

USAID LEAF'S REGIONAL CLIMATE CHANGE CURRICULUM DEVELOPMENT

Module 1	Basic Climate Change (BCC)
Purpose	To provide learners necessary KNOWLEDGE, SKILLS and ATTITUDES (KSA) on the broad topic of climate change, covering causes and effects, responses and adaptation to climate change.
Structure	<p>Basic Climate Change module is one of the four modules of USAID LEAF's Regional Climate Change Curriculum for universities and training institutions in the Asia Pacific region.</p> <p>Regional Climate Change Curriculum Development is part of capacity building component of the USAID LEAF program funded by the USAID Regional Development Mission for Asia (RDMA). US Forest Service has provided technical support to the curriculum development process.</p> <p>Basic Climate Change module is an introductory course to climate change that covers a broad range of climate change topics, including causes and effects, mitigation and adaption, application of tools and technologies as well as communication strategies in climate change. The course is divided into the three main sections, each including multiple topics:</p> <ul style="list-style-type: none"> • Section I: Why and How Climate is Changing • Section II: Effects of Climate Change on People and the Environment • Section III: Responses and Adaption to Climate Change <p>Exceptionally, Section IV is a collection of resources and tools.</p> <p>The module materials are elaborated in English and will be translated into the national language of the USAID LEAF participating countries. The module can be tailored to both degree and non-degree programs. Relevant training topics can be selected and customized as short course training for different target groups.</p>
Target groups	<ul style="list-style-type: none"> • Undergraduate and postgraduate students • Governmental officers, planners, policy makers at different levels • NGO practitioners and natural resources professionals
Prerequisite	Consent of the teachers/trainers/professors/academic department.
Learning Outcomes	<p><i>At the end of the basic climate change course, learners will be able to:</i></p> <ul style="list-style-type: none"> • Describe the components, drivers, and interactions of climate, globally and regionally • Analyze causes and effects of climate change • Explain the relationship between human activities and climate change, with emphasis on forest ecosystems and conservation • Assess the impacts of human activities on climate and the impacts of climate change on ecosystem services and socio-economic systems • Identify potential responses and solutions to climate change challenges, and assess their feasibility and potential effectiveness • Apply appropriate communication strategies on climate change mitigation and adaptation to different types of audience
Methodology	In class, interactive learning methods, field visits, case studies, role plays
Certification	Respective university will award a certificate/degree to those learners who successfully complete the module.

Module Content

Module 1: Basic Climate Change (BCC)

The following section contains the specific content of the curricula organized according to the following format:

Topics: Knowledge, concepts or skills are to be done or learned.

Learning objectives: A written statement describing what the learners will be able to do at the end of each training session.

Texts and Primary Teaching References

IPCC. 2013. AR5 Climate Change 2013: The Physical Science Basis

<http://www.ipcc.ch/report/ar5/wg1/>

World Bank, 2013. Turn Down the Heat: Why a 4 Degree Warmer World Must be Avoided

http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centigrade_warmer_world_must_be_avoided.pdf

Houghton, John. 2009 Global Warming: The Complete Briefing

<http://www.amazon.com/Global-Warming-The-Complete-Briefing/dp/0521709164>

TOPICS

LEARNING OBJECTIVES

I. HOW AND WHY THE CLIMATE IS CHANGING

1.1. Introduction to Climate Science and Climate Change

At the end of this training session, learners will be able to:

- Differentiate between climate change and climate impacts
- Explain how climate impacts are discerned
- Analyze how impacts of climate change combine with other impacts to people and the environment
- Explain what impact pathways are and how to discern and evaluate them

1.2. The Causes of Climate Change

At the end of this training session, learners will be able to:

- Explain and evaluate past climate investigations and tools to detect its change over time
- Analyze causes and factors (natural and human induced) contributing to climate change
- Describe past, current, and future concentrations of greenhouse gases (GHG) and their effect on Earth's climate, as well as humans' contributions to GHG emissions
- Identify major sectors and human activities contributing globally and regionally to GHG emissions

1.3. Intensification of Climate: Floods and Droughts

At the end of this training session, learners will be able to:

- Explain the basic physics of climate change
- Distinguish between climate hazards and climate impacts
- Analyze and evaluate risk and vulnerability to hazards and climate impacts, including floods and droughts
- Develop potential adaptation strategies to reduce risk and vulnerability

1.4. Climate Modeling

At the end of this training session, learners will be able to:

- Explain the need for and utility of models, their limitations, and the role of uncertainty
- Describe the structure, inputs, and outputs of climate models
- Explain the components of climate models, including climate feedback mechanisms, and how components and resolution have changed over the last few decades. Describe the scenarios that have been used by IPCC and others
- Explain the basic projections of changes to warming and precipitation from global circulation models, and regional or sub-regional downscaling efforts
- Explain climate model downscaling and its difficulties

II. THE EFFECTS OF CLIMATE CHANGE ON PEOPLE AND THE ENVIRONMENT

2.1. Introduction to Climate Change Impacts

At the end of this training session, learners will be able to:

- Differentiate between climate change and climate impacts
- Explain how climate impacts are discerned
- Analyze how impacts of climate change combine with other impacts to people and the environment
- Explain what impact pathways are and how to discern and evaluate them

2.2. Sea Level Rise

At the end of this training session, learners will be able to:

- Explain and evaluate global vs. local sea level rise and factors contributing to both
- Explain the causes of sea level change
- Describe how sea level has changed throughout Earth's history
- Explain current observations, projections of future sea levels, and their respective uncertainties
- Explain the mechanisms underlying potential risks and vulnerabilities and their geographic distribution
- Describe and evaluate potential adaptations to reduce or avoid the impacts to people and ecosystems

2.3. Climate Change and Water Resources: Effects

At the end of this training session, learners will be able to:

- Explain the basic values, issue, and threats to water, and how climate change is already affecting / and is likely to affect water resources and use
- Describe and assess observed changes in and projected impacts on freshwater systems and resources, especially in Southeast Asian countries
- Analyze how impacts to water resources interact and affect human uses and aquatic ecosystems

2.4. Climate Change and Food Security

At the end of this training session, learners will be able to:

- Explain and analyze how climate change is affecting agriculture and food security
- Propose potential adaptation actions to reduce the negative impacts of climate change on agriculture to ensure food security
- Propose potential improvements in agricultural systems to improve food security while mitigating climate change (i.e., reducing emissions from the agriculture land use sector)

2.5. Climate Change and Human Health

At the end of this training session, learners will be able to:

- Describe the diseases likely to be exacerbated by climate change - from local, regional, and global perspectives
- Identify the most vulnerable people and populations whose health could be affected by climate change
- Propose possible adaptations to climate change-related human health issues, risks, and problems

2.6. Impacts of Climate Change of Vegetation

At the end of this training session, learners will be able to:

- Describe how climate influences the distribution of plants around the world and ways of classifying plant communities.
- Describe the impacts of climate change on vegetation and wildlife, from the level of the individual to the biome level.

III. RESPONSES AND ADAPTATION TO CLIMATE CHANGE

3.1. Climate Change and Forest Management

At the end of this training session, learners will be able to:

- Explain the role of forests in greenhouse gas mitigation as well as in adapting to climate change impacts
- Explain the relevance and importance of key impacts of climate change on forests

3.2. Climate Change and Water Resources: Responses and Adaptation

At the end of this training session, learners will be able to:

- Explain and evaluate how people and ecosystems can adapt to climate change impacts on water resources
- Apply best practices for water resource and watershed protection to effectively adapt to climate change

3.3. Principles and Practice of Climate Vulnerability Assessment

At the end of this training session, learners will be able to:

- Distinguish different concepts of resilience and vulnerability
- Identify important elements and principles of climate vulnerability assessment
- Evaluate and apply the most relevant vulnerability assessment framework
- Interpret climate vulnerability assessment results
- Develop corresponding adaptation strategies

3.4. Dealing with Uncertainties in Climate Change

At the end of this training session, learners will be able to:

- Evaluate the sources of uncertainties associated with projected climate changes; and the sensitivity of natural resources, landscapes and watersheds
- Analyze uncertainties during decision making processes
- Use scenarios, smart adaptive thinking and measures to deal with uncertainties appropriately

3.5. Introduction to Ecosystem Services

At the end of this training session, learners will be able to:

- Explain and apply the framework of ecosystem services in climate change assessment and response
- Describe the basic concepts of the emerging ecosystem markets for carbon and watershed services
- Analyze the role of ecosystem-based adaptation and mitigation solutions

3.6. Introduction to REDD+

At the end of this training session, learners will be able to:

- Explain forest loss trends globally and how it contributes to GHG emissions
- Explain REDD+ and how it addresses climate change mitigation
- Describe the history of REDD+ and key definitions related to its implementation

3.7. Bioenergy and the Forests

At the end of this training session, learners will be able to:

- Explain the roles of forests in bioenergy technology
- Analyze the benefits and adverse impacts of bioenergy
- Describe sustainable forest management in bioenergy
- Propose relevant considerations for policy making

3.8. Communications and Engagement

At the end of this training session, learners will be able to:

- Explain communication process and components
- Analyze the challenges and opportunities in communicating climate change
- Describe six communication principles in climate change
- Apply effective communication when discussing climate change to different types of audience

IV. CURRICULUM MODULE RESOURCES AND TOOLS

Tools

This is a resource area for instructors and students

Videos

Apply practical tools, software, instruments, methods related to climate change issues.

Glossary

Literature

Be familiar with a wide range of tools and knowledge sources for climate change, and how to find them, and how to keep up on new developments.

Exercises

CREDIT HOURS

The Training Unit is responsible for defining the way in which the credit hours are calculated for the Degree and/or Non-Degree program

Grading System

Criteria for Grading

Each university has its own grading system and will apply its existing practice. This proposed grading system is based on the belief that knowledge, skills and attitudes are all important in becoming a good climate change actor. Hence, the assessment criteria are:

Criteria	Grading (points)
Knowledge Necessary knowledge on climate change Final exam (summative-objective)	40
Skills (should be paid more attention) Application of tools, instruments, technology, strategies	40
Attitudes <ul style="list-style-type: none"> • Attendance • Punctuality • Group Participation • Quality of assistance to others • Communication skills • Contribution to the overall training effort • Perceived effort • Preparation for class 	20
TOTAL	100

Criteria for Marks and Certificate/Degree

Percentage	Module Points Required	Marks Awarded	Performance Description	Certificate/Degree Awarded
90 - 100	90 - 100	A	Excellent	Yes
80 - 89	80 - 89	B	Good	Yes
70 - 79	70 - 79	C	Satisfactory	Yes
0 - 69	0 - 69	D	Unsatisfactory	Letter of attendance