Climate variability and change: adaptation to drought in Bangladesh
A resource book and training guide

The impacts of increasing climatic variability and change are global concerns but in Bangladesh, where large numbers of people are chronically exposed and vulnerable to a range of natural hazards, they are particularly critical. Agriculture is the largest sector of the economy, but agricultural production is already under pressure from increasing demands for food. Increasing climate variability and climate change are expected to aggravate vulnerabilities further by causing more frequent and intense droughts and increasing temperatures. Within this context, FAO and the Asian Disaster Preparedness Center are guiding the project “Livelihood adaptation to climate variability and change in the drought-prone areas of Northwest Bangladesh”, which is implemented under the Comprehensive Disaster Management Programme and in close collaboration with the Department of Agricultural Extension. It is specifically designed to characterize livelihood systems, profile vulnerable groups, assess past and current climate impacts, and increase understanding of local perceptions of climate impacts, coping capacities and existing adaptation strategies.

As part of this initiative, a series of capacity-building and training activities on climate change impacts and adaptation to drought has been undertaken for national and local-level technical working group members, disaster managers and community representatives.

This resource book, Climate variability and change: adaptation to drought in Bangladesh, has been tested and prepared as a reference and guide for further training and capacity building of agricultural extension workers and development professionals to deal with climate change impacts and adaptation, using the example of drought-prone areas of Bangladesh. It also presents suggestions for a three-day training course that would be readily adaptable for any areas of Bangladesh affected by climate-related risks. The information presented on climate change adaptation would enable participants to prepare, demonstrate and implement location-specific adaptation practices and, thus, to improve the adaptive capacity of rural livelihoods to climate change in agriculture and allied sectors.
Climate variability and change: adaptation to drought in Bangladesh

A resource book and training guide

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# Acronyms

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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADPC</td>
<td>Asian Disaster Preparedness Center</td>
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<tr>
<td>BARI</td>
<td>Bangladesh Agricultural Research Institute</td>
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<td>BRRI</td>
<td>Bangladesh Rice Research Institute</td>
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<tr>
<td>CDMP</td>
<td>Comprehensive Disaster Management Programme</td>
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<td>CDP</td>
<td>Coastal Development Partnership</td>
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<tr>
<td>CSO</td>
<td>civil society organization</td>
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<tr>
<td>DAE</td>
<td>Department of Agricultural Extension</td>
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<td>DMC</td>
<td>Disaster Management Committee</td>
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<tr>
<td>DoF</td>
<td>Department of Fisheries</td>
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<tr>
<td>DoL</td>
<td>Department of Livestock</td>
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<tr>
<td>DRR</td>
<td>Directorate of Relief and Rehabilitation</td>
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<tr>
<td>ENSO</td>
<td>El Niño/southern oscillation</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of UN</td>
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<tr>
<td>GCM</td>
<td>general circulation model</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>HYV</td>
<td>high-yielding variety</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<tr>
<td>LU</td>
<td>learning unit</td>
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<tr>
<td>MoEF</td>
<td>Ministry of Environment and Forests</td>
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<tr>
<td>MoFDM</td>
<td>Ministry of Food and Disaster Management</td>
</tr>
<tr>
<td>NGO</td>
<td>non-governmental organization</td>
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<tr>
<td>NTIWG</td>
<td>National-level Technical Implementation Working Groups</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Co-Operation and Development</td>
</tr>
<tr>
<td>SRI</td>
<td>system of rice intensification</td>
</tr>
<tr>
<td>SWC</td>
<td>Storm Warning Centre</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNFCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>UTIWG</td>
<td><em>Upazilla</em> Technical Implementation Working Groups</td>
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</tbody>
</table>
Bangla terms/crops

**aus**  a rice crop coinciding with late dry and early monsoon season

**Barind**  undulating uplands with red/yellow clay soils of Northwest Bangladesh

**bhiga**  equals one third of an acre

**boro**  dry season rice, grown from December to April

**chini atap**  local fine rice variety

**jujubi**  *zuzuphus mauritania* fruit tree commonly known as ber

**khari**  traditional irrigation canals

**kharif I**  season typically from March to June

**kharif II**  season typically from July to October

**monga**  seasonal famine condition

**pre-kharif**  a season before kharif II typically from March to June

**rabi**  dry season, typically from November to February

**t.aman**  transplanted aman rice typically from July to October

**t.aus**  transplanted aus rice, typically grown from March – June/July

**upazilla**  subdistrict
Preface

In Bangladesh where agriculture is the largest sector of the economy, agricultural production is under pressure from increasing demands for food. A large percentage of the population is already vulnerable to a range of natural hazards with increasing climate variability and climate change expected to aggravate the situation further by causing more frequent and intense droughts and increasing temperatures. General Circulation Model (GCM) data project an average temperature increase in Bangladesh of 1.0°C by 2030 and 1.4°C by 2050.

Within this context, FAO and the Asian Disaster Preparedness Center (ADPC) are guiding an assessment of livelihood adaptation to climate variability and change in the drought-prone areas of Northwest Bangladesh. The project, implemented under the Comprehensive Disaster Management Programme (CDMP) and in close collaboration with the Department of Agricultural Extension (DAE), is specifically designed to characterize livelihood systems, profile vulnerable groups, assess past and current climate impacts, and increase understanding of local perceptions of climate impacts, coping capacities and existing adaptation strategies.

The initiative has guided development of a good practice menu of adaptation options that is being evaluated and field tested in partnership with local communities. As part of this initiative, a series of capacity-building and training activities on “climate change impacts and adaptation to drought” has been undertaken for national and local-level technical working group members, disaster managers and community representatives. The working group members are drawn from key research and extension organizations in Bangladesh including the DAE, Directorate of Relief and Rehabilitation (DRR), Department of Livestock (DoL), Department of Fisheries (DoF), Bangladesh Rice Research Institute (BRRI) and Bangladesh Agricultural Research Institute (BARI).

This resource book, Climate variability and change: Adaptation to drought in Bangladesh, has been prepared as a reference and training guide for building the capacity of agricultural extension workers and development professionals to deal with climate change impacts and adaptation, specifically targeting drought-prone areas of Bangladesh. It also presents suggestions for a three-day training course that would be readily adaptable for any areas of Bangladesh affected by climate-related risks. The information presented on climate change adaptation would enable participants to prepare, demonstrate and implement location-specific adaptation practices and, thus, to improve the adaptive capacity of rural livelihoods to climate change in agriculture and allied sectors.

Contents: Based on an initial needs assessment and feedback from the national and local-level technical working group members, the manual is presented as a series of modules containing background information as well as suggestions for application of the information. Technical definitions are drawn from the “Climate Change 2001 Synthesis Report” of the Intergovernmental Panel on Climate Change (IPCC).

In the background sections, Module 1 describes the basics of climate variability and change in Bangladesh; Module 2 identifies types of droughts, their underlying causes and their impacts in Bangladesh; and Module 3 builds on this to describe the impact of climate variability and change.
in drought-prone areas of Bangladesh. In the application sections, Module 4 introduces participatory tools and methods for undertaking community-level climate risk assessment in the agriculture sector. Module 5 offers guidance for developing agricultural adaptation options to manage climate variability and change in drought-prone areas. Module 6 identifies the existing weather and climate forecast products available in Bangladesh and explains their utility for improving the adaptive capacity of rural livelihoods to reduce the impact of climate variability and change.

Who benefits from this training guide: This guide can serve as background resource material for training programmes on climate change impact and adaptation in the agriculture sector. Though designed and tested by project-based technical working group members representing extension, research and development organizations, it also can be used by other training facilitators or self-learners. However, it is strongly recommended that training participants and self-learners already have some basic knowledge of climate science and agriculture in Bangladesh.

How to use this book: The training programme suggested here is designed to be flexible so base information can be tailored to participants’ needs. This flexible training strategy is highly recommended over a step-by-step prescribed approach. The overall format of each module consists of sections on:

- setting goals and learning objectives,
- defining and highlighting key words and terminology,
- presenting principles and background information on individual topics, and

Each module also contains suggested training activities with LUs and exercises based on that module’s content. The exercises expose the participants to new concepts and skills, current risk management practices and future adaptation practices. The training activities include suggestions for supplementary handouts as well as guidance for preparing:

- interactive lectures
- review sessions
- individual exercises
- group exercises and presentations

The training can be facilitated by development workers, extension officers or national consultants. However, to be most effective, they should already have some background in both climatology and agriculture so they will be prepared to answer technical questions that may arise from the participants. Training facilitators and participants are requested to follow the training strategy to ensure that they capture the key aspects of the module.

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1 For additional guidelines on risk assessment in a cross-sectoral and multi-hazard perspective see: A facilitator’s guidebook for conducting community risk assessment by Directorate of Relief and Rehabilitation (DRR), Ministry of Food and Disaster Management (MoFDM), Bangladesh.