder crops increasing nutritional value of the harvested material.
 - b. Farm Mechanization helping to speed up fodder harvesting and preservations.

Important Factors that Increase per Acre Production of Fodder:

- Seeds which produce high yield.
- Timely cultivation according to schedule.
- Timely use of balanced fertilizers and water.
- Timely use of insecticides.
- Timely harvesting.

God Almighty has blessed human with various kinds of fodders according to the needs of the animals in different seasons. For instance, wintertime fodders have a higher protein content to help tolerate a cold climate; in the summer time fodders contain less protein to counter the harsh effects of high temperatures. These fodders can be divided according to the productive age of the fodders and different seasons, as listed below:

- 1. Kharif (summer) Fodders:** it includes Sorghum, Millet, Sorghum Sudan hybrid, Janter, Cowpeas, Guar, and Maize used as kharif fodder.
- 2. Rabi (winter) Fodders:** it includes Berseem, Lucerne, Cowpeas, Barley, Rape & Mustard, Oats, Rye grasses Rabi fodder.
- 3. Multi-cut / Evergreen Fodders:** it includes Lucerne, Mott Grass, Sorghum Sudan Grass, and multicut Oats,

Introduction of climate resilient multi-cut fodder varieties:

Multicut is the fodder which is planted once only and may be utilized all year long or even for many years. The quality seed is very important for these fodders better production. Seed quality means that it should be free from diseases, maximum possible per acre production and free of weed seeds. Only try to get those varieties of seed which are recommended by the government institutes and other authorized agencies from reliable source. Recommended varieties of different fodders are given below:

Crops	Sowing time	Harvesting time	Production (t/ha)	# of Cuttings
Sorghum grass hybrid	mid-Feb – mid-Mar	Mid-Apr to December	100-120	4-5 cuttings
Mott grass	mid-Feb – Aug	Mid-Apr to December (Perennial crop), 7 to 8 years life cycle	100-150	5-6 cuttings
Berseem	Sept – Nov	Mid-December to mid-May.	80-100	5-6 cuttings
Oats	Sept – Nov	Early December to mid-May.	100-120	5-6 cuttings
Lucerne	Nov – Dec	Perennial crop available around the year	65-90	6-7 cuttings
Rhode grass	Sept – Nov	Perennial crop available around the year	100-120	3-4 cuttings

Fodder Preservation, Fodder Preservation Benefits and Techniques:

Storing and preserving fodder for use in the non-growing season is an ancient practice. Fodder production is the major limiting factor for livestock production in our country. Fodder production from is high in summer and low in spring, autumn and winter. The fodder need of the animals however is almost equal throughout the year. In order to fill the gap during winter, farmers can produce winter fodder (e.g. oat, berseem etc.) and preserve excess fodder during the vegetation period. There are two types of fodder preservation i.e. hay making and silage making. Fodders and grasses can be preserved as hay (dried fodder) or as silage (wet fodder), depending on the weather conditions and the available resources.



1. Hay Making:

Hay making is a traditional method of fodder conservation in Pakistan. It consists of cutting the green biomass of the fodder plot and drying it to about 15% humidity (from the initial 85%). Dried biomass can be conserved in a dry place or a clamp without overheating or getting grey for quite some time. Depending on the type of fodder, the dry matter yield, the air temperature, the air humidity and the soil moisture, it takes two to five sunny days to produce good hay. That is why hay making is usually not possible during the rainy season. Hay can be made successfully only before or after the rainy season. For producing good quality hay, the fodder crops, grass and grass-legume should be cut just before flowering stage. If the fodder is cut early for hay, the yield will be less and if the fodder is cut after the flowering stage the quality will be poor. For the fodder crops, grasses and grass-legumes to reach the right stage for hay making at the end of the rainy season, the plots have to be grazed or cut six to eight weeks earlier. During hay making, there will be losses due to the cracking of leaves. Since the leaves contain the most valuable nutrients, one should try to minimize these losses. Losses are minimized through a quick drying process with careful handling.



Follow these steps to get optimal hay production:

- a. **Cutting:** Cut fodder in the evening (without spreading) or in the early morning.

b. Spreading: The fodder that is cut should be spread as soon as the dew has dried up and the sun begins to warm.

c. Turning: The fodder should be turned twice the first day and once or twice the following day(s).

d. Gathering: During the night, the pre-dried fodder should be gathered in heaps or windrows. Thus, the fodder is less exposed to the dew. In the morning, follow the usual procedure of spreading and drying fodder in an open area.



It is also recommended to use the hayracks or tripods for suspending the pre dried hay during bad weather periods. This technology is labour intensive and not always successful during the rainy season. Instead of proposing this technology, we would rather recommend silage making during uncertain weather conditions.

2. Silage Making:

All biomass contains a certain percentage of carbohydrates (e.g. sugar) which, under anaerobic condition (without air), are transformed into lactic acid by certain bacteria. A certain concentration of lactic acid protects the biomass from rotting or getting grey and it can be conserved for more than a year. Since the fodder for silage is gathered before complete drying, the losses due to the cracking of leaves are much less than hay making.



All the steps recommended for good silage making tend to favour a rapid fermentation:

a. Good quality of primary product: The primary product should contain a maximum of light fermentable carbohydrates. This is obtained by cutting the grass at the stage of shooting into ear, thus quite earlier than hay. A good grass clover mixture contains more carbohydrates than a pure clover stand. Predominant clover and legume fodder does not ferment easily; addition of molasses can partly resolve the problem. The fodder should be free of dirt, since dirt contains bacteria, which favour the rotting process. With the actual manual process of silage making, there is not much danger to carry dirt to the silo; however, with increasing use of machinery, precautions need to be taken to avoid dirt.



b. Pre-drying: Pre-drying of fodder to about 40% humidity increases the concentration of carbohydrates and facilitates the fermentation. It also prevents silage from leaking during storage and thus prevents the leaking losses and eventual water pollution. For a good pre-drying, follow the step of “cutting”

mentioned under hay making, spread once during the day and bring all the pre-dried fodder to the silo in the afternoon. However, the fodder should not be too dry (e.g. like hay), since the lacto-bacteria need some humidity in order to stay active.

c. Chopping: If the fodder contains long, rough and hard stems (e.g. maize, oat), it should be chopped in order to allow good compaction.

d. Compaction: Too much air present in the silage reduces its quality. Thus, the fodder must be thoroughly compressed in order to expel as much air as possible. A good compaction can be obtained by jumping and stamping on the fodder after each load, by rolling over it with the tractor, and by putting heavy material (dirt, stones) on the silo after complete filling.



e. Filling: The filling should be done in a few days, in order to cover the silo as soon as possible. It is possible to reopen the silo after a few weeks to add more fodder. While doing so, it is recommended to remove rotten or grey material on the surface of the previous filling.



f. Airtight storage: Fermentation will only start under anaerobic condition. It is thus, important not to let air enter into the silo after complete filling. All sides of the silo must be made airtight with the earthen pit wall, concrete wall or plastic cover. Make sure to cover the holes in the plastic with a tape. Protect your silo with a simple roof in order to prevent the plastic from cracking and to prevent water entry into the silo.

If all these steps are followed, after approximately one month the fodder will be fermented correctly. The fermented fodder will have a nice smell and will be ready for feeding. Bad smell and rotten or grey fodder are signs, that one or more of the recommended steps have not been followed correctly.

Recommendation on Improved feeding techniques and fodder management in target districts (Shikarpur and Kashmore):

The improved fodder is an important source of energy, protein and other nutrients in livestock for meat and milk production increase. Pakistan guidelines for improved fodder production and nutritive values and preservation practices are; to ensure fodder quality and integrating fodder crops into feeding techniques. These guidelines will help to strengthen the capacity, capability and proficiency of livestock farmers in target districts so that they can ensure availability of quality fodder throughout the year as fodder is needed for increase in livestock production.

Available fodder grown in Pakistan is show below:

Fodder Utilization	Availability (%)
Green fodder and crop residues	51
Forage grazing	38
Post-harvest grazing	03
Concentrates/Crop Residues	02
By products (Molasses, Sugarcane-tops, Vegetables)	06
Total	100

The annual fodder production in Pakistan is 52 million tons and Pakistan has 45 million livestock or cattle, this amount of fodder have been estimated to be 50 % of the maintenance needs. So, an efficient fodder management plan and improved feeding techniques for production and utilization is important to provide fodder.

Improved feeding techniques will help to optimize feed and nutrient of livestock; these will be a balanced diet, avoiding over-feeding, and providing abundant supplies of cool, clean, and pure water. These livestock will be the most profitable to the farmer and the most efficient users of nutrients. The recommended and attainable improved feed and fodder plan for both target districts Shikarpur and Kashmore.

1. **Roughages:** It is an essential feed for keeping healthy livestock. It has a lot of fibers and its nutritional value is relatively low but it is important to activate and normalize rumen function. Preparation of quality hay and silage are important tools to fight against fodder shortage periods during hot summer and cold winter.
 - a. Rice straw and wheat straw (dry fodder): it is low water content and low in nutrient.
 - b. Green grass (green fodder): it is high water content and relatively has many nutrients.
 - c. Mixed feed of dry and green fodder. It is good method that to mix green and dry fodder.
2. **Concentrate and Formula Feed:** It is feed to produce more milk. It has low water content and rich in nutrients. This includes cotton seed cake, wheat bran, rice bran and sunflower cake.
3. Balanced feed and abundant supplies of fresh water are necessary for increasing animal's production; fodder should be readily available to the animals for 24 hrs and 7days in a week.
4. Green fodder @ 10 % of body weight (at least) and ad lib water along with untying the animals will increase the production 1-2 liters per day. Feed must be offered in mangers or other types of feeders so that there will be less wastage during feeding. Floor feeding will increase the wastage and feed loss.

SESSION 25# BREED IMPROVEMENT OR DIVERSIFICATION:



Time: 60 minutes



Content:

- Breed improvement or diversification techniques.
- Benefits of breed improvement or diversification.
- Recommendation on Breed improvement or diversification in target districts (Shikarpur, Kashmore)



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the concept of Breed improvement or diversification and its benefits and
- Learn about recommended techniques on Breed improvement/diversification in target districts (Shikarpur, Kashmore)



Objectives:

- Explaining the concept of Breed Improvement and diversification.
- Describing Benefits of breed improvement.
- Explaining on Breed improvement/diversification in target districts (Shikarpur, Kashmore).



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <https://www.ncbi.nlm.nih.gov/pmc/article/>
- <https://www.saskatchewan.ca/business/>
- <http://agriculturewithmrsskien.weebly.com>
- <http://www.fao.org/3/i2414e/i2414e.pdf>
- <https://prmp.punjab.gov.pk/system/files/>

What is breeding?

Livestock farming is being practiced in Pakistan's rural areas in a traditional way since centuries. The farmers have not been able to make livestock farming a profitable enterprise, due to many reasons. One major reason is that due attention has not been paid to breeding.

A breed is a group of domestic animals with a homogeneous appearance, behaviour, and other characteristics that distinguish it from other animals. So, breeding means acting upon specific genetic principles, due to which the production and characteristics of every new generation of the animals is better than those of the previous generation are.

Breed Improvement or Diversification:

Breed improvement practices, using high yielding exotic and indigenous dairy breeds for improving the quality of cattle or livestock, with an emphasis on their productivity - scientific management of the cattle, feeding, rearing, and hygiene standards.

Every animal producer uses some type of breeding system to produce new offspring. A variety of systems can be used depending on the production goals of the operation.

Why Breeding needs to be improved:

If we study current breeding practices in livestock farming, we learn that though the number of animals has increased considerably during the last six decades, unfortunately the average milk production has decreased considerably. The main reason being that, instead of following basic rules at the mating of milk giving animals, our farmer loses not only the chance of getting the best breed but also decreases the production of his farm. It has been observed that most of the farmers use the same bull for mating in his own farm. This is called in-breeding and it not only decreases the animals' production but also makes the new generation prone to various diseases.

Benefits of Breeding:

- It maintains productive capability even in unsuitable environmental conditions.
- Early puberty.
- Increased lactation length (305 days).
- Decrease in calving interval.
- Normal parturition (calving).
- Immunity against diseases.
- It improves the economics of the farmer by making the farm more profitable.

Common Breeding Systems/terminologies for Livestock Production:

No	Breeding System	Definition
1	Straight breeding	Straight breeding is the mating of animals of the same breed
2	Cross breeding	Crossbreeding is the mating of animals of different breeds. A crossbreeding producer may have crossbred females but utilize a male from one breed, or vice versa.
3	Hybrid	An offspring born to a mating of two different breeds is called a hybrid
4	Heterosis or Hybrid vigor	The advantages of producing hybrids are that they typically grow faster, mature quicker, and utilize the superior traits of each breed. These advantages are referred to as hybrid vigor or heterosis.
5	Pure breeding	<ul style="list-style-type: none"> • Straight line breeding operations utilize only one breed. • A traditional straight line breeding is called pure breeding. • Pure breeds are animals with extensive pedigrees that can be traced back through one breed.
6	In breeding	The mating of an animal to a related animal is called inbreeding.
7	Line breeding	<ul style="list-style-type: none"> • Linebreeding is intentionally mating animals that are distantly related. • The animals might be distant cousins or share relative three or four generations back.
8	Close breeding	<ul style="list-style-type: none"> • Close breeding is the most intensive form of inbreeding because the two animals share more than one close relative. • This could include mating half-brothers and half-sisters or even brothers and sisters. • It is the most risky of the inbreeding systems. • Inferior genetics and even deformities can be expressed by using the close breeding system.
9	Out crossing	Outcrossing is the mating of animals of different families within the same breed. But the Animals are not related.
10	Grading up	Grading up is the mating of a pure bred male to a grade female.
11	Grade animal	A grade animal is any animal not eligible for registration but of high genetic caliber.

Disadvantages of In-breeding:

- Decrease in body weight and size of the next generation
- High mortality rate
- Decrease in immunity
- Delayed puberty
- Various physical disabilities

Selection of a Bull:

- Following points should be considered when selecting a bull:
- Muscular and compact physique
- Free from any physical abnormality
- Mother of bull should have high milk production
- The previous record of the bull should show that more female calves have been produced with the semen of the bull
- Previous record of better production of milk of his female progeny
- The bull must be free from venereal diseases

Note: Remember, “If a healthy bull is not available, do not use an ordinary bull for mating. It is better to use artificial insemination.”

Artificial Insemination:

Artificial insemination means making the female animal pregnant by putting semen in her uterus.

Advantages of Artificial Insemination:

- Maximum number of inseminations from a proven sire (bull) (about 150,000 semen doses can be obtained from one bull in one year)
- Semen of proven bull can be stored for years.
- Save the cost of rearing a bull.
- The semen of animals of different breeds is easily available.
- It helps to control diseases.
- The semen of the best bull of the world can be provided in far flung areas

Multiple ovulation and embryo transfer (MOET)

Multiple ovulation and embryo transfer (MOET) can be defined as a process or steps in removing the fertilised eggs from a female donor and putting them in **multiple** surrogate recipients, who are not related genetically

First embryo transfer calf in Pakistan was born at NARC in 1987 followed by first embryo transfer lamb in 1992. The technique has not been so far applied in buffalo due to poor embryo recovery. However, application of ultra sound guided ovum pick up technique and IVF may help in *in vitro* embryo production in buffalo.

Recommendation on Breed improvement/diversification in target districts (Shikarpur and Kashmore):

High yielding dairy cattle suggested for choosing semen for artificial insemination:

No	Breed	Possible Crossing
1	Local	Friesian, Jersey, Sahiwal
2	Sahiwal	Sahiwal (If proven semen is available)
3	Cross bred cow	Friesian, Jersey, Sahiwal
4	Pure Friesian, Jersey	Friesian, Jersey, Sahiwal
5	Buffalo	Use the semen of a proven Neeli Ravi bull

The major objectives of the breeding improvement or diversification at country level include improvement in milk production of indigenous dairy cattle and buffalo, reduction in age of maturity, improving reproductive efficiency and improvement in the quality and quantity of meat produced. The improved crossbreeding of purebred cattle such as Sahiwal and Red Sindhi with exotic semen is forbidden. However, crossbreeding of non-descript cattle is allowed. Further All sheep breeds are kept for wool and mutton. Milk is important only in Damani breed. Most of the sheep breeds produce coarse wool for carpet industry. The recommended breeds of livestock for target districts can be below:

	Species	Breed
1	Buffalo	Khundi
		Nili Ravi
2	Cattle	Sahiwal
		Red Sindhi
		Thari (Tharparkar)
		Dhanni
		Dajal
		Rojhan
		Bhagnari
		Kankraj
		Crossbred
		Holstein/Pure Friesian
	Jersey	
3	Sheep & Goats	Kachhi
		Awassi
		Damani
4	Camel	Dhatti
		Kharai
		Sindhi/Larri
		Sakrai

SESSION 26# VACCINATION AND DEWORMING:



Time: 105 minutes



Content:

- Why vaccination is important
- Types of available vaccination
- Disease vaccination and time chart



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Outcome:

- Participants will be able to understand the importance of vaccination
- Participants will learn about the available vaccinations
- Participants will be understand the disease vaccination time chart



Objectives:

- Explaining the importance of vaccination
- Describing the available vaccination
- Disease vaccination and time chart



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



References:

- Climate change and livestock: Impacts, adaptation, and Mitigation 2017
- FAO. 2018. Farmer field schools for small-scale livestock producers
- <https://www.pakdairyinfo.com/vaccination.htm>
- <https://livestock.sindh.gov.pk/sustainable-livestock>
- http://www.uvas.edu.pk/doc/advisory_services/Dairy-farming

Why Vaccination Is Important:

A common proverb states that “prevention is better than cure”. It means that instead of wasting a lot of money on the treatment of disease, we should try to protect animals from it. It would cost much less. You need to spend only a few rupees on their vaccination and immunization today, but in case of disease you would have to spend hundreds of rupees on their treatment. Consequently this minor sum will not only protect your animals but also make your dairy farming business more profitable.

What is Animal/Livestock vaccination?

What is Vaccination/Immunization? Vaccine is made by weakening or killing the germs of a disease in the laboratory. These germs, when they are injected into the animal, do not produce that particular disease, but their presence in its body naturally starts boosting their immune system, and then, if the same disease attacks the animal, it already has a strong defence system to fight against that disease. Thus vaccination protects the animal against that disease. Vaccines are categorized into conventional and next generation vaccines. Animal vaccines have been found to be the most cost effective and sustainable methods of controlling infectious veterinary diseases.

Issues related to Vaccination:

The main issues in relation to the vaccination of animals is access and availability. Vaccines are the most cost-effective measure in preventing disease in livestock populations, although the logistics of distributing vaccines to marginalized populations is still a challenge.

Accessibility

Most smallholder farmers' (SHFs) livestock in marginalized populations (MPs) die because of a disease, they do not reach their full potential, or they transmit a disease. The root of this issue could be prevented or controlled by increasing the accessibility to animal vaccines.

Availability:

The diseases have been characterized into diseases that cause economic losses, government-controlled diseases, and neglected diseases, which all link to availability. If the vaccine is expensive, it therefore becomes less available to poor farmers.

Other issues:

Some other issues include but are not limited to economic barriers, political barriers, technical and scientific barriers, regulatory barriers, field use barriers, and social and perception barriers.

Importance:

- **Safe and efficient food production**

Veterinary vaccines are used in livestock and poultry to maintain animal health and to improve overall production. More efficient animal production and better access to high-quality protein are essential to feed the growing population. An FAO High-Level Expert Forum reported in September 2009 that in order to feed a projected world population of 9.1

billion people, the overall food production will need to increase by 70% between 2005/07 to 2050. Vaccines that preserve animal health and improve production are important components in meeting this need.

- **Control of zoonotic diseases**

Vaccines to control zoonotic diseases in food animals, companion animals, and even wildlife have had a major impact on reducing the incidence of zoonotic diseases in people. Many countries have severe problems with Brucellosis in cattle, small ruminants, and people due to a lack of available Brucella vaccines for animals.

- **Control of emerging and exotic diseases of animals and people**

Emerging and exotic animal diseases are a growing threat to human and animal health and threaten food security. Increases in human and animal populations, with accompanying environmental degradation and globalized trade and travel, enhance opportunities for transfer of pathogens within and between species.

- **Reduction of the need for antibiotics**

Veterinary vaccines reduce the need for antibiotics to treat infections in food producing and companion animals. There are increasing concerns related to antibiotic resistance associated with the extensive use of antibiotics in veterinary and human medicine. Producers may choose either vaccines or antibiotics to control some diseases based on cost, if both options are available.

- **Food safety vaccines**

Recently, vaccines have been developed to reduce the shedding of organisms that cause food borne diseases in people. Vaccines for E coli in cattle and Salmonella enteritis in chickens are available. These vaccines typically do not improve the health of the vaccinated animal, but they reduce the shedding of pathogens that may contaminate animal products for human consumption.

- **Control of diseases of companion animals and horses**

Vaccines for diseases of companion animals and horses have greatly enhanced the ability to keep animals in the household and to own horses. The human-animal bond that develops enriches the lives of both the animals and the people.

Precautions about use of vaccine:

- It is important to take note of these things for better results of vaccination:
- Always use vaccine manufactured by a well reputed company.
- Store vaccine in a refrigerator or in a thermos flask covered with ice, because a rise in temperature can decrease its effectiveness.

- Shake well the vial/bottle before use.
- Do not vaccinate animals in front of other animals because it may make them afraid of it.
- Do not vaccinate sick animals.
- Consult a veterinary doctor about the vaccine dose because a less than required dose will not be effective.
- Try to vaccinate when the weather is cool.
- Do not worry if the body part where vaccine has been injected, swells or a blister appears. Apply some antiseptic solution and the scar would cure in a week.

De-Worming of Animals:

According to a careful estimate, 42% animals are affected by different types of worms. The worms adversely affect efficiency of the animals and cause a financial loss to their owners. That is why it is important to overcome the worms to improve production of the animals. The worms in animals are more in those areas where animals graze more, than in those areas where animals graze less. There are more worms in those animals which eat dried feed than in those which eat green fodder. Similarly, more worms are found in younger animals than in older ones. One important reason of lesser rate of growth in younger animals in Pakistan is the presence of worms in them.

Signs of worm infested Animals:

- Diarrhea
- Loss of weight
- Soil licking and eating pieces of cloth
- Delay in puberty
- Weakness and slow growth
- Decrease in milk production
- Death at an early age
- Thin and rough skin

Types of Worms: Worms are usually of two types:

I. Internal parasites (worms):

According to an estimate, the mortality rate among the younger animals of 6 months to one year old due to internal worms is 25-30%. Internal worms include round worms, stomach worms, lung worms, liver flukes and intestinal worms.

II. External parasites:

These parasites are found on external skin. They are mostly blood-sucking parasites and they cause spread of fatal diseases in the animals. They include lice, ticks, flies and mosquitoes, etc.

Kinds of adverse effects of Parasitic Infestation:

The adverse effects cause financial losses to the owners of the animals. The adverse effects of infestation can be divided into two types.

Hidden Diseases	Apparent Diseases
<ul style="list-style-type: none">• Decrease in milk production• Enlargement of the belly• Loss of weight• No pregnancy etc. are the hidden effects of worms.	<ul style="list-style-type: none">• Thinness of skin• Anemia• Scars and swellings on the body• Cough• Constipation• Diarrhea etc. which show the apparent adverse effects of the worms

Control of Parasites:

- Keep animals' sheds clean.
- There should not be any holes/cracks in the walls or roofs of the sheds, where these external parasites can hide or lay eggs.
- Spread limestone powder in sheds from time to time.
- Spray sheds with insecticides after removing the animals from their sheds.
- In case of ticks, get it treated by a veterinary doctor.
- Protect chopped fodder from dust and dirt and give the animals clean feed.
- De- worm animals regularly.
- Give a variety of de-worming medicines so that the worms cannot build immunity against any medicine.
- Whitewash the water troughs of the animals with limestone powder for protection against microbes.

Selection of De -Wormer:

These points should be kept in mind when de-worming medicines are being chosen:

- Determine the quantity of the medicine according to the weight of the animal.
- Easy to administer
- Choosing the most effective medicine
- Less expensive
- Personal safety
- Effectiveness of the medicine / A reliable company

Note: It is safe to drink the milk and/or eat the meat of the animal 3-4 days after de-worming

De-Worming the Herds of Cows and Buffaloes:

The production of milk increases by ½ to 1 litre of milk when lactating animals are de-wormed. The effects of the parasites are different on cows, buffaloes, bulls and on younger

animals. Therefore, the methods of their treatment should also be different. De-worming medicines should be administered at least thrice a year to the adult and four times to the younger animals.

Types of Available Vaccination:

Disease	Vaccine	Time for vaccination	Dose rate
Haemorrhagic Septicemia (HS)	HS (VRI)	May/June and November/December	5 ml / 300 kg s/c
	HS (NIAB)	Once a year (Before rainy season)	5 ml I/M
Black Quarter	BQ	March/April	5ml s/c
Anthrax	Anthrax	August	1ml s/c
Foot & Mouth Disease (FMD)	FMD (VRI)	February/March and September/October	5 ml s/c
	FMD (Marial)	At start of winter season	3 ml (large animal) 2 ml (small animal)

Vaccination in Calves: For FMD and HS: First injection at age of one month, second injection at the age of 1.5 month and the repeat after six months of second injection. Vaccination of brucellosis should be done at the age of 4-7 months.

Note: For each type of vaccination always give booster dose after 21-30 days of first dose.

Disease Vaccination and Time Chart:

مدافعت کا دورانیہ	ٹیکے لگوانے کیلئے مناسب وقت	متاثر ہونے والے جانور	بیماری کا نام	مہینہ
6 مہینے	ڈسمبر کا آخری ہفتہ	بھیڑ اور بکریاں	دست Enterotoxemia	جنوری
6 مہینے	جنوری کا آخری ہفتہ	گائے اور بھینس	منہ اور کھر کی بیماری F.M.D.	فروری
ایک سال	جنوری کا آخری ہفتہ	گائے، بھینس، بھیڑ اور بکریاں	سٹ Anthrax	مارچ
9 مہینے	فروری کا آخری ہفتہ	بھیڑ اور بکریاں	بھیڑوں کی چیچک Sheep Pox	اپریل
ایک سال	مارچ کا آخری ہفتہ		چوڑے مار Black Quarter	مئی
6 مہینے	اپریل کا پہلا ہفتہ	گائے اور بھینس	منہ اور کھر کی بیماری	جون
ایک سال	مئی	بھیڑ اور بکریاں	پھیپھڑوں کی سوزش Pleuropneumonia	جولائی
6 مہینے	جون کا آخری ہفتہ	بھیڑ اور بکریاں	دست	اگست
3 سے 4 مہینے	جولائی کا آخری ہفتہ	گائے اور بھینس	گل گھوٹو Haemorrhagic Septicemia	ستمبر
ایک سال	اگست	بھیڑ اور بکریاں	چیچک	
9 مہینے	اگست	بھیڑ اور بکریاں	سٹ	
9 مہینے	اگست	گائے، بھینس، بھیڑ اور بکریاں	R.P.	اکتوبر
6 مہینے	ستمبر کا آخری ہفتہ	گائے اور بھینس	چیچک	
ایک سال	اکتوبر	گائے، بھینس، بھیڑ اور بکریاں	- پھیپھڑوں کی سوزش - گل گھوٹو	نومبر
3 سے 4 مہینے	ڈسمبر کا آخری پہلا	گائے اور بھینس	گل گھوٹو	ڈسمبر

SESSION 27# SAFE AND DESCENT FARMING:



Time: 75 minutes



Content:

- Safe handling of pesticides and their residues,
- Hygiene promotion,
- Managing households and farm waste material etc.



Objectives:

- Explaining the concept of Good agricultural practices
- Describing the Safe handling of pesticides and their residues
- Explaining Importance of the hygiene promotion at farm to ensure food safety & farm waste management.



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



Outcome:

- Participants will be able to understand the concept of Good agricultural practices
- Participants will learn about the Safe handling of pesticides and their residues
- Participants will understand the Importance of the hygiene promotion at farm to ensure food safety & farm waste management.



References:

- Training manual on Good agricultural practices 2016 by FAO
- Farm Worker Health and Hygiene; Produce safety project 2005.

Good Agricultural Practices:

Good Agricultural Practices (GAP), as defined by FAO, are a “collection of principles to apply for on-farm production and postproduction processes, resulting in safe and healthy food and non-food agriculture products, while taking into account economic, social and environmental sustainability”.

Food safety has gained increasing importance over the years due to its impact on the health of consumers and the growth in the domestic and international trade in food products. Production of safe food is essential for protecting consumers from the hazards of foodborne illnesses. Further, food safety is an integral part of food security and contributes towards increasing competitiveness in export markets. Food safety hazards may occur at different stages of the food chain starting right from primary production and extending to secondary and tertiary processing, storage and distribution, and packaging. It is therefore very important to address food safety starting from the farm level. Implementing good practices during on-farm production and post-production processes is of immense importance for assuring a safe food supply.

Safe Handling of Pesticides and their Residues:

Chemicals used on the farm can be categorized as agrochemicals that are applied on the farm or produce such as fertilizers, pesticides, seed treatment material, plant growth regulators and additives, and non-agrochemicals such as grease, fuels and oils that are required for other purposes. The safe handling of chemicals requires following:

- i. Only pesticides permitted under a country’s regulations shall be used.
- ii. Chemicals shall be purchased only from registered/licensed suppliers.
- iii. Mixing of two or more chemicals should not be done, unless recommended by technically competent personnel/institutions/authorities.
- iv. The dosage as recommended by competent authorities shall be applied and excess chemicals shall not be used.
- v. Surplus chemicals shall be disposed of in a manner to avoid contamination to the produce.
- vi. Withholding periods for the interval between chemical application and harvest shall be maintained as per the pre harvest interval mentioned on the label.
- vii. Equipment for applying chemicals shall be maintained in working condition and checked for effective operation by a technically competent person.
- viii. Equipment shall be washed properly after every use and washing water shall be disposed of in a manner to avoid contamination to produce.

- ix. Chemicals should be stored in a well-lit, sound and secure structure, which is located and constructed to minimize the risk of contaminating produce and equipped with notices and emergency facilities in the event of a chemical spill.
- x. Liquid chemicals shall not be stored on shelves above powders.
- xi. Chemicals shall be stored in the original container with a legible label and according to label directions; if chemicals are transferred to another container, the container shall be clearly marked with the name of the chemicals, the dosage to be used and the withholding period.
- xii. Empty chemical containers shall not be reused and shall be collected in a secure place and properly disposed of according to the country's regulations and in a manner to avoid contamination of produce and the environment.
- xiii. Obsolete or expired chemicals shall be clearly identified and kept in a secure place till disposal. These shall be disposed of through official collection channels or in legal off-site areas.
- xiv. A record of chemicals obtained should be maintained, detailing the chemicals used, name of the supplier, date and quantity obtained, date of manufacture and expiry.
- xv. A record of application for each crop shall be maintained giving details of chemical, reason for application, treatment location, dosage, method, date of application and name of operator.
- xvi. A record of chemicals held in storage shall be maintained detailing chemical name, date and quantities procured and date of complete use or disposal.
- xvii. If chemical residues in excess of maximum residue limits *(MRL) are detected in the market where the product is traded or exported, the marketing of the product shall cease and the cause of contamination shall be investigated. Corrective actions shall be taken to prevent recurrence and a record kept of the incident and the actions taken.
- xviii. Non-agrochemicals shall be handled, stored and disposed of in a manner to avoid any risks to food safety.
- xix. Integrated Pest Management *(IPM), if implemented, shall require careful consideration of available pest control techniques and the subsequent integration of appropriate measures to discourage the development of pest populations, while keeping the use of plant protection chemicals at minimal level.

***MRL:** The maximum residue limit is the maximum amount of pesticide residue that is expected to remain on food products when a pesticide is used according to label directions that will not be a concern to human health.

***IPM:** Integrated pest management, also known as integrated pest control is a broad-based approach that integrates practices for economic control of pests. IPM aims to suppress pest

populations below the economic injury level. It is an effective and environmentally sensitive approach for **pest management**, which relies on a combination of common-sense practices. **IPM** takes advantage of all appropriate **pest management** options including, but not limited to, the use of pesticides.

Hygiene promotion at Farm:

Good agricultural practices also address the importance of Hygiene promotion at farm to ensure food safety and security. As farm workers have intimate contact with the crops, fruits and vegetables as they harvest, sort and pack these foods, so worker health and hygiene becomes a matter of concern. Pathogenic organisms of human health significance i.e. Shigella, Cryptosporidium, Cyclospora, Hepatitis A, and Norovirus associated with infected farm workers, can be implicated in outbreaks involving food items they produce.

Some of the factors contributing to outbreaks associated with produce caused by infected workers include lack of adequate water supply, workers with limited hygiene education, poor or no toilet facilities, bare hand contact with produce items, lack of food contact surface sanitation and lack of childcare for workers.

Worker Health and Hygiene:

- Workers must recognize that when they are sick, they should not report to work, or alternatively, report their illness to a supervisor who can assign them to a job where they will not handle produce.
- Workers displaying symptoms such as nausea, vomiting, diarrhea, severe abdominal pain, exposed cuts, sores or open wounds, Hepatitis A or yellow jaundiced skin and eyes should not have direct contact with food.
- Workers with upper respiratory infections should also be assigned duties not involving food handling.
 - Workers who have been removed from contact with produce should only be returned to these jobs when cleared by a licensed health care professional, stating that they are no longer infectious.
- Instruction on the prompt and proper treatment (first aid) for cuts, abrasions and other injuries, as well as policies and procedures on the specific handling and disposition of produce and food contact surfaces that come in contact with blood or other body fluids.

Personal Cleanliness:

- Taking a shower every day, wearing task-appropriate clean clothes to work, keeping fingernails trimmed short and clean, using only designated toilet facilities at all times (either field toilets, toilets in the packinghouse or other appropriate facilities), washing hands thoroughly and often, using appropriate head gear, and not eating food or candy,

chewing gum or using tobacco products while on the job working with produce are common personal hygiene items.

Water:

- Clean, potable water from a sanitary source for farm workers is needed for consumption and hand washing and reduces the likelihood of enteric organisms contaminating the hands of workers.
- Drinking water should be provided to ensure that workers do not get dehydrated and ill while working. The water supply should be in good working order and be monitored on a daily basis.
 - Water should be stored in clean and previously sanitized containers and tanks that are cleaned and sanitized daily.
 - The containers should be covered, kept away from sun and excessive heat and single-use, disposable cups should be provided.

Jewellery and Personal Adornments:

- Jewellery of all kinds including rings, bracelets, earrings, necklaces, piercings, as well as false finger nails and other personal adornments such as badges, buttons, etc. can create a physical hazard if they should break or become dislodged and fall into the product.
- Pens, pencils, thermometers, and other small items should not be kept in coat or shirt pockets as they might fall into the product.
- Appropriate head gear should be worn when workers are handling product and facial hair must also be covered.

Proper Toilet Use:

- It is vital that growers provide clean and sanitary toilets and hand washing facilities that are properly stocked with soap, water and single-use paper towels in the field as well as in packinghouse operations.
- Providing these facilities close to where people are working and enforcing proper use will promote good health and hygiene, reinforcing the farm's commitment to produce safety.

Hand Washing:

- Proper hand washing is the single most important way to prevent the transmission of infectious diseases and should be practiced by all workers who handle food.
- Hand washing is an activity that should always be done before beginning work and should be repeated frequently throughout the day. It is especially critical after performing any of the following activities:

- Using the toilet
- Eating foods or drinking beverages
- Returning to work after a break
- Coughing, sneezing or blowing the nose
- Touching or scratching the face, mouth, nose, skin, hair, or ears
- Smoking or using chewing tobacco
- Touching dirty surfaces, equipment or utensils
- Handling dirty raw materials, trash, garbage, or waste
- Handling contaminated or potentially contaminated materials
- Performing maintenance on any equipment
- Touching or handling agricultural chemicals including fertilizers, pesticides, and cleaning materials
- Any other situation that may lead to contamination of the hands

Gloves:

Since bare hand contact with ready to eat foods has often been linked to foodborne illness outbreaks, it is important that workers wear gloves when handling produce. Clean, intact gloves can provide an effective barrier between hands and produce.

- Once disposable gloves are removed, they should be discarded and not reused
- Reusable gloves should be washed and sanitized frequently and thrown away when they become old, soiled, torn or unclean able.
- Gloves are not a substitute for proper hand washing.

Managing Households and Farm Waste Material etc.:

Agricultural waste is waste produced as a result of various agricultural operations. It includes manure and other wastes from farms, poultry houses and slaughterhouses; harvest waste; fertilizer run-off from fields; pesticides that enter into water, air or soils; and salt and silt drained from fields.

An agricultural waste management system (AWMS) is a planned system in which all necessary components are installed and managed to control and use by-products of agricultural production in a



manner that sustains or enhances the quality of air, water, soil, plant, animal, and energy resources. In short, it is the management of all the waste, all the time, all the way.

Agricultural waste: is composed of organic wastes (animal excreta in the form of slurries and farmyard manures, spent mushroom compost, soiled water and silage effluent) Include:

- Natural waste
- Animal waste
- Plant waste

Field Wastes	Animal Wastes	Agro-Industrial Wastes
<ul style="list-style-type: none"> • Weeds • Straws 	<ul style="list-style-type: none"> • Animal Dung • Dead Bodies 	<ul style="list-style-type: none"> • Sugar cane: Molasses, Peals

Waste management:

If wastes are not properly handled, they can pollute surface and groundwater and contribute to air pollution.

- The proper management of waste from agricultural operations can contribute in a significant way to farm operations.
- Waste management helps to maintain a healthy environment for farm animals and can reduce the need for commercial fertilizers while providing other nutrients needed for crop production.
- The waste, which is, reduce, recycle and make it usable for different purpose is a waste management.

Management Processes:

- Source
- Generation
- Collection
- Transportation
- Treatment processes
- Disposal

Generation:

The major quantity of solid waste generated from agricultural sources are sugarcane baggage, paddy and wheat straw and husk, waste of vegetables, food products, tea, oil production, jute fibres, groundnut shell, wooden mill waste, coconut husk, cotton stalk, etc.

Collection:

- Waste like fruit and vegetable waste are collected from houses called domestic waste.
- Waste collected from Road Street or sides.
- Collected waste like dry refuse and green waste, animal dung from agricultural field.

Transportation process:

- Waste collected from the side of roads, agricultural field all are transported to decomposing site and for further treatment by trucks, trailers, carts.
- Different types of waste are collected and then transported for further treatment and the waste which is not used is directly disposal to the sanitary land.
- Waste are not burn in open air so and transported to incinerator.

Treatment process:

Various treatment process are performed on agricultural waste are as follows:

- When dealing with agricultural waste, we must follow health and safety regulations.
- We should provide written instructions for storing and disposing of each type of waste we produce.
- We must dispose of waste if we have determined that we cannot use prevention, preparation for reuse, recycling or any other recovery method.

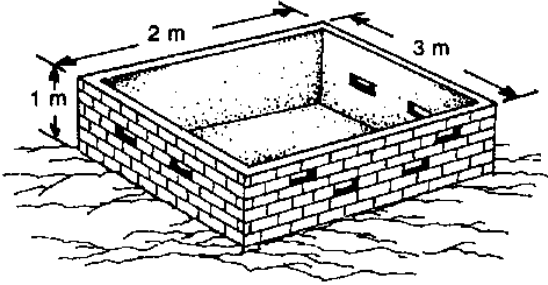
Treatment process:

- Composting

Composting is a method in which organic matter present in agricultural waste is decomposed by aerobically/ anaerobically through a biochemical process and converted into humus. Composting is divided into three-step operation.

- i. Preparation of agricultural waste
 - Shall be free of material that is not produced in agricultural field.
 - Shall be reasonably free of dirt, soil and visible surface
 - Shall be arranged so that it will burn with a minimum of smoke.

ii. Decomposition

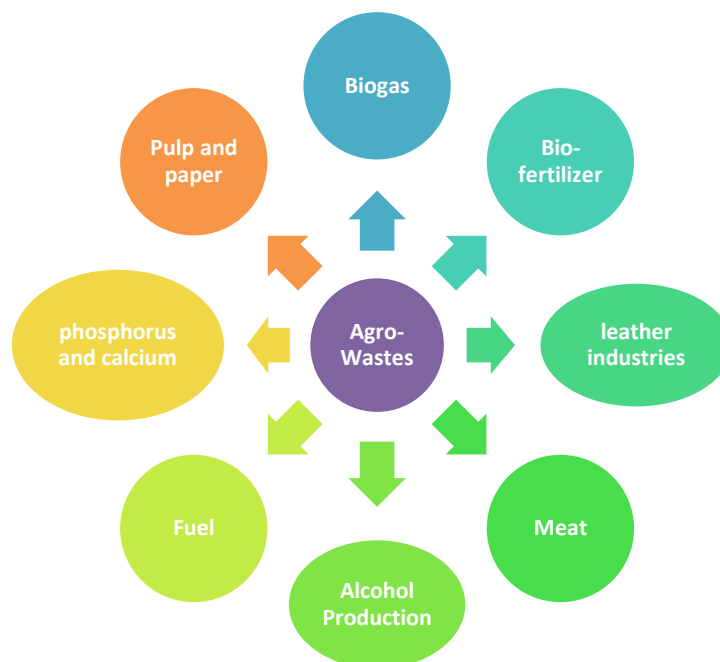
Nadep system	
Vermiculture Decomposition	
Anaerobically decomposition	

iii. Product preparation & marketing

- Recycling

- Process to change waste into new products
- Prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage
- Reduce air pollution from incineration and water pollution from land filling
- Lower greenhouse gas emissions
- Key component of modern waste reduction and is the third component of the "Reduce, Reuse, Recycle"

Management of recycling agro-wastes



- Incineration
 - Incineration is a modern and most hygienic method of disposal of dry refuse.
 - It is widely used in western countries, like, USA, UK, etc. and in it is gradually popular especially for large cities.
 - The method consists of burning the dry refuse in incinerator.

Landfill:

A landfill site (rubbish dump or dumping ground) is a site for the disposal of waste materials by burial have been most common method. Some landfills are also used for waste management purposes, such as sorting, treatment, or recycling.

Sanitary landfill

- Waste is compacted
- covered with soil
- When disposal site has reached its capacity-a final layer of 2ft is applied

Concerns about agricultural waste management:

- If not managed properly, agricultural waste can pollute the environment.
- The degradation of water quality can affect adjacent waterways and groundwater both onsite and offsite.
- This degradation reduces the ability of these resources to support aquatic life and water for human and animal consumption.
- Nitrates can found in fertilizers and agricultural waste runoff can seep into groundwater.
- Well water contaminated with nitrates is hazardous to humans, as it results in oxygen depletion in the blood.

Benefits of agricultural waste management:

- The reuse of animal waste in farming operations can reduce the quantity and hauling costs of commercial fertilizer.
- The contribution of animal waste increases the organic matter content of soils, which increases nutrient availability for crops and improves the water holding capacity.
- Good waste management reduces the instances of well water contamination and minimizes surface water pollution.

SESSION 28# RANGELAND AND PASTURE MANAGEMENT FOCUSING ON CYCLIC GRAZING:



Time: 60 minutes



Content:

- Defining rangeland and pastures
- How to manage rangeland and pastures



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Outcome:

- Participants will be able to understand the concept range land and pasture
- Participants will learn about the how to manage range land and pastures with focused on cyclic grazing



Objectives:

- Explaining the concept rangeland and pastures
- Describing how to manage rangeland and pastures



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



References:

- <https://sindhforests.gov.pk/page-rangelands>
- Climate Smart agriculture guidance notes 2018 by Concern worldwide.
- Pasture, Rangeland and Grazing Management 2018 ATTRA

Defining Rangeland and Pastures:

Pasture is defined as an area enclosed for growing forage and allowing animals, such as cattle, sheep, or goats, to graze. Pastures can support a wide range of plant species, offering varying degrees of nutrition for the grazers, stability for the pasture in terms of soil health, and habitat for wildlife.

Rangelands as "those lands on which the native vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing use. Rangelands include natural grassland, savannah, many wetlands, some deserts, tundra, and certain forb and shrub communities."



How to manage rangeland and pastures:

Production of food is dependent upon an adequate resource base - particularly the availability of land, water and energy. Most of Pakistan lies in the arid and semi-arid zone which is characterized by low precipitation, extreme temperatures, and low humidity. Sufficient food production for growing population with limited water supply and fragile land resource is only possible when they are used wisely and sparingly. Outside the irrigation system of Indus valley, most area of the country is used for extensive agriculture and rearing livestock.

Rangelands are ecosystems that play critical ecological roles which include: habitat for wildlife, source of biodiversity and pollution buffer. Furthermore, rangelands in Pakistan are a major source of forage for livestock, particularly sheep and goats. The increase has put more pressure on rangelands. On the other hand, rangelands are shrinking due to growth in human population with a need to allocate more area for crop production, house building and industrial development. Since the animal production systems in rangelands operate on low input basis, therefore, the problem of increase in grazing pressure will become worse over the period. The decline in vegetation cover due to grazing pressure will accelerate erosion and desertification of rangelands.

Productivity and vegetation of rangelands depend upon many factors such as type of soil, relative elevation, and climatic variation. Annual rainfall in 84% of the rangelands is less than 300 mm and droughts are the common feature in these areas that also affect the dry matter production. Moreover, quality of forage available from the rangelands can also vary, depending upon plant species, and general climatic attributes. It is estimated that except alpine pastures in northern areas, where dry matter (DM) production is about 1500 kg/ha, most of rangelands produce 100 to 500 kg DM/ha.

The arid lands in Sindh cover 60% of total land area of Province. These rangelands also support

millions of people and their livestock as a source of fodder, forage, food and fuelwood etc. In the absence of canal irrigation, seasonal rainfall during Monsoon is only source of water in these areas. Keeping in view the importance of this natural resource, these lands have been recognized within fourteen priority areas of environmental concern in Pakistan as identified under National Conservation Strategy (NCS).

Registan lies in the districts of Thar, Mirpurkhas, Sanghar Khairpur and Sukkur covering the eastern side of the province, which provides habitat for important fauna. This region encompasses 45,000 Sq. Kms. Large sandy dunes characterize it. Approximately 10% of the total area is under cultivation. The south eastern portion of the region (Nagarparkar) does not exhibit extensive dune development. It is dominated by the Karunjhar Range, which reaches an altitude of 300 meters. The range is surrounded by silty plains.

The Arid lands of Kohistan lies in the west of the river Indus, in Districts of Karachi, Dadu, Thatta and Larkana , wherein, the first National Park of Pakistan has been established for the protection of endangered Sindh Ibex. The region of 43000 Sq. Kms.

These range lands support millions of local population and their livestock in terms of being a source of fuelwood, food, fodder/forage etc. The limited irrigation water resources and extreme environmental conditions limit to bring these areas under irrigated agriculture. Contrary to being potential resources these lands are legally categorized as “Wastelands” because of apparently smaller economic output as compared to the irrigated lands along the Indus valley.

The desert ranges of the Sindh province, which have degenerated due to over grazing and shifting cultivation, have considerable potential for livestock production, which is basic source of income for local inhabitants. Owing to drought conditions, the livestock is mostly in poor conditions and fetches low prices as compared to animals from irrigated plains. The annual rainfall is lifeblood for these arid lands, which is usually very low and erratic. The environmental degradation and subsequent effects on the distribution of rainfall patterns at Global level has also disturbed the rainfall patterns in Pakistan, as a result of which these rain fed areas received very little/no rainfall during past decade causing disastrous famine situation and mass migration of the local people and their livestock to the irrigated area and cities.

Periodic droughts are a major cause of desertification in the desert rangelands of the province. The drought in recent past for several consecutive years has led to a drastic adverse impact of human and livestock population. The productivity of these rangelands has been minimized due to over grazing, over exploitation of vegetation and frequent droughts. This has caused severe damage to the economy resulting in land degradation, reduction in milk & meat production and loss of biodiversity.

Impacts of Drought on Rangelands:

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. Impacts are commonly referred to as direct or indirect.

Direct Impacts	Indirect impacts
<p>Reduced crop, rangeland, and forest productivity directly cause</p> <ul style="list-style-type: none"> • Increased fire hazard • Reduced water levels • Increased livestock and wildlife mortality rates • Damage to wildlife and fish habitat 	<p>Reduction in crop, rangeland, and forest productivity indirectly cause</p> <ul style="list-style-type: none"> • Reduced income for farmers and agribusiness • Increased prices for food and timber • Unemployment • Reduced tax revenues because of reduced expenditures, • Increased crime, • Foreclosures on bank loans to farmers and businesses, • Migration, and disaster relief program

The drought in the Kohistan in recent past for several consecutive years has led to a drastic adverse impact of human and livestock population. The productivity of these rangelands has been minimized due to over grazing, over exploitation of vegetation and frequent droughts.

In addition, due to scarcity of water, the water resources of the area have not been recharged because of almost no rains fall for last 3-4 years and local people have to wait long hours to collect water from the wells. Women and children are spending six to eight hours daily to collect water. Hence, it is very essential to take necessary measures for developing water resources of the area. District wise rangelands available under the control of Forest department is as under:

Sr. No	Districts	Area in hectors
1	Tharparkar/ Umerkot	109,516
2	Karachi	116,862
3	Dadu	159,031
4	Thatta	13,045

(Source: sindhforests.gov.pk/page-rangelands)

Management of Range Land and Pastures with Focused on Cyclic/Rotational Grazing:

Livestock productivity is often constrained by access to feed in the form of natural pasture, fodder, concentrates or commercial feeds, based on the type of livestock rearing system, whether extensive or intensive. In many of the contexts especially in drylands, livestock is managed through extensive free-range systems where livestock feed on the natural vegetation of the rangeland. Improving livestock feed regardless of the different rearing system means ensuring livestock has access to various types of food sources throughout the year in order to keep healthy and hence be less susceptible to diseases.

Below some option interventions suitable to different management system, from more extensive to more intensive management systems:

- i. **Ensure access to pastures** through nomadic routes, transhumance corridors and overall freedom of movement for nomadic and semi-nomadic pastoralists

- ii. **Controlled and rotational grazing** in communal land, community-based rangeland rehabilitation
- iii. **Conservation/storage of local natural grass** (low-cost fodder) through hay and silage production
- iv. **Fodder production with highly nutritious/leguminous** grass and shrubs species (with or without irrigation)
- v. **Community fodder** banks
- vi. **Grazing in individual** paddock
- vii. **Commercial feeds and** concentrates, diet supplementation

Native pastures can be managed through a number of grazing strategies including:

a) Continuous grazing and set stocking

Continuous grazing is a management system where livestock run in a paddock continuously over time with no, or only infrequent, spells from grazing. Continuous set stocking refers to the situation where livestock numbers in a paddock vary little from month to month, or from year to year.

Advantages	Disadvantages
<ul style="list-style-type: none"> • low start-up costs • most cost-effective method of grazing • abundance of forage and grass in the rainy season • requires less management and resources 	<ul style="list-style-type: none"> • causes overgrazing • encourages straying of animals • encourages the buildup of internal and external parasites

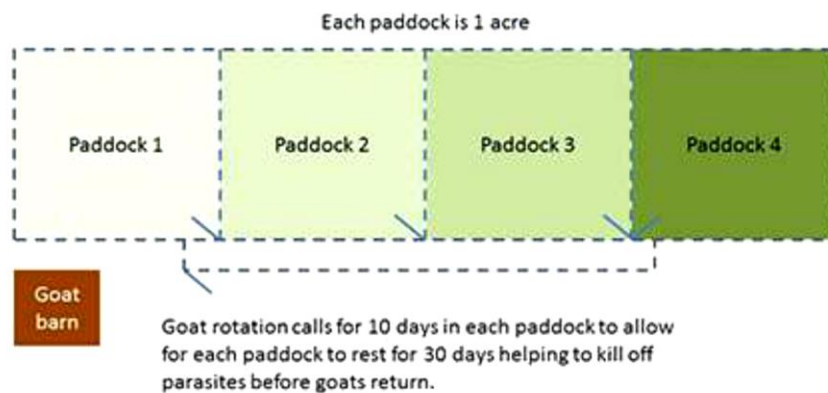
Risks to land condition and production can be minimised in a continuous grazing system by:

- Preparing a forage budget and adjusting stocking rate accordingly.
- Spelling the paddock during the growing season once every 3-4 years to allow full pasture recovery.
- Rotational burning to minimize patch grazing.

b) Rotational/ Cyclic grazing:

Rotational grazing involves moving livestock through a series of paddocks so when they have finished grazing the last paddock in the series, the first paddock has recovered to allow the rotation to recommence. Rotations are often organised around the plant growth cycles and aim to optimise pasture utilisation.

Advantages	Disadvantages
<ul style="list-style-type: none"> • reduces weed growth • reduces soil erosion • limits the compaction of soil • helps to maintain healthy forage and grass • animal wastes add nutrients to the soil • prevents over grazing • forage and grass are consumed more efficiently 	<ul style="list-style-type: none"> • requires additional labour • starting costs can be very high (these include materials and labour needed to construct fences) • fence requires proper maintenance



c) Cell grazing and Time control grazing:

Cell grazing and time control grazing are similar to rotational grazing, but are more intensive and involve more paddocks or 'cells'. In time control grazing, paddock moves are determined by plant growth - the faster the growth, the more moves and vice versa.

d) Spell grazing:

Spell grazing involves locking up pastures at critical times in their growth cycle to allow plants to replenish root reserves and set seed. This reduces the risk of over grazing and encourages pasture plant recruitment through seed set.

An example of spell grazing is wet season spell grazing in northern cattle production systems which involves destocking paddocks during the wet season to allow plant recovery and new native pasture plant recruitment through seed set.

Spell grazing can cause possible overgrazing if livestock are brought together at higher than optimal stocking rates while other paddocks are being spelled.

e) Zero grazing

In this type of grazing system, the animals are not allowed to go out into the pasture to graze. Instead, forage is cut and brought to the animals in their .The forage can be harvested manually or mechanically. In some areas harvested manually with a cutlass, knife or a scythe. It is essential that farmers know the correct time to harvest grass. If forage is harvested when it is too young, it can cause diarrhoea in animals and it can cause the plants to die or stunt their growth. If forage is harvested when it is too old, it will become too woody and loose its deliciousness.

Regardless of the strategy used, a successful system will:

- Manage pasture utilization effectively (carrying capacity and timing of spelling).
- Reduce uneven grazing that is either wasteful or harmful.
- Match stocking rate to the diet quality required by the animal production targets.

Strategic grazing can also play an important role in hazard reduction and weed management.

SESSION 29# MOBILIZATION AND INTEGRATION OF DRR COST:



Time: 60 minutes



Content:

- What is meant by resource mobilization?
- Practices of securing finance in DRR.
- Integrating DRR into national development plans and formulating long-term DRR plans.



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the resource mobilization, practices of securing finance and integrating DRR plans into national plans.



Objectives:

- Explaining the resource mobilization and practices of securing finance in DRR.
- Briefly describe the integrating DRR into national development plans and formulating long-term DRR plans.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <https://www.ncbi.nlm.nih.gov/pmc/article/>
- <https://www.saskatchewan.ca/business/>
-

What is meant by resource mobilization?

Resource Mobilization refers to all activities undertaken by an organization or a community to secure new and additional financial, human and material resources to start new community level development projects, or secure the existing projects and their infrastructures. Resource mobilization is actually a process of raising different types of support for your organization or community. It includes fund raising and in-kind support.

Resource mobilization advocates upon having the right type of resource, at the right time, at right place with making right use of acquired resources thus ensuring optimum utilization of the same.

- First, a risk analysis should identify the most hazard-prone areas and most vulnerable communities and households.
- Based on the result achieved during a risk assessment, appropriate measures need to be identified. Such measures should address the most dangerous hazards and provide tailor-made solutions to the most vulnerable groups.
- Support schemes can either address disaster prevention and mitigation and/or disaster preparedness. One should avoid doing too many things at the same time but prioritizing different steps together with the beneficiaries.
- Technological solutions are by no means the only and the best approach to achieve lasting effects. Social relationship, people's informal and formal organizations and self-help approaches should be prioritized in order to eventually apply technologies in a way that they truly benefit vulnerable people and communities.
- Protection, mitigation and preparedness can be pursued both by community based support systems and by help given to individual families. There are conflicting views on this and one can find implementing and donor organizations favoring an either-or approach. Also in this respect, there is no universally applicable solution but in many cases a combination of both seems to be most appropriate to local conditions and to the needs of population.
- Village committees and union council committees can approach Tehsil and District Government in addition to Provincial and federal level institutions including NGOs and UN Agencies.

Practices of securing finance in DRR:

DRR is part of a wider approach of disaster management which includes pre-disaster and post-disaster activities. Undoubtedly, many components, strategies and actions of disaster risk reduction interact with and refer to the wide range of development work and cooperation. Therefore, humanitarian aid should be closely linked to and coordinated with development work.

In most developing countries, main financial source of DRR is national, provincial and local government's investment in public services. A number of countries have mobilized their own

DRR finance, which is often more important than development assistance. Economic costs of disasters are on the rise, but most humanitarian investment is currently spent on responding to disasters, rather than managing their future risks. If this pattern continues, spending on reconstruction and relief will become unsustainable. Three broad categories of DRR financing secured through government resources.

1. Integrating DRR into national development plans and formulating long-term DRR plans:

A number of countries have started integrating DRR into national development plans. Some countries also formulated long-term plans that cover targets, policies, projects, and other related issues pertinent of DRR. These approaches are helpful in promoting DRR in some of the major disaster-prone countries in the Asian region as detailed below through selected cases.

While the long-term plans were useful in securing investment during the development stage of the country, there are some disadvantages, such as limited coordination among sectors, inflexibility of budget allocation, and demotivation due to decreasing budget. To stabilize the stage of economic growth, government should integrate all sectors into the infrastructure development plan.

2. Stand-alone DRR finance mechanisms:

In some countries, Government's national disaster risk reduction and management fund is specifically used for mitigation, prevention, and preparedness activities. 30% fund is marked as quick response fund, a stand-by fund for relief and recovery programs. Local governments are also required to dedicate revenue as the local disaster risk reduction and management fund and used to support pre-disaster and preparedness activities. In the fund also, 30% budget is kept aside for relief and recovery programs.

3. Sharing costs with local governments and communities:

Historically, local communities have been responsible for local flood prevention. Even now in various countries, water boards finance their activities of regional and local flood prevention almost entirely from their own individual taxes - the water board charges and the pollution tariff. However, local governments share some one third of costs for national flood prevention projects.

Other developed countries also have cost sharing mechanisms for flood prevention and a number of other funding sources, such as local tariff, drainage charges, or partnership funding.

Importance of Disaster Risk Finance:

Problems:

- Natural disasters devastate lives and livelihoods across the world and slowdown the development progress achieved through many decades of hard work.

- According to the IFRC world disasters report, the frequency and intensity of natural disasters is increasing.
- The risks are greater as increasing number of people live in vulnerable urban areas; construction practices are often substandard and insurance coverage is low.
- Consequently, the fiscal and economic pressure of developing countries having to deal with the adverse effects of natural disasters is increasing too.
- Although best way to counter the threat to poverty reduction and sustainable development is risk mitigation before a disaster, focus still is on disaster relief and reconstruction after a disaster.
- Lack of financial resources' often quoted as the excuse.
- Governments do not lack the financial resources to invest in DRM but they have not identified it as a (political) priority.
- Disasters become political priorities once they have occurred and caused loss of lives and devastation, as saving lives and assisting disaster victims is a humanitarian paradigm.
- On the up side, major disasters sometimes also trigger a real or perceived social demand for improvements in DRM
- However, after a disaster, the window of opportunity for DRM opens wider in some countries than in others:
- In some countries, the social demand for DRM either too weak or ignored, the strengthening of DRM cosmetic or the initial impetus difficult to sustain.
- Countries with weak governance and low institutional, financial and human capacities which lack the information on the costs and benefits of disaster risk reduction unable to measure the opportunity costs of investing in DRM and ,neglect disaster risk reduction (DRR).

Solutions:

Social and economic costs of a disaster be made more visible if

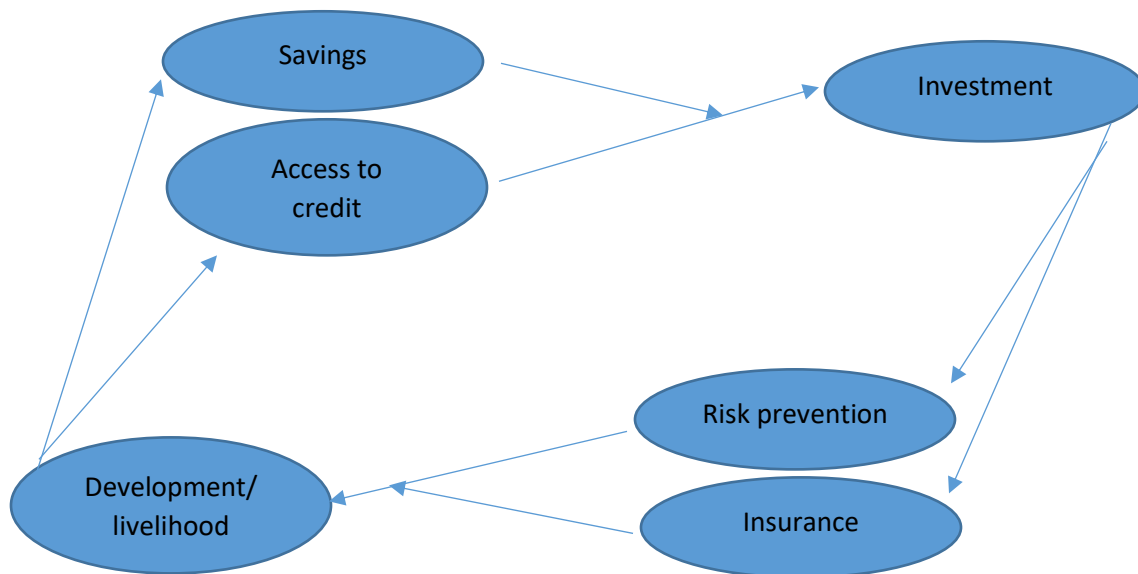
- Governments to account for recurrent disaster losses and future liabilities instead of transferring impacts to affected low-income households and community
- DRM be made a public policy priority similar to controlling inflation or resolving armed conflict

Sources & Tools of Finance in Disaster Management:

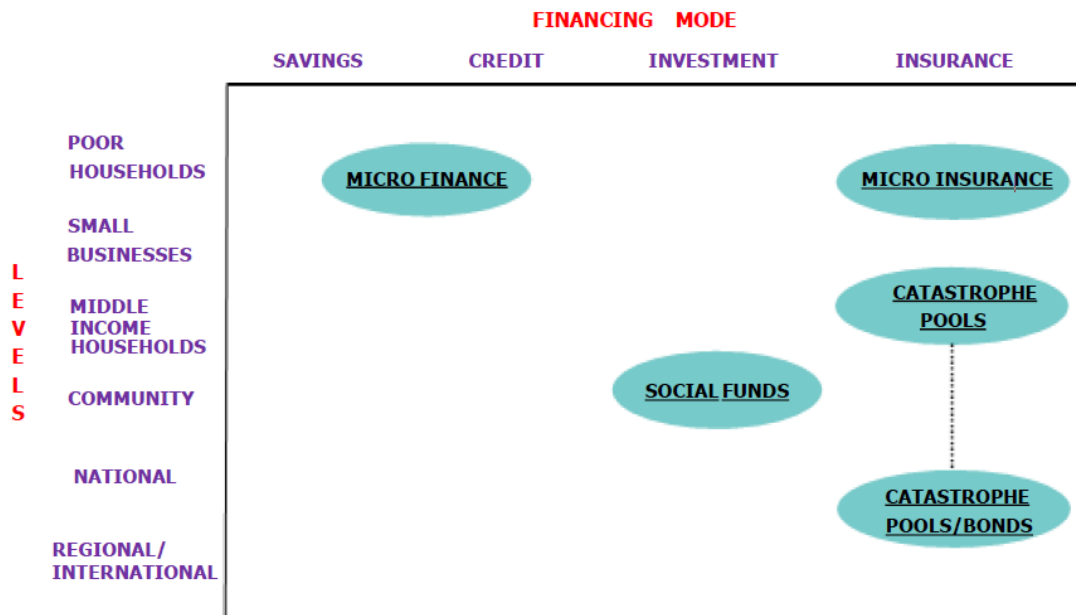
A variety of risk financing and other financial tools developed to facilitate management of risks.

- However, they primarily benefit upper and middle-income families, large businesses, and wealthy governments for whom the markets are ready to provide such tools.
- Those living in poor communities and in at-risk, developing countries typically have little access to formal financing options for disaster risk management.
- This is due to a range of market gaps and failures of formal market products to meet the needs of the poor, particularly those working in the informal economy and with irregular cash flows.
- Combined with greater exposure to risks, lack of access to effective risk management tools makes many poor communities and particular groups vulnerable.
- Post-disaster assistance from governments or humanitarian agencies may stem the impacts of the most drastic emergencies, but this assistance is too often ad hoc, poorly targeted and fails to reach or assist the most vulnerable.
- Robust financing tools can help the poor to break the poverty cycle by protecting their development gains, reducing impacts and losses of disaster shocks, and providing resources for disaster prevention and risk management

Developmental Loop



Mapping of Key risk financing tools



Targets of Risk Finance Tools

1. Poorhouse holds

- Vulnerable to disasters and other shocks not just because of a lack of financial assets but also because of social and political exclusion (based on caste, ethnic identification, or gender).
- Often marginalized from the formal economy, they are the ones with the least access to effective and efficient financing tools.
- When developing innovative solutions in poor communities, it is important to look at which segments of the community are really benefiting and which are not.
- Frequently the poorest of the poor are left out and the innovative programs serve only to broaden market access without really addressing the market gaps themselves.

2. Small businesses:

- Small businesses particularly vulnerable to disaster risks.
- Often over looked as programs oriented mainly toward households and families.
- Effective financing for risk management is intimately tied to the promotion of strong, resilient livelihoods and healthy local economies, and the resiliency of small businesses is critical for each of these.

3. Communities:

- Communities represent an important part of risk decision-making.
- Operates between the level of individual families and that of government.
- Many aspects of risk management (e.g. Ensuring that collective water and sanitation systems are protected and able to provide services even after disaster) need to be planned and maintained at the community level in order to be sustainable.

4. National governments:

- Poor communities also depend on effective regulatory guidance and financial assistance from their national governments for both pre-disaster risk reduction and post disaster relief and recovery assistance.
- To do this, national governments need to protect their own investments and maintain access to sufficient and readily available financial resources.
- Yet too often governments themselves lack access to effective risk financing.

Tools of Disaster Risk Finance:

i. Microfinance

Risks from injury, sickness, or disaster are a critical dimension of poverty and can easily threaten the small savings and fragile livelihoods of poor families.

- Microfinance is an effective means for strengthening access to credit, savings, and other financial services in poor and vulnerable communities and has changed perceptions of the poor, and women in particular, as un-creditworthy and ‘un-bankable’
- Microfinance can increase financial resilience by providing access to credit and other financial services to
 - Enable investment in higher yield livelihood strategies.
 - Diversify livelihood strategies.
 - Enable investment in risk reduction measures to limit exposure of livelihoods to disaster shocks

ii. Social funds:

- Social funds are programs that provide block grants for projects to build up community assets such as community facilities, infrastructure or improved services, including microfinance and micro insurance services to build livelihood security and resilience for poor and vulnerable households.

- Represent innovative approach to community- driven development, allowing local stakeholders to prioritize activities and guide implementation decision-making.
- Typically setup and coordinated as autonomous government agencies and may serve as a channel for financial support coming from international financial institutions or other donors.
- However, the community role distinguishes social funds from other approaches. The communities themselves submit proposals and the localized administration allows quite specific geographic and poverty targeting and encourages proposals directly from poor and vulnerable communities.

iii. Micro-insurance

- A potential solution for extending insurance coverage in poor communities
- Provides access to post disaster financial resources in fast, reliable and predictable manner allowing the poor to protect their investment and retain their financial gains in the face of disasters.
- Promotes dignity and self-reliance by providing immediate liquidity to the poor.
- Promote increased levels of resilience by
 - Increasing access to finances aftershocks thus strengthening coping and reducing the likelihood of disastrous impacts.
 - Providing greater discretion to households and small businesses in pursuing coping and recovery strategies.

iv. Catastrophe pools/bonds

- Provide a mechanism for catalyzing the provision of insurance in markets where there have been impediments to private insurers offering disaster coverage.
- These pools typically combine arrangement of governmental, private sector and donor support– often focused on addressing distinct layers of risk to engage market interest and establish available insurance fund.
- The pooling can be either among citizens in a particular country or set of countries or among governments to limit their own exposure to disaster risks.
- Catastrophe pools can promote increased levels of resilience by;
 - Increasing access to financial liquidity after disaster shocks (for both individuals and governments)
 - Transferring a portion of the risk to external and/or capital markets

Other Tools:

Conditional cash transfers

- Cash transfers and public works encourage safety nets and promote holistic social risk management.
- Support local choice and self-management in driving recovery and prioritizing investments for livelihoods development and resilience.
- Used in particular to protect children's school enrolment from being affected by adverse risk coping.
- The income helps poor households avoid sale of assets, foregoing of health expenditures, or withdrawal of children from school.
- Public works programs used to strengthen labor markets to protect against the risk of unemployment and to support public investments that can link to preventions strategies.

Cash for work programs

- Basic employment programs with the work targeted toward social or community objectives.
- Help to restore earning capacity and livelihoods, repair and reconstruct disaster damage, and contribute to long-term development.

Alternative currencies

- Complementary or local currencies used in a number of locations to stimulate local economic activity by issuing as Crip currency to facilitate the exchange of local services in areas where availability of the national currency is limited (as it might be in poor communities).
- These types of alternative currencies have been used to support local development, including in post-disaster recovery contexts.

Insurance for disaster reserves for private companies

- United Nations environment programme finance initiative currently exploring a program that would offer insurance to companies in lieu of maintaining reserves for responding to disaster events, thus allowing those companies to invest much of the funds that would have been put in these reserves in other ways.

Contingent credit

- Governments or private sector companies obtain the right to take out a pre-specified post-disaster loan that is repaid on fixed terms, providing immediate liquidity after a disaster. Such credit might be offered as part of a development aid package to governments or in exchange for an annual fee.

SESSION 30# RISK TRANSFER OR INSURANCE:



Time: 60 minutes



Content:

- What is risk transfer?
- Residual risk.
- Basis risk.
- Importance of Risk transfer and micro insurance in CBDRM.
- How resource pooling reduce the cost of disaster?



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the concept of Risk Transfer
- Participants will understand importance of Risk transfer and micro insurance in CBDRM
- Participants will learn how resource pooling reduce the cost of disaster



Objectives:

- Explaining the concept Risk Transfer
- Describing Importance of Risk transfer and micro insurance in CBDRM
- Briefing about how resource pooling reduced the cost of disaster?



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- Zwi et al. (2013) Do community based disaster risk management (CBDRM) initiatives reduce the social and economic cost of disasters? University of London Research gate,
- The role of risk transfer and insurance in disaster risk reduction and climate change adaptation by Margaret Arnold
- <http://proventionconsortium.net/>
- <https://www.unescap.org/sites/pre-ods/>

What is risk transfer?

The Sendai Framework for Disaster Risk Reduction 2015-2030 is highlighting risk financing, insurance and risk transfer under priority 3 on investing in disaster risk reduction for resilience.

Risk transfer, defined as shifting the responsibility or burden for disaster loss to another party through legislation, contract, insurance or other means, can play a key role in helping to manage natural hazard risk and mitigate or minimise disaster losses. As the international community places increasing emphasis on disaster risk reduction, there is growing interest in the potential of risk financing solutions, of which risk transfer is a major component, as part of an overall disaster risk management strategy. Recent developments in this field include the use of a range of risk transfer mechanisms such as;

1. Catastrophe pools and bonds,
2. Traditional Hazard Insurance,
3. Index-based Insurance,
4. Micro-insurance Schemes,
5. Risk Financing.

Social protection program such as safety nets and calamity funds can also provide effective financial instruments for managing risk and dealing with natural disaster shocks.

So, Risk transfer is the process of formally or informally shifting the financial consequences of risks from one party to another. Insurance, for example, is a well-known form of risk transfer, where coverage of a risk is obtained from an insurer in exchange for ongoing premiums paid to the insurer to cope with losses after major disasters.

1. Catastrophe Pools:

- a. In a catastrophe pool, different but similar entities such as national governments or insurance companies combine resources to form a fund which provides financial protection against catastrophic risks.
- b. The amount paid into the pool by participating entities depends on their individual exposure to the covered hazards.

2. Traditional Hazard Insurance:

- a. Traditional insurance products covering natural hazards are written on what is often termed an “indemnity” basis, where the policyholder insures a defined property, economic activity or other entity, such as a building or a business, against specific hazards such as earthquake, wind or flood.
- b. In the event of the insured item being lost or damaged as a result of a covered hazard, the policyholder is compensated for their financial loss.
- c. Therefore, insurers pay claims based on actual losses.

- d. Natural hazards tend to impact large areas, thus affecting large portions of the population or risk pool at the same time. This can challenge the resources of a local insurance provider who may only do business in the affected area.

3. Index Based Insurance:

- a. Index-based insurance also called **parametric insurance**.
- b. Index based/Parametric insurance is a subset of insurance products that provides compensation when hazard-related parameters, such as rainfall, wind speed or heat, surpass a predetermined threshold.
- c. Payments are based on the intensity of an event rather than actual loss, and when compared to traditional indemnity-based insurance, parametric insurance products offer a scientific and more transparent determination of payments.
- d. Index-insurance is often used for crop risks, where farmers collect insurance compensation if the index reaches a certain measure or “trigger” regardless of actual losses.

4. Micro Insurance Schemes:

- a. The protection of low-income people against specific perils in exchange for regular monetary payments (premiums) proportionate to the likelihood and cost of the risk involved.
- b. Micro-insurance has grown out of the micro-finance movement, where savings, credit and other services have proven successful in helping low-income communities better manage their resources and create their own opportunities.
- c. The intent of micro-insurance is to provide easily accessible insurance cover for small-scale assets at affordable premiums by keeping transaction costs low.

5. Risk Financing:

- a. Catastrophe risk financing refers to the combination of all methods used to pay for financial losses incurred during a disaster.
- b. In the past in developing countries main focus was on post-disaster aid and lending.
- c. It is clear, however, that such post-disaster strategies are not efficient or sufficient.
- d. Risk financing now stresses pre-disaster measures such as risk transfer and sharing.

- e. While use of pre-disaster risk financing methods is increasing, during most disasters in developing countries some degree of post-disaster support will always be needed.
- f. A truly integrated risk financing strategy should utilize all appropriate and effective methods, in combination as appropriate.
- g. Just as risk financing should form an integral part of a general disaster reduction strategy, risk transfer should form an integral part of a risk financing strategy. Aiming to strengthen the flow of resources for effective disaster risk management both pre-disaster and post-disaster.
- h. This mechanism to deal with the economic and financial shocks caused by hazard events for all levels, from individual household level to national and regional levels. Examples are self-insurance, informal community based mechanisms, safety nets, insurance and reinsurance, contingency financing, and calamity funds, etc.
- i. Comprehensive risk financing strategies will assist in driving both DRR and climate change adaptation.

Residual Risk:

The risk that remains in unmanaged form, even when effective risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained.

Basis Risk:

In parametric insurance, basis risk is the difference between the amount paid and the actual cost; that is, it reflects the risk that a policyholder may not recoup their full losses from a disaster. In traditional insurance, basis risk is also present in the terms of coverage.

Importance of Risk Transfer and Micro Insurance in CBDRM:

All efforts towards relief, rehabilitation and reconstruction should aim at contributing to the reduction of vulnerability as it reduces risk, saves lives and livelihoods in the short and long term. Therefore, risk transfer is;

- The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority;
- Will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.

In the disasters affected communities it is often the poor who are affected the worst but also who have the least means to recover from the impact of these disasters. The Governments made an effort, slowly and gradually, for the insurance companies to provide a percentage of their

coverage for the poor. Yet the poor are not well informed or organised enough to access these risk transfer and micro insurance schemes. For the insurance industry insuring the poor is too much effort for too little returns. The problem was how to access the poor to ensure insurance in the face of ever increasing disaster risks due to climate change, poor urbanisations and rapid population increase in high risk areas.

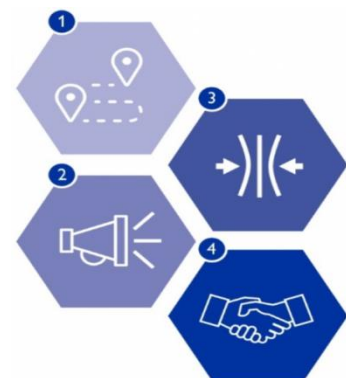
In this regard micro-insurance can help provide low-income households, farmers, and businesses with rapid access to post-disaster liquidity, thus protecting their livelihoods and providing for reconstruction needs.

1. As insured households and farmers are more credit worthy, insurance can also promote investments in productive assets and higher-risk/higher-yield crops. In addition, insurance has the potential to encourage investment in disaster prevention if insurers offer lower premiums to reward risk-reducing behavior.
2. Micro insurance can cover sudden-onset events, such as earthquakes, and floods, as well as slow-onset events, such as droughts.
3. Traditional micro-insurance programs have consisted of indemnity insurance, which pays claims based on actual losses and requires an extensive network of claims adjusters who assess individual losses following an event.
4. The micro-insurance arrangements for independent risks, such as unemployment, fire and accidents, by extending cover to loss of life, property or livestock due to natural disaster events.
5. Coverage for property losses due to floods, earthquakes, and other natural calamities is offered to groups such as women, or to community groups for managing the impacts of disasters post-event.

How resource pooling reduce the cost of disaster?

A lot of human risk reduction strategies are really tangled with cultural norms, environment, communication and coordination among communities. When it comes to dealing with unpredictable and unexpected risks, people often help each other without expecting things in return, and often will only ask for help when they are actually in need. So, resource pooling is the act of a community people sharing resources like money, human and other resources for an eventual larger common goal or expense.

In disaster situation the resource pooling is an important disaster risk transfer mechanism. Under this system, communities, groups of



private or public stakeholders, insurance companies or even countries come together to form a pool, which can provide protection against catastrophic risks such as, floods, droughts and earth quakes.

Instead, at its best, financial protection involves post-disaster planning to better manage the costs of disasters and ensure predictable and timely access to much needed resources and ultimately mitigate long-term economic impacts.

SESSION 31# PARTICIPATORY MONITORING AND EVALUATION:



Time: 45 minutes



Content:

- Introduction to Participatory Monitoring and Evaluation.
- Recommended Steps for Participatory M&E.
- Most Significant Changes (MSC).



Method:

PPT Presentation, Brainstorming, Discussion, Group work and Question answers.



Outcome:

- Participants will be able to understand the concept of participatory M&E and its recommended steps.
- Participants will understand most significant changes.



Objectives:

- Explaining the participatory M&E.
- Explaining the steps for participatory M&E.
- Briefing about most significant changes.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, Markers, Charts, Multi-Color Markers, Masking tape, & Handouts.



References:

- <http://www.fao.org/3/x5307e/x5307>
- <https://www.intrac.org/wpcms/wp-content/uploads/2017/01/Participatory-ME.pdf>
- <https://sswm.info/arctic-wash/module-3-health-risk-assessment/further-resources>

Introduction to Participatory Monitoring and Evaluation:

Participatory monitoring and evaluation (PME) involves the local community, development agencies, local authorities and other stakeholders in measuring the progress made, and identifying necessary follow-up actions. Harmony among all the groups in PME is an important factor for success. This is a communication system in which information flows amongst all the people involved in the project: the community, the implementing staff and the support agency, concerned government agencies and donors. Participatory monitoring and evaluation (PME) involves the local community, development agencies, donors and other stakeholders deciding together how progress should be measured and what actions need to be taken as a result of this analysis. This approach assumes that all concerned parties need to know how effective the project efforts have been. It may be challenging, because it encourages people to examine their assumptions on what constitutes progress and to deal with contradictions and conflicts that may emerge.

Principles of Participatory Monitoring and Evaluation: There are 4 broad principles at the heart of PME:

- 1. Participation:** Multiple stakeholders participate in PME. These may include beneficiaries, project or program staff at all levels of the implementing organization, researchers, government agencies, and donors.
- 2. Learning:** The emphasis is on practical, or experiential, learning. Participants gain skills, which strengthen capacity for planning,

Monitoring:

- Monitoring is the systematic collection and analysis of information as a project progresses. It is a continuous process to check how activities are progressing, whether the project is on track or not, and if responsible persons doing are their tasks properly.
- Monitoring helps organizations track achievements by a regular collection of information to assist timely decision making, ensure accountability, and provide the basis for evaluation and learning.

Evaluation:

- Evaluation is the comparison of actual results to planned objectives in order to assess whether the objectives have been achieved or not, or whether the activities of the project are successful or not.
- Evaluation often looks at: effects to the beneficiaries, effectiveness, relevance, sustainability and replication of the activities. Evaluation activities are periodic (annually, mid-project, end-of project, post-project).
- M&E could use different methods depending on quantitative (numbers and charts) and/or qualitative indicators (people's knowledge, attitude and behavior).
- The evaluation process needs to provide reliable and trustworthy information; offering provides inputs and lessons learnt for the decision-making process of communities and related agencies.

problem solving, and decision making. They also gain a greater understanding of the factors or conditions that affect their project, reasons for successes or failures and why alternates may be tried.

3. **Negotiation:** PME becomes a social process for negotiation between people's differing needs, expectations, aspirations, and visions.
4. **Flexibility:** There is no one way to do PME. It is flexible and adaptive according to project-specific circumstances and needs

The main objective of the participatory monitoring and evaluation (M&E) is to review the progress and support the decision-making and management system. Participatory monitoring has the following purposes:

- To know whether or not implemented activities achieve the planned objectives. What can be done to better achieve the planned objectives?
- To measure the process of achieving objectives, performance, efficiency and impacts.
- To develop a feedback system that encourages regular learning and sharing among communities and stakeholders for better implementation in the future.



Expected Results:

- Disaster risk reduction measures are implemented effectively, and in a timely manner.
- Accountability is applied and helps to improve the management and decision-making system.

- Community members' skills in planning, problem solving, and decision making are built up. For government agencies and related stakeholders, qualitative information and feedback systems are obtained to provide information on the progress and results of activities. They also gain a greater understanding of the factors or conditions that affect their project, reasons for successes or failures and why alternatives may be tried.

Principles:

- Ensure the meaningful involvement of community members, government agencies and related agencies, right from the stage of setting M&E indicators.
- Participatory M&E should emphasize practical or experiential learning and encourage regular sharing and feedback among stakeholders on process and results.
- Participatory M&E empowers communities, building their capacity and creating local ownership.
- Participatory M&E should be flexible and adaptive to fit local circumstances and needs.

Recommended Steps for Participatory Monitoring & Evaluation:

Further Steps and tools in participatory monitoring and evaluation are described below:

- **Design M&E plan and set up the M&E system:** it includes identifying what information needs to be collected given available human and financial resources, how will this information be collected, who will collect, analyze, and use the information. Setting up the M&E system with a participatory approach builds stakeholders' understanding about the project and starts creating a learning environment.
- **Collect data and information:** Select appropriate methods and tools to gather information, qualitative and quantitative and individual versus group based. Such as formal surveys, structured or semi-structured interviews, group discussions, direct observation and case studies. The choice of method depends on the nature and scale of the project, the type of information required, and the frequency, ease and cost of collection.
- **Analyze data:** Process, consolidate and analyze qualitative and quantitative data. This requires data cleaning, organizing and coding to prepare the data for analysis.
- **Document, communicate and share findings:** This includes reflecting critically (on experience and information) to improve action. Lessons are drawn and best practices are shared with various stakeholders within communities, government, and NGOs to promote the CBDRM process and approach.

Methods and tools in participatory M&E:

Participatory M&E helps stakeholders evaluate the performance of CBDRM activities. The basis to decide what to monitor and evaluate, is to go back to the objective of the activities/plans/strategies that have been implemented and see how this was done.

Some basic M&E methods can be applied depending on quantitative and/or qualitative indicators. Quantitative indicators can be measured and be related to quantity under numbers and charts. Qualitative indicators cannot be measured by numbers but information is gathered through materials such as minutes of community meetings, observation or group discussion reflecting people's knowledge, attitude and behavior. Examples about M&E methods are: Observation and participant observation, Interviews with key persons, Focus Group Discussions, Questionnaires and surveys, Monitoring with specific indicators.

1. **Direct observation:** This is the most popular tool to collect useful and update information from observation. From direct observation, the evaluator could use results as inputs to develop realistic decisions for improving the situation or as assumptions for deeper investigation. Observers will ask her-self or him-self: "What do I see?" or "What do people do?", "Is the planned activity happening?". Direct observation is also called "participatory observation".
2. **Interviews with key persons:** The evaluator(s) ask key persons (someone who is expected to know more than the average person about what is happening, or who understands or can explain it better) a number of questions about what is happening, and why it is happening (or not happening).
3. **Focus group discussions:** This method uses a small group of people to gather information, clarify some issues or collect opinions over one topic. Focus groups are also used to build consensus. This method is very useful in M&E for collecting opinions about changes, the quality of the services delivered by some providers and helps to address areas for improvement.
4. **Questionnaires and surveys:** This method is used to get information from a large group of people by asking the same questions and often uses analytical tools for data processing. Participants will fill in the questionnaires themselves or there is one facilitator to give the question and note down the answers.
5. **Monitoring with specific indicators:** For this method, the M&E person collects data on specific items. The purpose is to get information about these specific data for the whole local area, or to get it for different stages (e.g. before and after the project was implemented). Depending on using indicators for M&E or not, there are also some popular participatory M&E methods and tools.

Log Frame:

From the Log Frame, there will be indicators for monitoring and evaluation.

Most Significant Changes (MSC):

The most significant change (MSC) technique is a form of participatory M&E, in which many stakeholders are involved both in deciding the sorts of change to be recorded and in analyzing the data. MSC focuses on monitoring intermediate outcomes and impact. The method uses one simple question to collect stories about most significant changes: “Looking back over the last period [month, quarter, etc.], what do you think was the most significant change in [particular domain of change]? Domains of change include changes in: living conditions of local people, capacity of government officers and other stakeholders, people or the areas of work the project has addressed.

Answers are stories of who did what, when and why it is significant. When a group is involved in MSC, the next question could be: “Among all changes, what is the most significant change” Recommended steps for conducting MSC contain at least these following steps:

- Introduce MSC to a range of stakeholders and foster interest and commitment to participate (local people, community management committees, project staff, government officers, etc.). And discuss to define the domains of change and reporting period.
- Collect stories about significant changes with above questions.
- Related stakeholders select the most significant stories, according to defined domains of change and agreed criteria. Stories are analyzed and reviewed through levels of authority.
- Record, document, report and feedback these stories to related stakeholders.

SESSION 32# TRAININGS AT FIELD LEVEL AND TRAINING CYCLE:



Time: 45 minutes



Content:

- Training Cycle
- Planning of training/workshop
- Characteristics of a good trainer
- Trainers skills and Methodologies



Objectives:

- Explaining the concept of Training Cycle
- Describing planning for training workshop
- Briefing characteristics of a good trainer
- Describing Trainer skills and methodologies



Method:

PPT Presentation, Brainstorming, Discussion, Constant Interaction with participants, and Question answers.



Materials Required:

Multimedia, Screen, PPT Presentation, White Board, & Markers charts, handouts.



Outcome:

- Participants will be able to understand the concept of Training Cycle
- Participants will understand planning for training workshop
- Participants will learn characteristics of a good trainer
- Participants will learn the trainer skills and methodologies



References:

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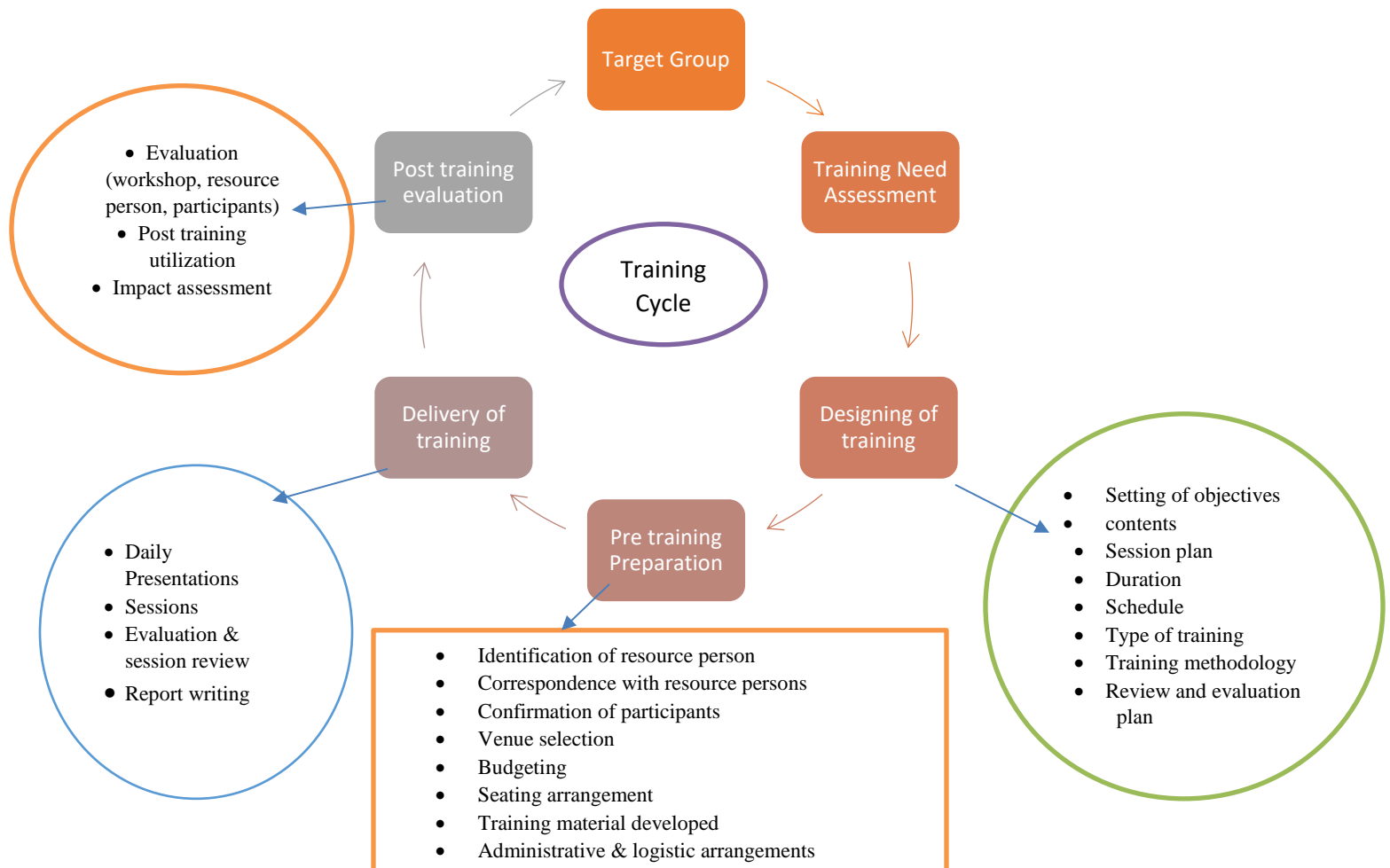
What is Training:

Training is about acquiring knowledge, skills and attitudes. The initiation of training is a continuum of activities during which participants undergo a behavior modification process. The success of this educational and learning venture depends on how carefully the whole process is conceived and implemented.

- Training is an exercise to bring desired behavioral modification in an individual by exposure to a simulated environment, making him/her capable of improved performance
- Training is a structure intervention, focused for awareness raising and capacity building
- It is an artificially created learning environment in which certain objectives are achieved
- Training is the process to fill the gap between the desired performance and the actual performance

Training Cycle:

A “Cycle” is a process where all stages are repeated. Cyclic process always takes a re start from zero. In the training cycle, first Training Needs Assessment (TNA) is carried out and then on its basis, training is designed. After designing training, preparation for various support activities is carried out and ultimately the training is conducted. After training, evaluation of the whole process is done. Based on the feedback of evaluation, the whole process may be initiated again when required. The following illustration shows main steps involved in a training event.



Planning of training/workshop:

Whenever you plan to do a workshop always keep these seven small steps in mind:

Who: Always be clear, who is it for (target participants) and who will do it (trainer).

Why: Ask question, what the reasons for conducting this event are.

When: Finalize duration and the dates on which it is to be held.

What for: Set the objectives of the workshop.

Where: Determine location or site of the event.

What: Prepare contents of the event, what will be included and what is to be left out.

How: Finalize methodology of the event considering the type of target group and material selected for the workshop.

Characteristics of a good trainer:

- **Warm personality:** has an ability to demonstrate / acknowledge approval and acceptance of participants
- **Good communication skills:** has extra ordinary communication in general and excellent listening skills in particular;
- **Pleasant personality:** is able to bring the participants together and built comrade ship; ability to control group without damaging it;
- **Facilitation skill:** has a natural style that encourages generation of new ideas, sharing of knowledge, experiences and skills of participants;
- **Good organizer:** is able to arrange and utilize available resources in efficient manner and make smooth logistical arrangements;
- **Conflict Management skill:** is able to notice and resolve participant's conflicts, problems and issues with ease;
- **Knowledgeable:** has a superior knowledge of the subject matter with a good life experience.
- **Understanding of Group Dynamics:** has an ability to understand group dynamics and its changing need and respond by adjusting the programme on the spot
- **Patient:**
- **Enthusiasm:** Is enthusiastic has plenty of energy and is able to motivate the participants for reaching the desired objective, happily and enthusiastically;

- **Flexible:** one who is flexible and has a natural ability to respond to the situation as it arises and is not stuck with pre-conceived notions;
- **Trust in other people and their abilities**
- **Self-aware:** is conscious of the surroundings, both cultural and environmental
- **Confident:** has confidence without arrogance or a large dose of ego
- **Creative and innovative thinking:** is not only creative, but has an ability to encourage participants to experiment with new ideas and be innovative;
- **Good drawing and writing skill:** should be able to draw and have legible handwriting

Trainers' skills and Methodologies:

There is a wide selection of participatory training methods that can be used in a training event. A table list several methods with its characteristics, objectives and application.

Methods	Characteristics	Objectives	Application
Group Discussion	Participants discuss a specific topic to generate opinion as a group	To achieve mutual understanding To teach consensus	Both managers and facilitators Classroom training
Peer-learning	Learning from each other by sharing experiences	To develop understand and build confidence as well as build rapport with peers	Both managers and facilitators Classroom training
Brain-storming	Exhaustive discussion to consider all related ideas about a topic without rejecting any of them	To discover new ideas and responses quickly	Both managers and facilitators Classroom training
Exercises (Songs, Drawings, Games)	Involves physical activities, fun (do not appear to be directly related to the training topic)	Group formation, ice-breaking, removing psychological barriers	Facilitators Classroom training
Simulation	Participants play roles of different characters within the given context of a case study and then discuss/ analyze it	To see others attitudes, feelings and roles · To improve understanding of human behaviour, including gender roles	Both managers and facilitators Structures, formal training
Role playing	Participants play roles of different characters based on their own real-life experience and the discuss/ analyze it	To see others attitudes, feelings and roles · To improve understanding of human behaviour, including gender roles	Both managers and facilitators Structured, formal training
Demonstration	Enhance understanding of functional knowledge of skills showing the actual skills or process in a close to life situation	To illustrate actual processes and skills	Both managers and facilitators Structured, formal training
Practical exercise	Participants actually perform the tasks or activities that they have to learn (e.g. teaching practice)	To retain knowledge, develop skills, to test the learning process	Both managers and facilitators Structured formal training
Field study/ visits	Planned visit of a field specific	To observe understand	Both managers and

	objectives	and learn from the real-life situations	facilitators Structured, formal training
Case studies	Participants receive a described situation/ problem to be analyzed and solved	To learn lessons from a given situation	Both managers and facilitators Structured, formal training
Question-answer techniques	Trainers give questions and the participants answer them individually or in groups	To understand that more than one possible solution to a situation/ problem is possible	Both managers and facilitators Structured, formal training
Interactive lecturing	Lectures incorporating dialogues between the trainer and the participants	To transfer knowledge effectively through active listening	Both managers and facilitators Structured, formal training
Visualization in participatory programs (VIPP)	Communication through written ideas/ information on cards and flip-charts	To obtain exhaustive list of ideas in a short time To encourage participants to express opinions in a clear manner	Both managers and facilitators Structured, formal training

Training Review and Feedback:

Review is important source of information and assessment of the training event, the importance is listed below;

- To recap previous day's work
- Create a link between yesterday and today
- Get feedback on learning
- Course correction
- Get focused on the issues at hand
- Improve learning