COMMUNITY RADIO GUIDE FOR CLIMATE CHANGE REPORTING

Development Alternatives

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INTRODUCTION

This is a community radio guide prepared by Development Alternatives. It provides community radio reporters with valuable information about climate change and its effects and how to make effective radio programmes on climate change adaptation measures to help communities adapt in the face of change.

CHAPTER 1

CLIMATE CHANGE AND ITS IMPACTS

Outcome

After reading this chapter, one would have a basic idea about climate change, its causes and impacts on human lives.

What is climate change?

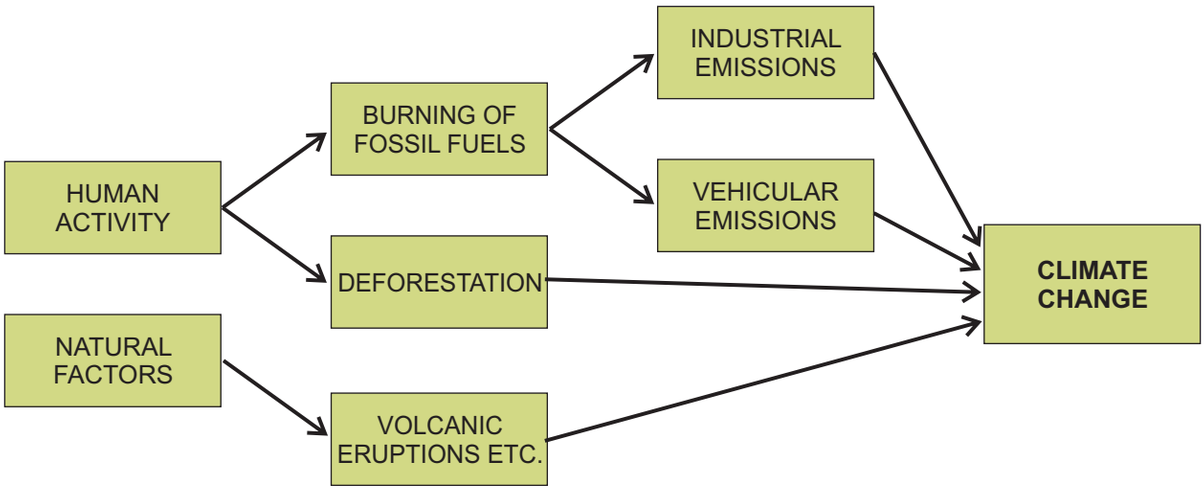
To understand climate change, one must understand the meaning of the term 'climate' and how it is different from 'weather'. Weather is a specific condition that occurs over a short period of time, such as a thunderstorm or today's temperature. Climate, on the other hand, is the average or prevailing weather conditions of a particular area over a long period of time. For example, 'today is very hot' is a statement about an area's weather, while 'the Thar Desert is very dry' is a statement on the area's climate.

In this sense, climate change is the term given to a shift or alteration in the planet's prevailing long-term climate patterns. Specifically, it refers to an increase in the planet's temperature due to human activities, which in turn is causing additional changes in other parameters such as rainfall patterns.

What is causing climate change?

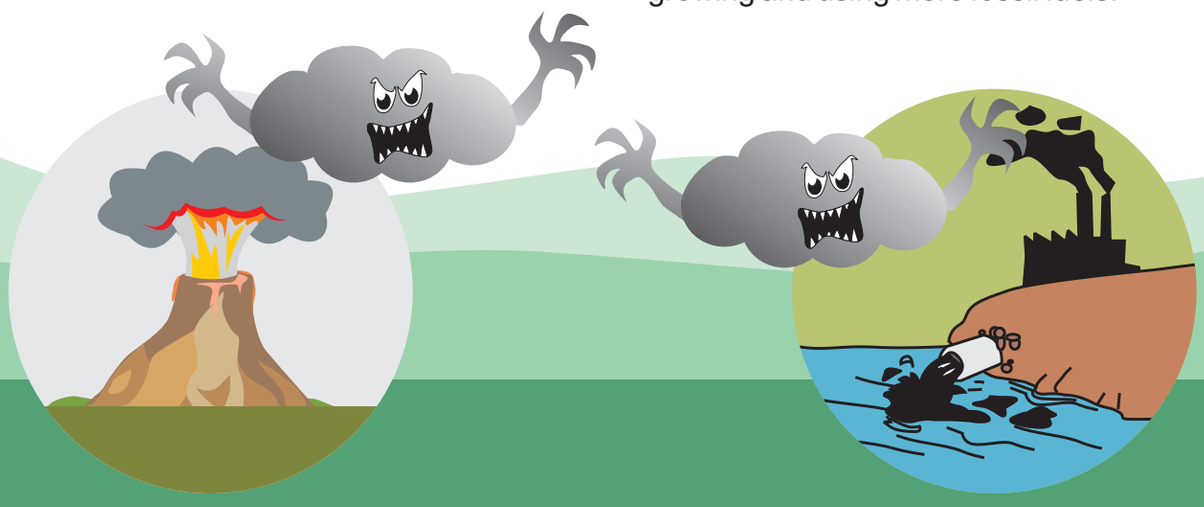
Climate change is caused by the emission of greenhouse gases, such as carbon dioxide, methane and nitrous oxide into the earth's atmosphere. Due to their chemical properties, these gases trap heat in the atmosphere. When the concentration of these gases builds up in the atmosphere (as is currently occurring), it causes the planet's temperature to increase.

CAUSES OF CLIMATIC CHANGE



Many different human activities contribute to the addition of greenhouse gases in our atmosphere. The biggest contributing activity is the burning of fossil fuels such as coal, natural gas and oil for use in electricity, transportation, industry etc. When these fuels are burned, they release the carbon that has been stored within them for millions of years into the atmosphere in the form of carbon dioxide. The next biggest contributing activity is deforestation i.e. the destruction of forests. Trees store large amounts of carbon within them and when forests are cut down, the carbon stored in them is released into the atmosphere. Other human activities such as agriculture and burning of waste also contribute to the total global greenhouse gas emissions.

Historically, the developed nations of the world are responsible for the vast majority of total greenhouse gas emissions due to these countries' high levels of fossil fuel use since the beginning of the industrial age. Now, even developing countries like China and India are releasing significant amounts of greenhouse gases as they are growing and using more fossil fuels.

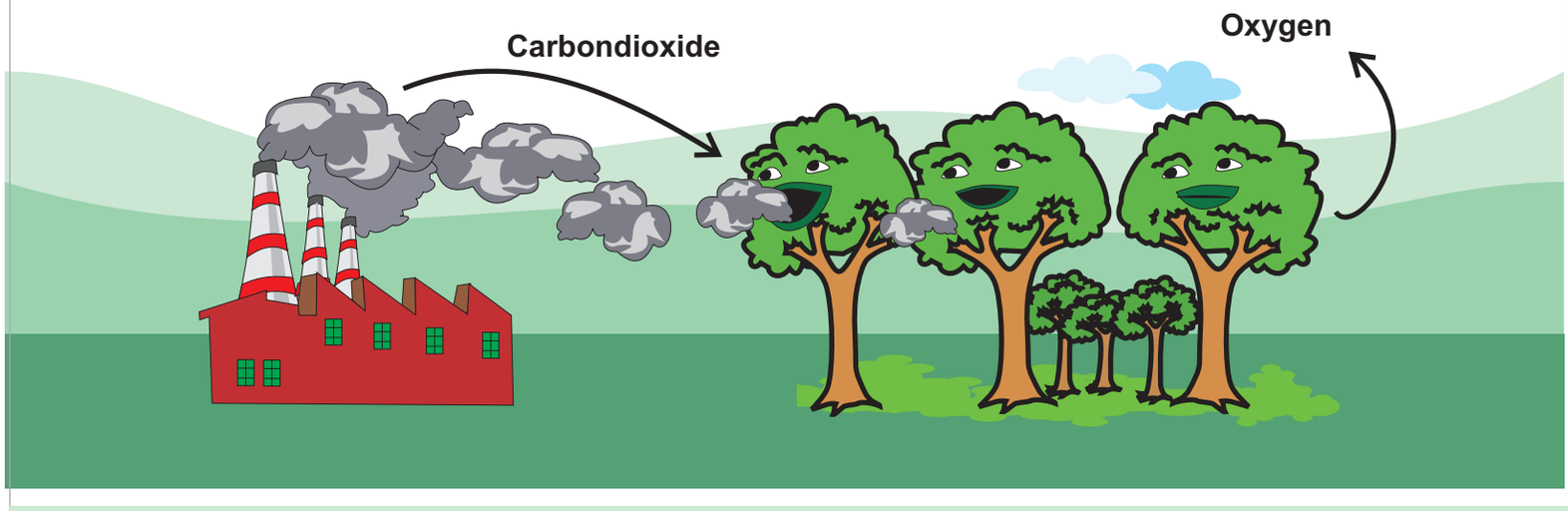


What are the global impacts of climate change?

The global climate system is very sensitive to changes in temperature. When increasing concentrations of greenhouse gases in the atmosphere cause the planet's temperature to increase, the change also affects where, when and how much rainfall occurs, winds blow, and storms develop. These changes in temperature and rainfall then have significant effects on many other aspects of our world - oceans, plants, animals and diseases. The effects of climate change on the planet are referred to as climate change impacts. Some of them are mentioned below:

- During the last decade, the global average temperature was higher than it has ever been recorded.
- Heat waves (periods of sustained high temperatures) are becoming more common in many parts the world.
- Warmer temperatures are also causing glaciers and sea ice to melt faster, which is increasing the sea level threatening biodiversity and ecosystem services. This in turn is affecting food and water supply, livelihoods and the wellbeing of coastal communities all over the world.
- Additionally, the increasing temperature has significant effects on global rainfall patterns causing more periods of drought in some regions and excess rainfall and flooding in other areas.

These impacts are only expected to increase in the future as climate change occurs to a greater degree.



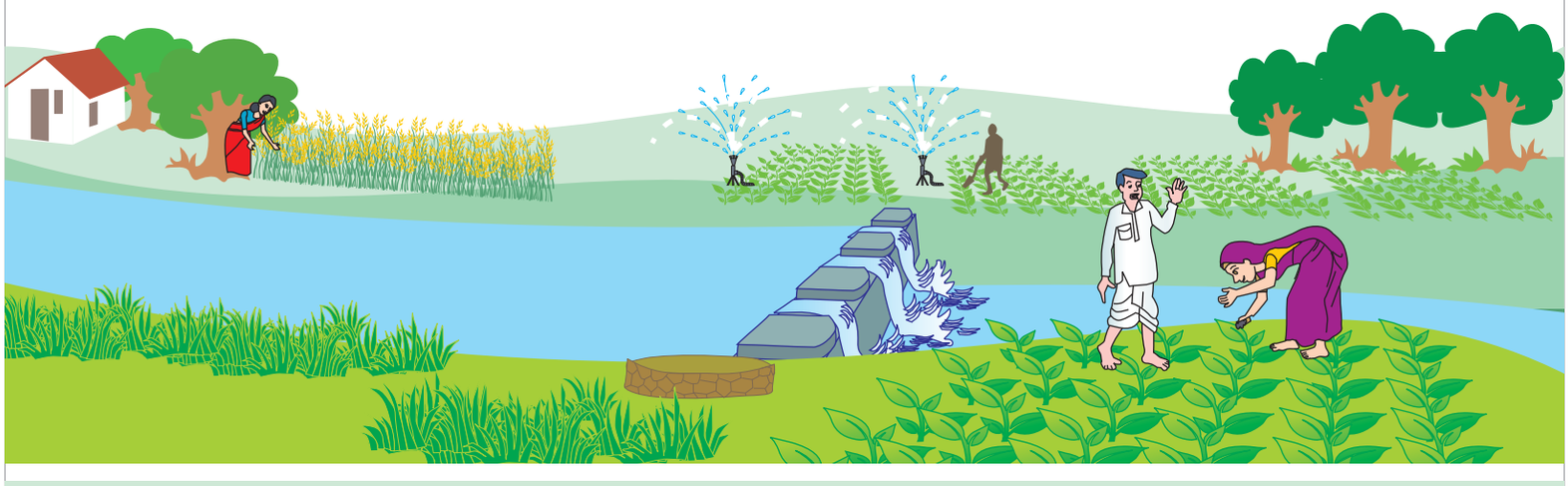
Strategies to tackle climate change

Climate Change Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later. Examples of adaptation measures include: using scarce water resources more efficiently; adapting building codes to future climate conditions and extreme weather events; building flood defenses and raising the levels of dykes; developing drought-tolerant crops; choosing tree species and forestry practices less vulnerable to storms and fires; and setting aside land corridors to help species migrate.

Agricultural strategies for climate change adaptation that farmers in arid and semi-arid regions can adopt are mentioned in Annexure 2 at the end of this community radio guide.

Climate Change Mitigation refers to the efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior. It can be as complex as designing an eco-friendly plan for a new city, or as simple as making improvements to a cook stove design. Efforts underway around the world range from high-tech subway systems to bicycling paths and walkways to replace private transport. Protecting natural carbon sinks like forests and oceans, or creating new sinks through silviculture or green agriculture are also elements of mitigation.

Reference:
http://www.unep.org/climatechange/mitigation/



CHAPTER 2

ROLE OF COMMUNITY RADIOS IN CLIMATE CHANGE COMMUNICATION AT THE GRASSROOTS

Outcome

Reading this chapter, one would understand the vital role that community radios play in bridging the climate change communication gap between rural communities, scientists and local government officials.

Impacts of climate change on agriculture and rural communities

Climate change has wide ranging effects on agriculture which forms the backbone of the rural economy. It thus becomes extremely important for the vulnerable rural communities to learn about climate change impacts and take adequate measures to deal with them.

Climate change
↓
Change in rainfall/temperature patterns
↓
Reduction in availability of water
↓
Reduction in agricultural productivity
↓
Adverse effect on livelihood security
↓
Rising socio-economic issues

Information needs of rural communities living in climate sensitive regions

Rural communities dependent on agriculture as their main source of livelihood require:

- Information about agriculture related adaptation measures and government schemes relating to climate resilient farming practices.
- Information dissemination on agro met data on a daily / weekly basis.
- Access to information in local language that is easily understandable.

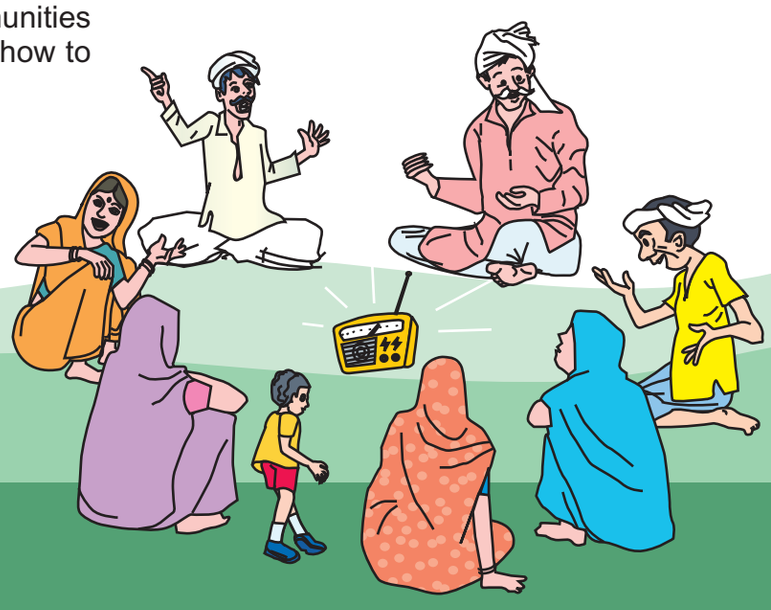
Role of community radios in creating grassroots level participation in the development process

Community radio is designed for the community and operated by the community to address their concerns. It caters to the informational and entertainment needs of local communities usually within a radius of 10 kilometers. Reporters are member of the community. They produce and present the shows primarily in the local language. Thus community radios promote grassroots level participation in the development process by helping marginalised rural communities voice their views and concerns. It also helps promote local folk music and artists.

Community radios have been successfully running in various tsunami affected areas of India and various parts of Bangladesh and Nepal. Radio Bundelkhand has been running the Shubh Kal campaign (a campaign for a better future) in Bundelkhand, one of India's most climate sensitive regions to educate the vulnerable rural communities about climate change issues and how to deal with them effectively.

Community radio reporters can help in:

- Bringing queries and information needs of the community members to the scientists.
- Disseminating information from the scientists to the rural communities in simple, easy to understand language.
- Communicating information on government policies relating to climate resilient agriculture to the rural population.
- Presenting problems of the community and how they are getting affected by climate change to policy makers helping them formulate more effective policies to help vulnerable communities cope with the changing climate.



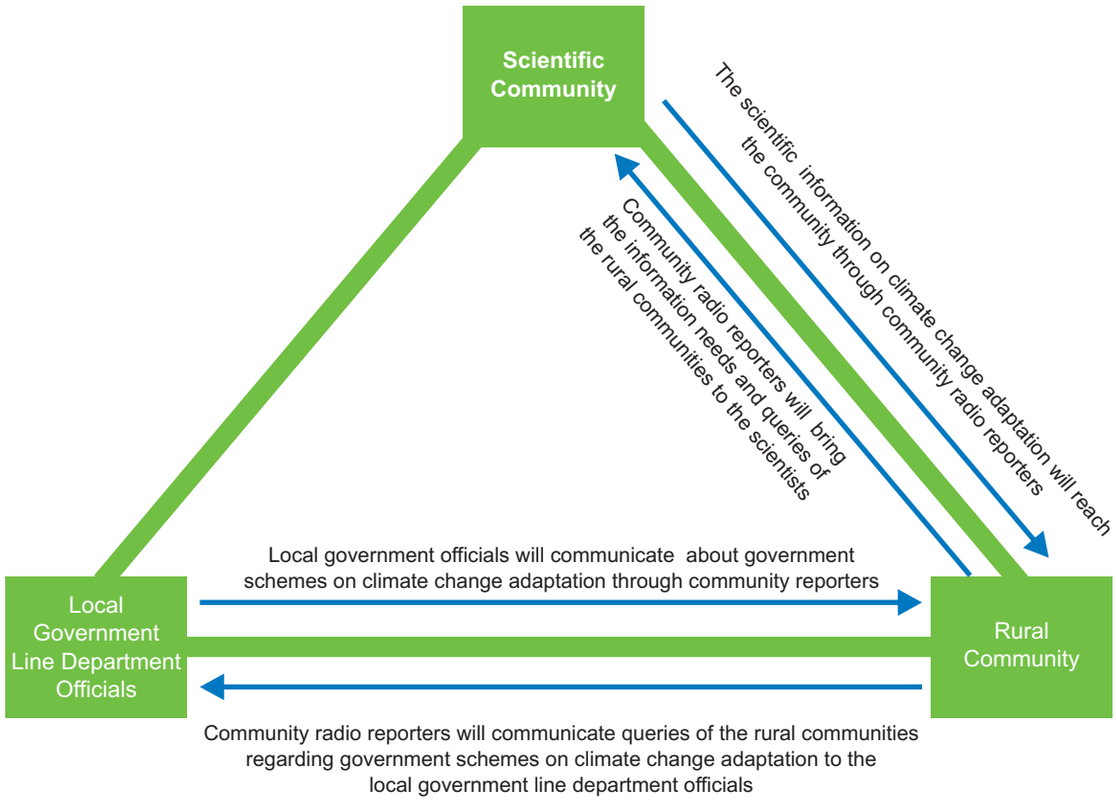
Shubh Kal
We change with climate change

Community radio – an effective communication link between rural communities, scientists and local government officials

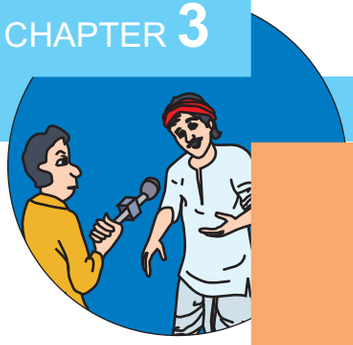
In rural areas, the poor remain isolated from various forms of media. Illiteracy, affordability, and lack of access to electricity are all barriers for access to different forms of media. Community radio is a medium that can overcome these barriers. Community radio anchors are from within the community and thus there is no language barrier when communicating.

Community radio can play an important role in initiating a two-way communication process between the community and the local level scientists and government officials, which is currently a lacuna. With the right kind of training and capacity building, community radio broadcasters and journalists can provide access to information and serve as an interactive medium where citizens can ask questions and raise their concerns regarding climate change. Radio reporters can take the voices and concerns of the community to the scientists and local level decision makers. They can also address the priority concerns of the community by ensuring that the relevant information available with scientists and decision makers is brought to them. This includes information on relevant government schemes, agro-meteorological data, potential impacts of climate change, adaptation options etc.

COMMUNITY RADIO REPORTERS FORMING A TWO WAY COMMUNICATION LINK



CHAPTER 3



CLIMATE CHANGE REPORTING GUIDELINES

Outcome

After reading this chapter, one would understand things to keep in mind while reporting on climate change issues.

Characteristics of an effective radio reporter

An able radio reporter:

- Must feel passionately about spreading awareness in the community.
- Should be eager to know what is happening in the world around him.
- Should try to go to the root of every problem or story.
- Should present all aspects of an issue and be balanced in his/her reporting.
- Must inform and entertain the listeners to keep them engaged.

Climate change reporting guidelines

- Proper research: Reporter should do his / her research on the relevant topic thoroughly before going out in the field to interview community members and experts.
- Provide sufficient background of the topic to the listeners: What is the issue? How is it connected to climate change? How does it affect the community?
- Stories and topics should be relevant to the local community.
- Avoid jargon: The reporters must simplify climate change terminologies so that the communities understand what is being talked about.

- Information from scientific experts should also be presented in a simplified manner to the communities.
- Use numbers very carefully: The figures and projections from research studies must be communicated in moderation so that they do not panic the listeners.
- Take care of accuracy of facts being stated in the stories.
- A radio programme should not only be talking of problems. Provide solutions to the listeners in the form of comments from experts.
- Make balanced stories: Present different points of view and facets of the issue so that the story is balanced and the listeners get a complete picture.
- Present climate change information to the community in an entertaining manner using simple, easy to understand language.

Information sources for research on climate change issues

- www.thethirdpole.net
- www.earthjournalism.org
- www.feji.org.in
- Media Club of India
- South Asian Dialogue on Development, Environment and Democracy (SADED)

Key contacts for climate change reporting

Following is a list of contacts that can be used as a starting point in the reporter's search for information regarding stories on climate change related issues. The reporter may be able to obtain the desired information from these contacts or they may direct the reporter to the correct place to find the information.

Local level government officials

- Department of Agriculture
- Department of Water Resources
- Department of Irrigation
- District Planning Office
- Agriculture Technology Management Agency (ATMA)

Scientific Research Organizations

- KrishiVigyan Kendra
- Scientific Research Institutes

Community

- Village elders
- Progressive farmers
- Sarpanch
- Gram Sewak/KrishiMitr

HOW TO MAKE EFFECTIVE AND ENGAGING RADIO PROGRAMMES ON CLIMATE CHANGE

Outcome

After reading this chapter, one would know how to make entertaining and informative climate change radio programmes.

Steps in producing and disseminating radio programmes

While making a radio programme, the focus should be on attracting a large audience base who will become regular listeners over time. The programme should be informative as well as entertaining holding the audience's attention.

1. Planning before making the radio programmes
2. Making the radio programmes
3. Broadcasting and narrowcasting of the programmes
4. Receiving and analyzing feedback after broadcast

1. Planning before the radio programmes are made

a) Collecting information about the issues the community is facing. What type of problems are the farmers and their families facing as a result of climate change? A competition can be organized on the radio where there is an exchange of information on various environmental issues. Similarly a community gathering can be organized where people brainstorm with the radio reporters to prepare a list about the effects of climate change on various facets of their lives and possible adaptation options.

b) From the above prepared list, evolve names and topics for each episode. (*Refer to Annexure 1 at the end of this guide for information, topics and themes for making climate change programmes*).

c) Select key contacts that can be used as a starting point in the reporter's search for information regarding stories on climate change related issues. *(Key contacts for climate change reporting given in chapter 3 of this guide)*

d) Promotion of the programme: It is important for the community to know that a programme on climate change issues (particularly those affecting the community) is being broadcast on community radio. This can be done by wall postings, during community meetings and through the radio. Make an attractive jingle for the programme. The topic of the programme must be incorporated into the jingle.

2. Making the radio programmes

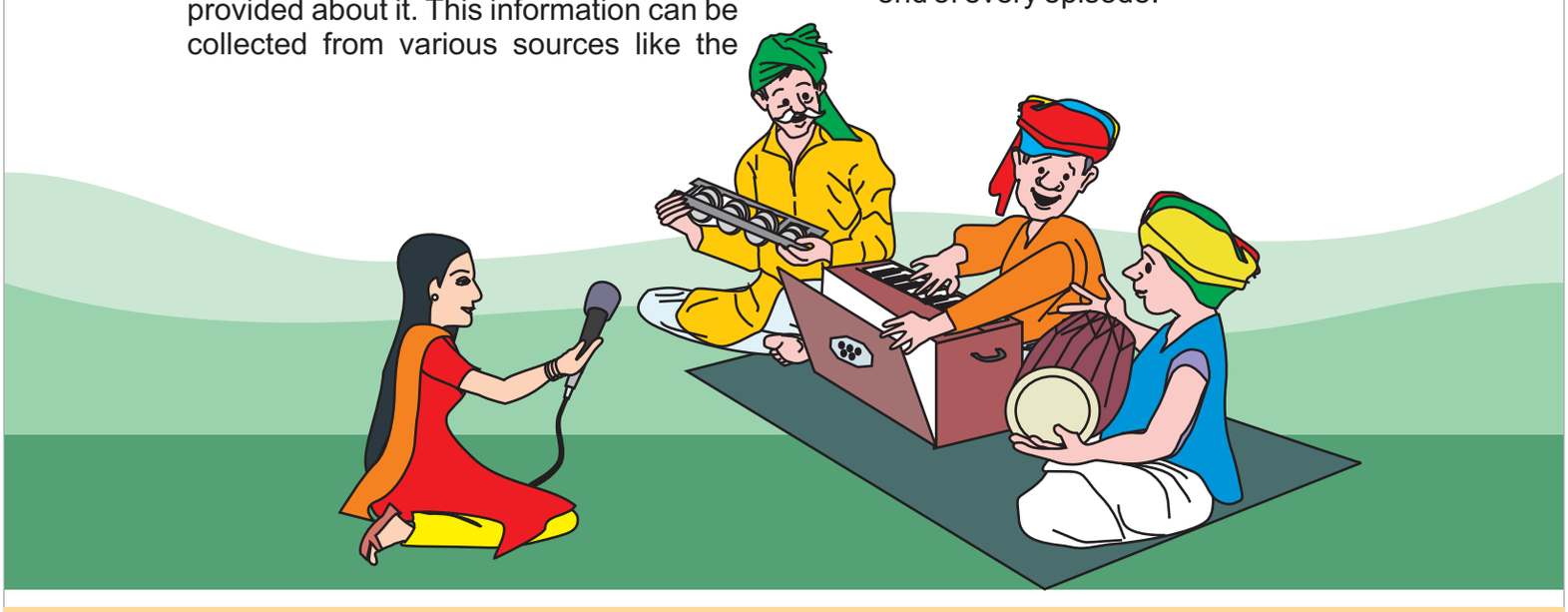
The topic of the programme needs to be clear with complete information being provided about it. This information can be collected from various sources like the internet or books. (*Internet sources for getting climate change information have been mentioned in chapter three of this guide*).

a) It is recommended that programmes be made in magazine format having a mix of success stories from the ground, interviews with community members – scientists and local government officials, radio dramas, folk songs to make the radio shows interesting and hold the attention of the viewers. Total duration of each radio programme should be about 10 - 15 minutes. Each section in the programme should not be more than 3-4 minutes to keep it interesting and crisp.

b) In all the radio programmes, anchor script must link the theme with climate change.

c) As a rule, in the beginning of each programme, radio anchors should talk about what was discussed in the last episode so that continuity is maintained for the listeners.

d) The signature tune of the programme should be there in the beginning and end of every episode.



e) At the end of every episode,

- Radio anchors should give 1 – 2 minute summary on main points discussed in the episode. Also they must tell the audience what theme will be discussed in the next episode.
- Anchors should give the farmer helpline number – repeat it 2 times.
- Radio anchors should ask the listeners to call and tell about any community members demonstrating knowledge on climate change adaptation. Radio anchors should then talk about this in the next episode.

f) As a rule, try and use two different types of experts (one who has a scientific background and another who is a government official - line department official). Avoid using only one expert in the entire episode.

g) For the radio reporters to form a two way communication link between farmers and experts – (scientists and local level government officials), it is important that reporters tell the scientists and local decision makers about the concerns of the community. It is important to tell experts about problems that farmers are facing. The reporters must try to find solutions to their listeners' problems. The solutions should be communicated back to the farmers by telling the farmers what the scientists and local line department officials said.

h) For every episode while interviewing farmers, radio reporters should:

- Interview some old farmers and some young farmers who are less than 30 years old - to get different points of views. Reporters should try and interview women farmers as well.
- Find a quiet corner to interview farmers in the village. They should interview farmers one by one - not in a group. While editing – avoid using sound bites with too much background sound.
- Introduce the person who he is going to talk to and which village he/she is from.

i) While editing farmers' sound bites, use music transition (3-4 seconds) between all the bytes.

j) After farmers' interview section in the beginning of the episode – use some entertainment – song or radio drama before moving on to the expert's interview.

k) Expert interview section:

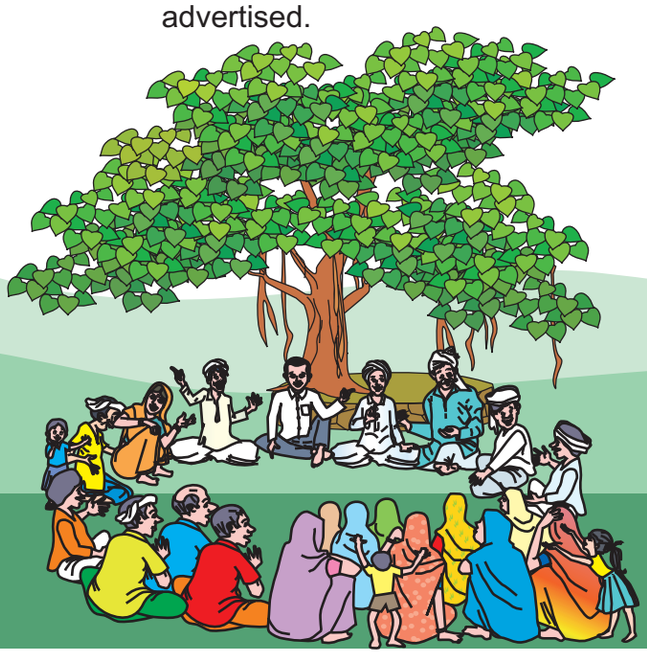
- Expert needs to be properly introduced by the radio reporter - from what department he is and what organization.

- It is recommended to keep the expert interview about 2-3 minutes. Rest of the points talked by the expert should be simplified and explained by the radio anchors in their script.

l) After every expert is interviewed, as a rule, the radio anchors should sum up the main points of discussion in a simplified manner for the benefit of the listeners.

3. Broadcasting of the radio programmes

- The programme should be broadcast at times according to the convenience of the community. Morning and evening slots are most opportune to attract farmers.
- Advertising for the programme should start many days before the actual broadcast.
- It is important for the programme to have a repeat broadcast, whose timings also needs to be advertised.



Narrowcasting of the radio programmes

Narrowcasting refers to the practice of reporters taking pre-recorded programmes directly to a gathered audience in a community. Although narrowcasting allows for a smaller audience to access the programme, questions and problems can be put forth immediately for a solution and feedback can be obtained on the spot.

4. Receiving and analyzing feedback after the broadcast

After the broadcast of the programme, the issue of feedback is of utmost importance to enhance quality and make changes if necessary.

Feedback can be obtained in several ways:

- Phone: The audience could be a given a phone number to call on where they give their opinion on the programme.
- Letters: Listeners can be requested to post their feedback in the form of letters.
- Feedback Form: Feedback forms can be effective ways of knowing audience opinion especially after narrowcasting sessions.

ANNEXURE 1

Climate Change Radio Programmes – Topics and Themes

Below is a list of potential program topics and themes accompanied by potential questions which can be asked to the members of the community, local government officials and scientific researchers:

1st Topic	**The community's, policy makers' and scientists' perceptions on climate change and effects of climate change globally and locally**
Questions for community	What does climate change mean to you? What is causing climate change? How have changes in the climate (such as drought) affected the community? How important is a stable climate (such as a regular and predictable monsoon) to the livelihood of farmers and the rural community? What can you do to adapt to climate change?
Questions for local government officials	What does climate change mean to you and what are its affects? How seriously are policymakers taking the issue of climate change? Why do they believe climate change is or is not important? How is climate change affecting agriculture? What is your department's role in addressing climate change? What are the difficulties in addressing climate change?
Questions for scientists	What is climate change? What is causing climate change? What are the impacts of climate change globally and locally? How is climate change affecting agriculture? How have cropping patterns changed over the last decade? Why have they changed? What can communities do to adapt?

2nd Topic	The community's, policy makers' and scientists' perceptions on climate change and effects of climate change globally and locally
Questions for community:	What does climate change mean to you? What is causing climate change? How have changes in the climate (such as drought) affected the community? How important is a stable climate (such as a regular and predictable monsoon) to the livelihood of farmers and the rural community? What can you do to adapt to climate change?
Questions for local government officials :	What does climate change mean to you and what are its affects? How seriously are policymakers taking the issue of climate change? Why do they believe climate change is or is not important? How is climate change affecting agriculture? What is your department's role in addressing climate change? What are the difficulties in addressing climate change?
Questions for scientists:	What is climate change? What is causing climate change? What are the impacts of climate change globally and locally? How is climate change affecting agriculture? How have cropping patterns changed over the last decade? Why have they changed? What can communities do to adapt?

Anchor script information

If the climate is going to be uncertain, what can the farmer do? In arid and semi-arid regions, the first and most important step would be to use farming techniques that need less water. That is why it is important to do line and dry sowing, to sow crops like barley and maize that need less water.

This radio episode must include information on different sustainable agricultural practices like:

- Short duration crop varieties
- Line and dry sowing
- Water efficient crops like barley instead of wheat
- Contour farming
- Drought tolerant improved seeds
- Multi cropping

Important note: Refer to Annexure 2 at the end of this guide for more information on climate resilient farming practices.

3rd Topic:	Organic farming as a climate adaptation strategy
Questions for community:	How is organic farming better than using chemicals and pesticides for growing crops? Has adopting organic farming improved your yield and income? What contributed to the adoption of these practices? If you do not use organic farming practices, then why not? What are the barriers to practicing and adopting organic farming?
Question for local government officials	What policies/schemes are in place to encourage the adoption of organic farming practices?
Questions for scientists:	How is organic farming better than using chemicals and pesticides for growing crops? How is organic farming a good climate change adaptation technique? What should the farmers keep in mind while switching from chemical based farming to organic farming?

Anchor script information

a. Climate change mitigation

- Organic farming reduces the amount of climate change causing gases (greenhouse gases) that are released into the atmosphere by using less synthetic agricultural inputs such as nitrogen fertilizers and pesticides. Synthetic fertilizers and pesticides require large amounts of energy to produce, which causes greenhouse gases to be emitted. By not using these inputs, organic farming avoids emitting greenhouse gases that would be emitted under conventional farming practices.
- Organic farming techniques tend to increase the amount of organic carbon that remains in the soil. This decreases the amount of carbon dioxide, a greenhouse gas, in the atmosphere because more carbon is stored in the soil instead of the atmosphere.

b. Climate change adaptation

- By increasing the amount of organic carbon that remains in the soil, organic farming also has advantageous climate change adaptation characteristics. Soil organic carbon tends to act like a “sponge” in the soil because it absorbs excess water and retains additional moisture.
- Organic farming systems tend to promote biodiversity through various techniques. More diverse farming systems tend to be better at adapting to external stresses such as extreme weather events like droughts, floods and heat waves. Biodiversity is also vital for natural renewal processes that maintain soil and water health.

- Organic farming reduces dependency on expensive agricultural inputs like synthetic fertilizers and pesticides. It also allows farmers to produce crops that may fetch a premium price at the market when compared to conventionally cultivated crops. These two qualities can make organic farming more financially viable, especially for small-scale farmers since it reduces the amount of investment needed thus reducing financial risks. Increased financial stability can help farmers cope with potential impacts resulting from climate change.

c. Navdanya, a Delhi based non-government organisation, has been researching the benefits of organic farming and aggressively promoting this form of agriculture among small-scale farmers in different parts of India. They have helped over 200,000 farmers convert to organic farming techniques in India. From field trials conducted in arid, semi-arid, sub-humid and humid regions of India, Navdanya found that organic farming techniques can improve soil carbon levels by 5% to 25% and increase the water holding capacity of soils between 2% to 17% as compared to conventional farming methods. Soil that can hold more moisture is particularly valuable for farmers in drought prone regions of India.

d. Organic food fetches higher prices for the farmers - The price premium that organic crops garner from the perceived health and taste benefits perceived by city consumers allows organic farming to be more financially profitable than conventional farming. In a 2007 study published in the International Journal of Agricultural Sustainability, researchers found that organic cotton farmers in India experienced 30-40% higher gross profit margins than conventional cotton farmers due to lower input costs and higher prices for organic cotton. Increasing the income of small-scale farmers is a very effective way of increasing food and livelihood security.

e. Organic Certification - However, for small farmers the cost of obtaining the necessary certification demanded by consumers can be prohibitively high. Certification processes are often too complex, lengthy, and expensive for individual, small farmers to undertake on their own. It takes about three years for a farm to be labeled as 'totally organic'. Organisations like Navdanya, have been working to make organic certification processes easier for small-scale farmers by helping them pool their land to obtain the 'organic certificate' as a 'group'. This helps the farmers share the costs associated with the certification.

Important note: This radio programme on organic farming must have at least one success story of a farmer who has adopted organic farming and is happy with the results.

4 th Topic:	Agro forestry as a climate adaptation strategy
Questions for community:	Do you practice agro forestry? Do you think agro forestry has any benefits? Has adopting agro forestry improved your yield and income? What contributed to the adoption of these practices?
Questions for local government officials:	What policies/schemes are in place to encourage the adoption of agro forestry farming techniques? What are the barriers to adopting agro forestry farming techniques?
Questions for scientists:	Why is agro forestry an effective adaptation strategy? What should the farmers keep in mind while practicing agro forestry? What are the kinds of trees to be grown and the distance to be kept between the trees to help improve yield from those trees?

Anchor script information

Agroforestry systems use trees to aid the cropping system to increase farm productivity, diversify farmers' income sources and provide environmental benefits. The trees provide farmers with yields of fruit, oil, fodder, fuel and medicinal products, increasing their livelihood opportunities. Diversification is a key adaptation strategy for the small and marginal farmers living in climate vulnerable areas. Agroforestry reduces dependency on one crop variety and so helps in maintaining agricultural production during both wet and dry years. It has great potential to increase farm income and sustain crop production thereby strengthening the socio-economic situation of the farmers.

The reason why more farmers do not practice agroforestry by planting trees along with their crops is that the shade from the trees has an adverse effect on the crops. But this problem can be solved by choosing the trees that are tall and have relatively few branches, such as guava or amla.

5th Topic:	Water resources and climate change
Questions for community:	How has water (both surface and groundwater) availability changed over the last decade? How has the seasonal monsoon changed over the last decade? How have these changes affected community members' lives? Does the community currently make use of rainwater? Do they store rainwater at all? If they do, how do they store it? How helpful is having the ability to store rainwater? Are there barriers to storing rainfall such as not being able to build adequate storage facilities or not having adequate knowledge?
Questions for local government officials:	What kind of policies /schemes exist to address water availability issues and climate changes impact on water availability? Are there any schemes that can help farmers implement rainwater-harvesting practices?
Questions for scientists:	How is climate change expected to impact water availability? How is climate change expected to impact the monsoon? How can communities adapt to these expected changes? What are the best practices for rainwater harvesting? Are there concerns that should be addressed when storing rainwater? Can stored rainwater be used for drinking purposes?

Anchor script information

In the semi-arid region of Bundelkhand, water is a very valuable resource. With climate change, water availability may become more and more unpredictable. When it rains, it is important to utilise as much of the available water as possible before it runs off and becomes inaccessible. Rainwater harvesting is one way to take advantage of the rains. Rainwater harvesting uses various techniques to capture and store rain when it occurs such as storage ponds, cisterns, and other means. Rainwater harvesting can be an important strategy to reduce the risk of climate change by using water resources more efficiently.

All radio anchors can talk about Rajendra Singh, known as the 'Rain Man of Rajasthan', who has won acclaim for pioneering innovative community based water harvesting and management schemes. Through a host of different strategies such as rainwater harvesting structures, Rajendra Singh has helped bring 'water back to more than 1,000 villages and got water to flow again in all five major rivers in Rajasthan'.

6th Topic	Water efficient irrigation practices
Questions for community:	Ask farmers about their irrigation practices. How do they irrigate their fields? Why do they use the technique that they use? Do they know about alternative irrigation techniques? Do they take advantage of any government schemes to assist with irrigation?
Questions for local government officials:	What kind of policies /schemes exists to address water availability issues and climate change impacts on water availability? What are the government irrigation schemes available? How does one qualify for such schemes if they exist?
Questions for scientists:	How is climate change expected to impact water availability? How is climate change expected to impact the monsoon? How can communities adapt to these expected changes? What are the different water efficient irrigation techniques? What methods are best suited for the Bundelkhand area? Why are some methods better than others? Does the type of irrigation depend on the type of crops that are being grown?

Anchor script information

For farmers that are fortunate enough to have access to water for irrigation purposes, it is important for them to use that water as efficiently as possible. Under climate change, using water more efficiently will become even more important as water availability becomes more unpredictable. There are different forms of irrigation such as field flooding, sprinkler irrigation, and drip irrigation. Field flooding requires few resources but is a relatively inefficient use of water, while drip irrigation requires specialized tubing and pumps but uses water much more efficiently. The appropriate technique will depend on a farmer's resources and location.

Important note: In this radio programme there must be success stories of farmers who are benefitting from using water efficient irrigation techniques.

7th Topic:	Preventing soil erosion and improving soil quality
Questions for community:	Ask farmers about their perceptions on soil erosion. Is soil erosion a problem in their communities? What do they do, if anything, to prevent soil erosion on their farms? If they do not do anything, why do they not do anything? Do they not know the correct techniques or do they not have adequate resources? How do they currently manage the fertility of their soil. Do they use synthetic fertilizers? Compost? Manure? Do they use special techniques to prepare compost or manure? How did they learn about these techniques?
Questions for local government officials:	What are the initiatives by the government to reduce soil loss? Are there schemes to help farmers cope with this problem? How can farmers receive assistance in improving soil fertility? Are there any schemes that promote these techniques? Are there ways farmers can access information on these techniques? Do policy makers think improving soil fertility is important for Bundelkhand? Why or why not?
Questions for scientists:	Ask scientists about the importance of conserving soil. What is lost when top soil erodes? What strategies would be appropriate for regional farmers to pursue in reducing soil erosion on their farms? What are the best options? What are the most affordable options? What are the different ways to improve soil health? Are there certain techniques that are more suited for the semi-arid region of Bundelkhand? What is the proper way to make compost? What is the proper way to incorporate manure into the soil? What type of cover crops promotes soil health? What are the costs of these techniques in comparison to synthetic fertilizers?

Anchor script information

Soil erosion can have significant negative effects on a farm's productivity by washing away important nutrient rich soil. With climate change, soil erosion may increase due to the potential of more heavy rainfall events. Reducing soil erosion is a good way of increasing the productivity and profitability of a farm. There are various different techniques to help retain soil including planting fast growing trees and shrubs, using cover crops when food crops are not being grown, or creating artificial barriers around farming fields. The most appropriate strategies will depend upon the location and resources available.

Crops are only as good as the soil they are grown in. Farmers can improve their crops by improving their soil. There are many different ways to improve soil. Correctly incorporating compost or manure into soil can help increase important nutrients in the soil. Growing certain crops (called legumes) can also increase important nutrients in the soil. Having healthier soils can also make farming less sensitive to adverse climatic conditions, making it one way to adapt to a changing climate.

8th Topic:	Impacts of climate change on livestock rearing
Questions for community:	Ask farmers if they feel the changing climate has affected their livestock rearing practices? If yes, then how? Do they know of any government schemes that promote livestock rearing? Do they perceive benefits from livestock rearing? How important is livestock for farmers in their livelihoods? How do they manage fodder production and livestock veterinary issues, such as vaccinations?
Questions for local government officials:	Are there any government schemes to help farmers do more livestock rearing?
Questions for scientists:	What are the impacts of climate change on livestock rearing? How can these impacts be addressed? How should farmers look after their livestock?

Anchor script information

Animal husbandry in climate sensitive arid and semi-arid regions has been adversely affected by drought and scientists tell us that one of the effects of climate change is that droughts will become more frequent and more severe. So the problems of animal husbandry in these regions are also partly due to climate change. If we can promote animal husbandry, that serves as a way to adapt to climate change, because it provides farmers with an alternate source of livelihood in case of crop failures.

9th Topic:	Use of agro-meteorological information such as weather, seasonal, and monsoon forecasts
Questions for community:	What are the traditional ways farmers have used to predict weather and seasonal forecasts? To what extent do farmers use scientifically derived agro-meteorological information? Where do they obtain this information? Do they think this information is helpful? Why or why not? How does it influence their decisions on the farm?
Questions for local government officials:	How can farmers obtain agro-meteorological information? How is agro-meteorological information integrated into decision making processes at the district/state level?
Questions for scientists:	How are farmers' traditional methods of predicting weather and seasonal forecasts similar and different from scientific forecasts? How are scientific forecasts derived? How should forecasts be interpreted? How does climate change affect the accuracy of traditional forecasting techniques?

Anchor script information

Forecast information can help farmers make better decisions on their farm. It can help them decide what type of crops to plant, when to plant them, how much fertilizer to apply, and other decisions. For thousands of years, farmers have developed traditional ways to make predictions about the future state of the weather. In the increasingly unpredictable climate due to global climate change, having knowledge of the probability of future weather events can be particularly valuable. Traditional techniques may not be as effective under climate change, making scientifically derived forecast information more important.

10th Topic:	Health and climate change
Questions for community:	Ask farmers about the incidence of disease and weather related stress on them, their families, their livestock, and their communities. How do they perceive the impact of climate on the health of their communities? Have they experienced increases in diseases like malaria or dengue? What steps do they take to prevent these diseases? How do they deal with these diseases when they occur? What are the home remedies / traditional remedies to deal with heat strokes?
Questions for local government officials:	Ask policy makers about government efforts to address the public health issues of climate change. What does the government do to prevent vector borne diseases like malaria and dengue fever? Does the government provide assistance for livestock health? Are they incorporating the potential impacts of climate change into their planning? Why or why not?
Questions for scientists:	Ask scientists about the connection between climate change and health. How and why will climate change impact vector borne diseases like malaria or dengue fever? How might climate change affect the transmission of infectious diseases? How might climate change affect the incidence on noninfectious diseases? Ask scientists about how to prepare for the health impacts of climate change. What should be done in case of extreme heat waves? How can vector borne diseases be prevented?

Anchor script information

Climate change is expected to impact health—both for human populations and livestock. More frequent heat waves are detrimental to public health. Increasing temperatures and altered rainfall patterns may shift the normal time and location of vector borne diseases such as malaria and dengue fever. Likewise, these same issues can affect livestock. Heat stress and vector borne diseases may increase livestock mortality under climate change. Responding to these issues will require preventive actions by both farmers and governments. Some farmers may already be experience health related impacts.

Radio anchors must talk about heat strokes – dehydration – home remedies to deal with this.

11th Topic:	Bottom up planning process
Questions for community:	Are communities participating in the planning process? How are they participating? What have been the perceived results of participating in the planning process? Ask farmers about their current perceptions on the government's response to climate change. What do they believe the government is already doing? What do they think the government should be doing? What government schemes have benefitted the community on climate change, agricultural, and water issues? What schemes are communities aware of and not taking advantage of and why? What are the most utilized schemes? What is the community's view on the role of government in climate adaptation issues?
Questions for local government officials:	How are policy makers incorporating grassroots voices into policy/scheme development? How can community members participate in the process? Why do they feel it is important, if at all, for community members to participate? What schemes are available for communities to use for climate change, agriculture and water issues? Ask policy makers about the government's response to climate change. What is being done at the district level about climate change? How can farmers and communities participate in plan development?
Questions for scientists:	How do researchers interact with the grassroots level, if at all? How does they steer their research, if at all? How do the researchers feel that their work is incorporated into policy? How do researchers contribute to the creation and implementation of schemes and policies? What is there perception on the efficacy of the government's policies and schemes?

Anchor script information

Many governments at the international, national, and state level are beginning to explicitly address the issue of climate change. In India, the national government has prepared a National Action Plan on Climate Change that describes the overarching national strategy of addressing climate change. Many state governments, including Madhya Pradesh, have developed similar State Action Plans on Climate Change. It is important for communities to be aware of these initiatives so that they can help influence their development and take advantage of the schemes that emanate from them.

12th Topic:	Wasteland reclamation
Questions for community:	Ask farmers about their perceptions of wastelands. How much of their land is 'wasteland'? How much of their community is wastelands? What do they think is the cause of lands becoming unproductive? Have they successfully reclaimed wastelands before?
Questions for local government officials:	Ask policy makers about government initiatives to address the problem of agricultural wastelands. Do they view this as a priority? What is being done to reclaim wastelands at the government level? Are there schemes that farmers can take advantage of to help them reclaim wastelands?
Questions for scientists:	Ask scientists about the causes of wastelands. What causes agricultural lands to be unable to support cultivation? How can this be avoided? Ask scientists about methods for reclaiming wastelands. What are techniques that can be used in Bundelkhand to make wastelands productive again?

Anchor script information

In many areas, agricultural wastelands go fallow because of environmental degradation. If these lands could be used for productive agricultural activities, the potential detrimental effects of climate change could be partially alleviated through the increased production of crops. Also wastelands could be used for growing trees or fodder for livestock.

13th Topic:	Crop insurance and crop loans
Questions for community:	Ask farmers about the current use of crop insurance and crop loans. Do they currently use these financial services? Did they use them in the past? What has their experience been in using these services? Have they been treated fairly? Do they feel it was a good purchase? Would they recommend other farmers to purchase these services?
Questions for local government officials:	Ask policy makers about the government's role in crop insurance and crop loans. Does the government provide any of these services? Do they ensure that the process is fair? Do they provide any help in making decisions on these services?
Questions for scientists:	Ask bankers about the advantages, risks and types of crop loans and crop insurance. How can these services help farmers? How can these services hurt farmers? How should farmers make decisions on whether to use these services or not? What are the different types of crop insurance and loans?

Anchor script information

Crop insurance and crop loans are financial instruments that farmers can use to increase the productivity of their farm and decrease the risk of crop loss or failure. Crop insurance ensures financial compensation to the farmer in case their crop fails and they are not able to sell it in the market. Crop loans provide financial assistance to farmers to allow them to purchase agricultural inputs and other resources to increase the productivity of their farm. These services can help farmers adapt to the negative effects of climate change by reducing risk and increasing productivity. Both services, however, do cost money. Therefore, purchasing the right kinds of crop insurance and crop loans should be a carefully considered option.

Important note: Here other than interviewing farmers and government policy people, please interview banks – NABARD, Gamin bank etc. as experts

14th Topic:	Impact of climate change on coral reefs and fishing
Questions for community:	Ask the fishermen if the changing climate has affected their catch of fish? If yes then by how much? How have their livelihoods been affected?
Questions for local government officials:	What policies/schemes are in place to help the fishermen affected by climate change?
Questions for scientists:	What is causing this effect on the coral reefs and marine life? How do fishermen evolve better fishing techniques to deal with this change? How is ocean acidification affecting the marine environment?

Anchor script information

The impact of climate change on coral reefs and the marine environment, has been severe and the capacity of the marine organisms to adapt to these changes is still under debate. Climate models indicate that the sea surface temperature is expected to rise by 1 to 3°C, while the sea level is expected to rise by 0.18 to 0.79 metres. Regional weather patterns are likely to change, resulting in an increase in the severity and frequency of storm events, particularly cyclones. In addition, ocean circulation patterns are expected to be modified and pH is expected to decline as a result of the absorption of CO_2.

Corals are very sensitive to fluctuations in temperature. These rich coral ecosystems are highly vulnerable to the impacts of climate change. Rise in ocean surface water temperatures may alter the oceanic chemistry. Ocean acidification reduces the calcium carbonate absorption capacity of corals, important to maintain their skeletons. Already, ocean acidification has lowered the pH of the ocean by about 0.11 units (SCOR 2009). Moving the ocean's pH from 8.179 to a current pH of 8.069, which means the ocean is about 30% more acidic now than it was in 1751 (SCOR 2009). If nothing is done to reduce carbon dioxide emissions into the atmosphere, ocean acidification will increase and more and more corals will be damaged or destroyed. Coral reefs are rich in biodiversity and provide wide range of ecosystem services. Coral reefs support a large diversity of species and provide irreplaceable sources of food and shelter. They also play an important role in coastal protection.

The anticipated increase in ocean temperature is predicted to stimulate the migration of marine organisms based on their temperature tolerance, with heat-tolerant species expanding their range northward and those less tolerant species retreating. which would result in fishermen having to go further encountering dangerous conditions to earn their livelihood. Organisms who are unable to migrate will eventually become extinct again making it harder to find a decent catch. Ocean acidification, or increased CO_2 levels which result in the lowering of the pH of seawater, not only reduces the abundance of phytoplankton but also decreases calcification in certain marine animals like corals and shellfish, causing their skeletons to become weaker and growth to be impaired.

ANNEXURE 2

Agricultural strategies for climate change adaptation in arid and semi-arid regions

Table A: Agricultural Management Adaptation Practices

TECHNIQUE	DESCRIPTION	ADVANTAGE
1. Organic farming practices	Farming practices that use natural compost such as vermi-compost	Helps to improve water holding capacity of the land and soil fertility. Reduces the amount of greenhouse gases being released into the atmosphere by eliminating the use of chemical fertilizers
2. Improved seeds	Seed varieties that offer improvement over traditional seeds in yield, resilience, quality, etc.	Helps reduce agricultural inputs and increase agricultural yield and income
3. Drought tolerant crops	Crops and crop types that can survive drought like conditions	Better adaptation to low water situations (such as drought or lack of irrigation)
4. Short duration crops	Crops and crop types that have shorter sow to harvest periods	Adaptation to scarce water situations by shortening the duration of time that water is required for irrigation. Also increases cropping intensity by allowing more additional crops to be planted and harvested
5. Mixed cropping (multi-cropping, inter-cropping)	Planting of more than one crop in a field	Reduces the risk of total crop failure through the diversification of crops as well as increases overall yields through synergistic effects between different crop types
6. Agro-horticulture	The integrated cultivation of traditional crops with crops such as vegetables, fruits, and spices	Helps diversify farmer's crops, increases sustainability and income levels

TECHNIQUE	DESCRIPTION	ADVANTAGE
7. Agro-forestry	The integrated cultivation of crops with trees and shrubs	Increases productivity of fields through synergistic effects between crops and trees and income levels through increased production.
8. Line sowing	Seeds are sown in a straight line with the use of tools such as a seed drill	Increases yield by decreasing inter-species competition; uses less seed than 'broad casting' sowing technique
9. Dry sowing	Seeds are sown in dry conditions	Allows for timely planting of crops during dry conditions, which can increase yield compared to late sowing
10. Ridge and furrow method / broad bed and furrow method	Crops (predominantly soya beans and wheat) are sown in raised beds (height depends on crop) with furrows alternating between	Allows for water drainage in the case of extreme rainfall; provides better aeration to roots and conserves soil moisture during times of scarce rainfall
11. Contour cultivation methods	Hilly lands are ploughed along the contours lines of elevation	Slows water runoff from hilly slopes, which reduces soil erosion and allows more water to infiltrate the soil
12. System of rice intensifi-cation (SRI)	Utilization of a combination of techniques that alter water management, planting method, fertility management, and pest control.	Significantly reduces water and seed requirements for rice while simultaneously increasing yield
13. Grain and fodder storage	Storage of grain and fodder in facilities and conditions that reduce spoilage	Allows farmers to delay selling crops until market prices are favourable and/or retain excess fodder for times when it is scarce

Table B: Water Resource Management Practices

TECHNIQUE	DESCRIPTION	ADVANTAGE
1. Drip irrigation	Applies water directly on the soil surface via small piping systems with many small water outlets	Significantly increases water and fertilizer use efficiency by reducing evaporation and water runoff
2. Sprinkler irrigation	Applies water through the air to the field from a central location	Reduces labour inputs and saves water
3. Surface irrigation	Applies and distributes water to a field from an inlet via gravity	Allows large areas of land to be irrigated with relatively little technological inputs
4. Basin irrigation	Applies water to an entire basin contained by field bunding and allowed to infiltrate	Same as surface irrigation
5. Furrow irrigation	Applies water through parallel channels/furrows in the field in which crops are planted between the furrows	Same as surface irrigation
6. Check dams	A small structure that retains and/or slows water across a small stream or drainage ditch	Helps reduce soil erosion and increases soil water infiltration. Retained water can be used for irrigation
7. Gabions	Rock and/or concrete material used to line streambeds and irrigation channels	Reduces channel erosion and required channel maintenance
8. Artificial groundwater recharging	Through various techniques, rainwater and other surface water is transferredunderground to increase ground water levels	Increases groundwater levels and recharge rate

Table C: Other Adaptation Practices

TECHNIQUE	DESCRIPTION	ADVANTAGE
1. Livestock rearing	Raising animals such as cattle, buffalo, sheep, chicken and pigs for food products	Can help reduce agricultural risks and increase overall income by utilizing marginal lands for grazing and fodder; can still be susceptible to climatic conditions that reduce available grazing lands and fodder
2. Alternative livelihoods	Adoption of livelihoods that are less prone to climate change	Reduces the risk of losing main source of income due to climatic vagaries
3. Crop insurance	A financial service that ensures agricultural producers receive some form of financial return in case of crop loss due to adverse climatic conditions	Ensures financial security in case of climatic variability
4. Crop loans	A financial service that provides a sum of money for the purchase of agricultural inputs that must be paid back at a later date, with interest	Provides an additional tool for agricultural producers to maintain or increase agricultural productivity through obtaining needed resources
5. Knowledge sharing and communi-cation	Transfer of knowledge relating to agricultural, water resource, or other adaptation strategies through various channels including workshops, farm visits, and information and communication technology	Increases the overall knowledge base of impacted communities in relation to climate change adaptation

Notes

www.devalt.org

Development Alternatives (DA) is a premier social enterprise with a global presence in the fields of green economic development, social equity and environmental management. It is credited with numerous technology and delivery system innovations that help create sustainable livelihoods in the developing world. DA focuses on empowering communities through strengthening people's institutions and facilitating their access to basic needs; enabling economic opportunities through skill development for green jobs and enterprise creation; and promoting low carbon pathways for development through natural resource management models and clean technology solutions.

Climate & Development Knowledge Network

www.cdkn.org

Climate and Development Knowledge Network (CDKN) supports decision-makers in designing and delivering climate compatible developments by combining research, advisory services and knowledge management in support of locally owned and managed policy processes.

Shubh Kal

We change with climate change

Bundelkhand - a semi arid region comprising of 13 districts in the states of Madhya Pradesh and Uttar Pradesh is one of the most climate sensitive areas in India. With over 80% of the population dependent on agriculture, climate change is posing a growing threat to the livelihood security of the rural community in this region. Increasing droughts and reducing crop yields are pushing people into extreme poverty.

Development Alternatives has been running the Shubh Kal Campaign in Bundelkhand to inform and educate the rural community regarding the risk of climate change and possible adaptation options. Community Radio along with other popular mediums of rural communication such as street plays are being effectively used in this campaign to bring a change in the lives of those most vulnerable to climate change.

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