



APN CAPaBLE

- Making a Difference -

Scientific Capacity Building & Enhancement for Sustainable Development in Developing Countries

Removing Barriers to Capacity Building in Least Developed Countries: Transferring Tools and Methodologies for Managing Vulnerability and Adaptation to Climate Change

**Final Report for APN CAPaBLE Project:
CBA2007-01CMY-Bambaradeniya**



Removing barriers to capacity building in Least Developed Countries: Transferring tools and methodologies for managing vulnerability and adaptation to Climate Change

Project Reference: CBA2007-01CMY- Bambaradeniya

Final Report submitted to APN

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Overview of project work and outcomes

Non-technical summary

Developing country policy makers, climate change negotiators and the NGO's attending the IPCC negotiations have limited capacities to relate global thinking with local actions. It is essential that they also understand the methodologies and techniques for assessing the impacts of climate change during the negotiations even if the actual scientific assessments could be carried out by trained scientific community. In most of the Conference of Parties (CoPs), representatives from developing countries are at loggerheads when it comes to interpreting and assessing technically available climatic data. Additionally, these policy makers do not have multi-sectoral training to understand the implications and cross-linkages of climate change on various sectors. Considering this, IUCN-The World Conservation Union sorted financial support from Asia Pacific Network for Global Change Research (APN), Japan to organize a regional workshop for LDC member states of South-east Asia (Lao, Cambodia and Vietnam) during the last quarter of 2007. This workshop was intended to build capacity and train policy makers, researchers and the NGO's for understanding issues of Vulnerability and Adaptation to changing climate, and impart relevant knowledge and state of art training to all stakeholders in use relevant tools and technologies. Using the funds received from APN, IUCN was able to leverage additional funding through a fruitful collaboration, which enabled to upscale the workshop to a wider group, including 10 APN member states in Asia.

Objectives

The project originally aimed to:

1. Build sub-region and country-specific knowledge base that is critical for assessing, facilitating and removing barriers to adaptation and resilience to climate change in the LDCs of South and Southeast Asia.
2. Facilitate transfer of technology package kits to climate change negotiators, policy makers, researchers and NGO's from developing nations of Asia on Vulnerability and Adaptation of climate change at the local and regional level.
3. Disseminate lessons learnt and best practice guidelines on community based adaptation strategies through multi-stakeholder consultations

Amount received and number years supported

The Grant awarded to this project was:

- Funding sorted was US\$ 30,000 for 2007-08
- Funding received to-date for 2007-08 is US\$ 24,000

Work undertaken

Subsequent to the approval of funding from APN, IUCN was able to leverage additional funding to upscale the originally planned workshop for a much wider group of participants from the Asia and Africa regions, through a collaboration with UNFCCC, UNITAR and the Government of Indonesia, and hold a training workshop on Developing Adaptation Strategies to Climate Change. Prior to organizing this event, IUCN received approval from APN for the above collaboration.

Results

The four-day workshop was held in the Hyatt Regency Hotel in Yogyakarta, Indonesia, between 30th October – 2 November, 2007, and was attended by 44 participants representing 26 countries in the Asia and Africa regions, including 10 LDC members of APN in Asia. The aims and objectives of the up-scaled workshop, convened under the New Asian African Strategic Partnership (NAASP) framework,

complemented and further enhanced the original objectives of the smaller sub-regional workshop planned under APN funding, and increase benefits to a much wider group.

Relevance to the APN CAPaBLE Programme and its Objectives

The project translated global thinking into local actions through building scientific capacities of local governments by way of transferring technologies and methods to a range of the stakeholders for assessing vulnerability and adaptation to global change process at local levels. The trans-regional consultative workshop that was organized for developing nationals in the Asia and Africa regions, which included 10 LDC members of APN located in Asia (Bangladesh, Nepal, India, Pakistan, Mongolia, Indonesia, Malaysia, Lao, Cambodia, Vietnam), laid emphasis on community based adaptation approaches, encouraged ground level consultations and multi-stakeholder analyses to disseminate tools and technologies for vulnerability assessments, thus complementing the APN Science and Policy Agenda on global change research. The workshop also enabled to enhance the capacity of developing country experts and national teams in developing adaptation strategies with the view of improving the preparation of national communications, NAPAs and to develop fundable adaptation projects. Furthermore, the workshop contributed to increase the ability of participants to formulate national strategy on adaptation, to share perspectives on the significance of integrating adaptation strategies with national planning for sustainable development.

Self evaluation

The project translated global thinking into local actions through building scientific capacities of local governments by way of transferring technologies and methods to a range of the stakeholders for assessing vulnerability and adaptation to global change process at local levels. The regional workshop laid emphasis on community based adaptation approaches, encouraged ground level consultations and multi-stakeholder analyses to disseminate tools and technologies for vulnerability assessments through the regional consultative workshop that was organized for LDC members located in Asia and Africa regions and the project was able to successfully accomplish all the objectives mentioned in the report. A self-evaluation was carried out (see Table below) in relation to each project objective, using the following evaluation grades:

FS – Fully Successful (The Original project objective/output was achieved as planned, in a commendable manner)

S – Successful (The Original project objective/output was achieved as planned, amidst a few constraints that were not envisaged earlier)

MS – Moderately Successful (The Original project objective/output was not fully achieved as planned, due to constraints that were not envisaged earlier)

US – Unsuccessful (The Original project objective was not achieved as planned, due to major constraints that were not envisaged earlier)

Project Objective	Self Evaluation to Date	
	Grade	Description
Build country-specific knowledge base that is critical for assessing, facilitating and removing barriers to adaptation and resilience to climate change	FS	The regional workshop resulted in building capacity in an interactive manner and train policy makers, researchers and the NGO's from 26 countries in Asia (including 10 APN member states in Asia) and Africa regions, for understanding issues of Vulnerability and Adaptation to changing climatic regimes. It also contributed to enhance the capacity of developing country experts and national teams in developing adaptation strategies with the view of

		improving the preparation of national communications, NAPAs and to develop fundable adaptation projects.
Facilitate transfer of technology package kits to relevant personnel	FS	A compilation of background material and resource kit on climate sensitive sectors such as Water, Energy, Health, Agriculture and Biodiversity (WEHAB) as envisaged by WSSD, and climate adaptation, was prepared and disseminated to all participants and resource persons during the workshop.
Disseminate lessons learnt and best practice guidelines on community based adaptation strategies	S	<p>Information compiled were disseminated among the participants. The participants were able to share lessons learnt and best practice guidelines on community based adaptation strategies through interactive discussions during the workshop. The presentations made at the workshop also enabled to highlight best practices in the Asia and Africa region, while additional material were also distributed among the participants.</p> <p>The preparation of the proceedings of the workshop including the full versions of scientific papers was constrained due to delays and non-response in receiving papers from experts and resource personnel who attended the workshop. However, the proceedings compiled into a CD-ROM contains all the full papers received, while a separate CD-ROM includes the best practice guidelines related to community based adaptation strategies and lessons learnt.</p>

Potential for further work

There is tremendous potential to design and implement some pilot projects in Lao, Cambodia and Vietnam, related to managing vulnerability and adaptation to climate change.

Publications

CD-ROMs:

1. Resource Kit on Climate Change and Adaptation
2. Workshop proceedings (including power point presentations, full papers of presentations received)
3. Best practice guidelines and lessons learnt related to community based adaptation strategies

Acknowledgments

We are extremely thankful to APN for providing us with financial assistance under its CAPaBLE Programme to implement this project. We wish to acknowledge the co-financing as well as the technical inputs received from UNFCCC and UNITAR, which enabled to upscale the workshop and involve a much wider group of participants. The support provided by the government of Indonesia in organizing and hosting this event is much appreciated.

Technical Report

Abstract

IUCN (The World Conservation Union) received funding from APN to organize a sub-regional capacity development workshop on tools and methodologies for managing vulnerability and adaptation to Climate Change for three LDC member states of South-east Asia (Lao, Cambodia and Vietnam). The funding received from APN was efficiently used to leverage additional financial and technical support from UNFCCC, UNITAR and the Government of Indonesia, to organize an up-scaled trans-regional workshop for developing countries in Asia and Africa regions, which was held in Indonesia in the last quarter of 2007, and attended by 54 participants from 26 countries, including 10 APN member states in Asia.

1.0 Introduction

The Intergovernmental Panel on Climate Change (IPCC) projects that developing countries will experience the brunt of the impacts of climate change due to the lack of resources and capacity to enable effective adaptation. In Asia, an additional 130 million people across the region could experience severe food and water shortages by 2050 brought about by climate change, while about 1.8 billion Africans will not have enough water by 2080, which could lead to a drop in agricultural revenues by up to 90 percent at the end of the century.

Developing country policy makers, climate change negotiators and the NGO's attending the IPCC negotiations have limited capacities to relate global thinking with local actions. It is essential that they also understand the methodologies and techniques for assessing the impacts of climate change during the negotiations even if the actual scientific assessments could be carried out by trained scientific community. In most of the Conference of Parties (CoPs), representatives from developing countries are at loggerheads when it comes to interpreting and assessing technically available climatic data. Additionally, these policy makers do not have multi-sectoral training to understand the implications and cross-linkages of climate change on various sectors.

Considering this, IUCN-The World Conservation Union sorted financial support from Asia Pacific Network for Global Change Research (APN), Japan to organize a regional workshop for LDC member states of South-east Asia (Lao, Cambodia and Vietnam) during the last quarter of 2007. This workshop was intended to build capacity and train policy makers, researchers and the NGO's for understanding issues of Vulnerability and Adaptation to changing climate, and impart relevant knowledge and state of art training to all stakeholders in use relevant tools and technologies.

Using the funds received from APN, IUCN was able to leverage additional funding through a fruitful collaboration with UNFCCC, INITAR and the Government of Indonesia, which enabled to upscale the workshop to a wider group of participants (44) from 26 countries in the Asia and Africa regions, including 10 APN member states in Asia. The aims and objectives of the up-scaled workshop complemented and further enhanced the original objectives of the smaller sub-regional workshop planned under APN funding, and provided benefits to a much wider group. The aim of the up-scaled collaborative workshop was to enhance the capacity of developing country experts and national teams in developing adaptation strategies with the view of improving the preparation of national communications, NAPAs and to develop fundable adaptation projects.

Objectives

The objectives of the originally planned workshop (as elaborated in the proposal submitted to APN for funding) for three LDC countries in south-east Asia included the following:

- a. Build country-specific knowledge base that is critical for assessing, facilitating and removing barriers to adaptation and resilience to climate change among APN LDCs members of South Asia.
- b. Facilitate transfer of technology package kits to climate change negotiators, policy makers, researchers and NGO's from developing nations of Asia on Vulnerability and Adaptation of climate change at the local and regional level.
- c. Disseminate lessons learnt and best practice guidelines on community based adaptation strategies through multi-stakeholder consultations

The aims and objectives of the up-scaled collaborative workshop complemented and further enhanced the above objectives of the smaller sub-regional workshop planned under APN funding. The up-scaled workshop was expected to increase the ability of participants to formulate national strategy on adaptation, to share perspectives on the significance of integrating adaptation strategies with national planning for sustainable development. In particular, the workshop aimed to achieve the following:

- a. To reinforce regional and country-specific knowledge base that is critical for assessing, facilitating and removing barriers to adaptation and resilience to climate change in the Asia and Africa regions, in particular, the Least Developed Countries;
- b. To provide tools and methodologies on vulnerability and adaptation assessments of climate change at the local and regional level;
- c. To share lessons learnt and best practices on adaptation strategies and knowledge, experiences, and difficulties/constraints in the preparation and implementation of strategies for national adaptation programmes of action.

2.0 Conference Outputs and Outcomes

A. Main outputs (products)

A summary of the main products related to the conference is highlighted below:

Output	Details
Resource Kit on Climate Change and Adaptation (CD-ROM)	Background information on climate change, policy documents, and its impacts on biodiversity, human health, water, energy, agriculture, and aspects related to adaptation + extensive bibliography
Workshop proceedings and best practice guidelines and lessons learnt on adaptation (CD-ROM)	Power-point technical presentations related to each day; full papers of technical presentations; photographs related to each day; Best practice guidelines and lessons learnt related to community based adaptation strategies in the developing as well as developed countries
Workshop report	A summary of the proceedings of each day of the workshop

B. Outcomes of the workshop

The four-day trans-regional consultative workshop (see appendix 1 for agenda) that was organized for developing nationals in the Asia and Africa regions, which included 10 LDC members of APN located in Asia (Bangladesh, Nepal, India, Pakistan, Mongolia, Indonesia, Malaysia, Lao, Cambodia, Vietnam), laid emphasis on community based adaptation approaches, encouraged ground level consultations and multi-stakeholder analyses to disseminate tools and technologies for vulnerability assessments, thus complementing the APN Science and Policy Agenda on global change research (see appendix 2 for list of participants). The workshop also enabled to enhance the capacity of developing country experts and national teams in developing adaptation strategies with the view of improving the preparation of national communications, NAPAs and to develop fundable adaptation projects. Furthermore, the workshop contributed to increase the ability of participants to formulate national strategy on adaptation, to share perspectives on the significance of integrating adaptation strategies with national planning for sustainable development. The participants were also able to establish useful networks with each other to share experiences, and useful contacts with the resource personnel for relevant guidance in the future (see appendix 3 for list of resource personnel).

During the proceedings of the workshop, the participants were able to get involved in two group discussions. The first discussion focused on lessons learned in vulnerability and adaptation assessments, which enabled to identify the following related to developing nations:

- Adaptation priorities, challenges and gaps
- Emerging trends: transition from the vulnerability analysis to how the information assists in identifying climate change priorities
- Gaps in terms of our current knowledge
- Needs for data, analytical tools, and interpretation

The second group activity involved the development of three adaptation related projects, in a participatory manner; for the coastal zone, for agriculture and food security in drought prone areas, and for agriculture and food security in flood prone areas. Each group was recommended to consider cross-cutting issues e.g. livelihoods, health, capacity-building, gender, and public awareness. The groups were able to identify key issues and impacts related to climate change on their focal area, and propose measures to avoid impacts and options for adaptation, where they prioritized interventions using a set of suitable criteria, and a scoring matrix. They were able to design the objectives of the prioritized project, identify key outcomes and activities, and propose an institutional arrangement and recommendations to move forward.

Further details related to the workshop are presented in the workshop report (see Annex 5).

3.0 APN-Funded Participants

The funds received from APN were used to support the participation of seven participants from Vietnam, Laos and Cambodia (see Table below). In addition, the APN funds were also utilized to cover the expenses (ie., travel and per diem) of three resource personnel from IUCN in Asia (Dr. Channa Bambaradeniya, Dr. Ainun Nishat and Dr. Sriyanie Miththapala).

Name of Delegate	Designation	Organization	Email/Tel/Fax
VIETNAM			
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4.0 Conclusions

Based on the discussions and group work activities among participants who attended the workshop, it was clear that there are many opportunities to design and implement community based climate adaptation strategies related to sectors such as water, energy, health, agriculture and biodiversity. Several projects have already been implemented in LDC's in Asia and Africa regions, which offers opportunities to learn lessons, and improve the implementation of future projects. The participants from LDC's emphasized the following key points, in relation to climate change adaptation:

- The need to integrate community based climate adaptation strategies into national development programmes and stressed the value of sharing lessons learnt through pilot projects.
- The need to provide adequate funds to support the implementation of adaptation programs.
- The need to establish and operationalize an Adaptation Fund as soon as possible (wanted this to be raised during the COP 13 meeting at Bali).

The participants also reached the following conclusions, in relation to the transfer of tools and methodologies for managing vulnerability and adaptation to climate change:

- The global climate change models/data should be down-scaled to regional/national/local levels.
- Open access to available data through clearing house mechanisms/platforms at international, regional and national level
- Relevant information should flow from expert level to local level and vice-versa.
- Infrastructure for sharing of tools is an important pre-requisite.
- The need to have translation mechanisms to translate global scientific models and information into local level for awareness raising
- The need to establish early warning systems at local level
- The need to have centers of excellence at sub-regional level, for training and capacity development

References

IPCC (2007). *Climate Change 2007: Synthesis Report*. United Nations Environmental Programme (UNEP).

Appendices

Appendix 1: Agenda of Training Workshop on Developing Adaptation Strategies for the Asia and Africa Regions, Yogyakarta, Indonesia (30 Oct. – 2 Nov. 2007)

Day 1: 30 October, Tuesday

Registration	8:30 - 9:00
Opening	9:00 -9:45
Chairperson: Mr. Salman Alfarisi, Director, Department of Foreign Affairs	
Opening remarks Mr. Yolando Velasco, UNFCCC secretariat Ms. Annie Roncerel, UNITAR Dr. Channa Bambaradeniya, The World Conservation Union (IUCN) Welcome remarks Mr. Primo Alui Joelianto Director-General for Asia, Pacific and African Affairs	
Coffee/Tea Break	9:45 -10:00
Departure for field visit	10:00
Project briefing and site visit: Site 1: Karangdowet Forest plantation Site 2: Wanagama forest plantation	11:30 -13:00
Presenter: The objective of this session is to showcase a community-based adaptation project through reforestation and management of degraded landscapes. At the project site, participants will be briefed about the background of the project and its benefits to the local community. The briefing will also outline tools/methodologies used in developing vulnerability and adaptation assessments including the use of geographic information systems and remote sensing.	
Lunch Break	13:00 -14:00
Project briefing and site visit (continuation)	14:00 -15:00
The Wanagama Reforestation Experience (and its role in adaptation and mitigation of climate change impacts) Prof. Mohomed Naiem	
Impacts of climate change	15:00 -17:00
Chairperson: Ms. Dewi Wahab, Department of Foreign Affairs Water and agriculture (Dr. Ainun Nishat, IUCN Bangladesh) Coastal resources (Dr. Don McIntosh, Mangrove for the Future) Biodiversity (Dr. Channa Bambaradeniya, IUCN) Livelihoods (Ms. Kai Kim Chiang, SEI Bangkok)	
Questions and Answers	17:00 -17:30
Departure for the hotel	17:30

Day 2: 31 October, Wednesday

Day 2 Reflection – feedback on issues to address during day 1	9:00 – 9:15
Discussion session (Carousel session)	9:15 – 10:45
Lead facilitator: Dr. Sriyanie Miththapala, IUCN	
Small group discussion session (rotating groups) to focus on lessons learned in vulnerability and adaptation assessments. Intended session outcomes: <ul style="list-style-type: none"> o Discussed status of vulnerability adaptation assessments o Identified adaptation priorities, challenges and gaps o Identification of emerging trends: transition from the vulnerability analysis to how the information assists in identifying climate change priorities o Identify the gaps in terms of our current knowledge o Identify the needs for data, analytical tools, and interpretation 	
Coffee/Tea Break	10:45 – 11:00
Plenary and summary	11:00 – 11:30
The reports by rapporteur from each group outlining key lessons-learned, issues and challenges and recommendations identified during the small group discussions. Reflection by the facilitator of key points	
Overview of Adaptation strategies in the context of the Convention	11:30 – 12:30
Chairperson: Dr. Channa Bambaradeniya (IUCN)	
Presenters: Mr. Yolando Velasco (UNFCCC secretariat) – National Communications Ms. Annie Roncereál (UNITAR) – National Adaptation Plan of Action	
The objective of this session is to provide the participants with an overview of the need to develop adaptation strategies in the context of national communications, National Adaptation Programmes of Actions and preparing robust adaptation projects.	
Lunch	12.30 -1.30
Key issues to consider when establishing a link between climate variability and change	1:30 – 2:00
Presenter: Ms. Fernanda Zermoglio, SEI Bangkok	
Questions and Answers	2:00 – 2:15
Parallel Sessions 1: 2.15 – 3:30	

Tools/methodologies in developing adaptation strategies	Formulation of NAPA steps 2–8
<ul style="list-style-type: none"> Tools and approaches in developing adaptation strategies for coastal zones, agriculture, water and health. <p>Resource persons: Dr. Sriyanie Miththapala Dr. Ainun Nishat Mr. Mozarul Alam,</p>	<ul style="list-style-type: none"> Status of NAPA/team posters Introductory remarks on climate change risk assessment, leading to adaptation options and project profiles (steps 5–8) <p>Resource persons: Ms. Fernanda Zermoglio Ms. Kai Kim Chiang</p>
Parallel Sessions 1 (continuation): 3:30 – 4:00	
<ul style="list-style-type: none"> Exercise in developing adaptation strategies 	<ul style="list-style-type: none"> Practical exercise using NAPA Technical Sheets steps (2–8)
Coffee/Tea Break	
Climate risk assessments	4:15 – 4:45
Presenter: Ms. Fernanda Zermoglio, SEI -Awhere	
The objective of this session is to provide the participants with an overview of the tools/methods used in assessing disaster risks in the context of climate change and climate variability. The session includes exercise in application of tools/ methodologies such as geographic information system and remote sensing.	
Integrating climate adaptation strategies into national development programmes	16:45 – 17:15
Presenter: Mr. Mozarul Alam, Bangladesh Center for Advanced Studies	
The objective of this session is to present examples through case studies on approaches and process in integrating climate adaptation programmes into national development programmes. This session will also discuss institutional and policy arrangements needed for integration.	
Questions and Answers	17:15 – 17:45
Plenary and summary	17:45 – 18:00

Day 3: 1 November, Thursday

Day 3 Reflection – feedback on issues to address during day 2	9:00 – 9:15
Costing adaptation projects and programmes	9:15 –9:45
The objective of this session is to present challenges in costing adaptation and to provide an overview of tools/approaches that may be used in costing adaptation projects.	
Coffee/Tea Break	9:45 – 10:00
Exercise in costing adaptation projects	10:00 – 11:00
Screening adaptation projects	11:00

	– 11:30
The objective of this session is to provide the participants with an overview of the screening tools developed in the context of assessing adaptation projects.	
Discussion on financing options for adaptation projects and programmes	11:30 – 12:00
Presenter: Mr. Mozarul Alam, Bangladesh Center for Advanced Studies The objective of this session is to provide the participants with options for financing adaptation projects and programmes through public and private sector funding. The agencies will present their overall strategies (criteria and format) for eligible funding	
Questions and Answers	12:00 – 12:30
Lunch Break	12:30 – 13:30
Parallel Sessions 2: 13:30 – 17:30	
Developing adaptation projects	Application of NAPA steps 8
<ul style="list-style-type: none"> Reviewing adaptation strategies to identify adaptation project proposals (livelihood, coastal zones, water sector, agriculture, health, early warning/disaster management). Work with representatives of bilateral and multilateral agencies and international organizations. 	<ul style="list-style-type: none"> Technical needs to analyze the development and preparation of project profiles Hands-on work (Steps 2 – 7 and 8)

Day 4: 2 November, Friday

Day 4 Reflection – feedback on issues to address during day 3	9:00 – 9:15
Parallel Session 2 (continuation): 9:15 – 11:00	
<ul style="list-style-type: none"> Poster presentation and feedback-giving of project proposals 	<ul style="list-style-type: none"> Technical needs to analyze impacts and methods to address issues. Review work plans/action for final NAPA formulation
Exchange of views on technical support needs	11:00 – 11:30
This session will involve identifying skill-gaps of participants in developing adaptation strategies and in preparing adaptation project proposals.	
Workshop summary and evaluation	11:30 – 12:00
Facilitator reflection Panel discussion on key outcomes from the workshop.	
Workshop closing session	12:00 – 12:30
Closing remarks Representative from Government of Indonesia Mr. Yolando Velasco, UNFCCC secretariat Ms. Annie Roncerel, UNITAR Dr. Channa Bambaradeniya, The World Conservation Union (IUCN)	

**Appendix 2: Training Workshop on Developing Adaptation Strategies to Climate Change for Asia and Africa Region
Yogyakarta, 30 October – 2 November 2007**

List of Workshop Participants

No.	Name of Delegate	Designation	Organization	Email/Tel/Fax
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Appendix 3 : Training Workshop on Developing Adaptation Strategies to Climate Change for Asia and Asia Region, Yogyakarta, 30 October – 2 November 2007: List of Resource Persons

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Appendix 4: Training Workshop on Developing Adaptation Strategies to Climate Change for Asia and Africa Region, Yogyakarta, 30 October – 2 November 2007: Funding sources outside APN

Agency/Institution/Organization	Amount (US\$)
IUCN (The World Conservation Union)	(In-kind): 5,375
IUCN Mangroves For the Future Initiative (MFFI)	Co-funding: 20,000
UNFCCC	Co-funding: 30,000
United Nations Institute for Training and Research (UNITAR)	Co-funding: 60,000
Government of Indonesia	In-kind + co-funding (unknown)

**Training Workshop on Developing Adaptation Strategies to
Climate Change for Asia and Africa Region
Yogyakarta, 30 October-2 November 2007**

The programs consisted of presentations of resource persons from UNFCCC Secretariat, UNITAR, IUCN, Stockholm Environmental Institute, Global Environmental Facility (GEF), United Nations Development Programme (UNDP) and group discussions to provide a focused elaboration on certain issues. A Field visit to Karangduwet Forest and Wanagama Forest was conducted during the first day of the workshop, to understand aspects related to a community-based reforestation initiative, as a climate adaptation as well as a mitigation strategy.

Day 1: 30 October 2007

Opening Ceremony

The Workshop was officially opened by H.E Rezlan Ishar Jenie, Director General for Multilateral Affairs, The Department of Foreign Affairs of the Republic of Indonesia. His opening remarks was preceded by introductory remarks by Yolando Velasco, Official from the UNFCCC Secretariat, Ms. Annie Roncerel, UNITAR, and Dr. Channa Bambaradeniya, World Conservation Union (IUCN). The Welcoming remarks was delivered by Ms. Suhartuti Sutopo, Assistance for Facilitation and Investment from the Special Province of Yogyakarta representing the Governor of Yogyakarta.

In his opening remarks, The Director General of Multilateral Affairs emphasized that climate change has impacted all countries particularly developing countries due to their vulnerability, inadequate means and limited capacities to adapt to climate change. There is a need to managing the unavoidable changes in climate change both by promoting adaptation and by building capacity. He stressed the need for immediate action by the international community to strengthen its commitment for global as well as regional cooperation to address the adverse impact of climate change.

Delivering her welcoming remarks, Ms. Suhartuti Sutopo highlighted various forms of climate change related impacts that occur around Yogyakarta. The adverse effects of climate change affecting agriculture and fishing sectors, threatens people living on the southern coast of Yogyakarta. She also stressed that the Government of the Special Region of Yogyakarta is well aware of the issue of climate change that touches the concerns of the people living in the region.

Field Visit

The Opening ceremony was followed by a field visit to Karangduwet Forest and Wanagama Forest located at the southern part of Yogyakarta. The objective of this visit is to showcase a community based adaptation project in both forests. The participants were welcomed and briefed by Prof. Na'iem, attached to Gajah Mada University, on the success story of Wanagama Forest which was previously a barren land. Furthermore, Prof. Na'iem presented the environmental and socio-economic benefits of the Wanagama Forest, and highlighted the watershed value of the forest which enables to provide water for local people in the area.

Presentations and Discussions

Following the site visit, a technical session was held, where several resource

persons presented a number of key issues on the impact of climate change. The sessions was chaired by Ms. Dewi Wahab, official from the Department of Foreign Affairs. Dr. Sriyanie Miththapala, IUCN presented the impact of climate change on coastal resources. The presentation stressed on the coastal and marine resources which are prone to adverse impacts of climate change. The negative impacts vary from higher sea temperature, sea level rise, increase of carbon dioxide in the sea, salinity intrusion and floods in wetlands which affect the livelihoods, leaving coastal communities more vulnerable to natural disasters.

Dr. Channa Bambaradeniya of IUCN highlighted the impact of climate change on bio-diversity and stressed the need to have conservation planning based on adaptive management strategies, which considers the observed trends in biodiversity, revisit current protected area coverage at national, regional and global level in order to meet the changes in distribution patterns of species related to climate change as well as to monitor biodiversity at a national and regional level using suitable indicators.

The next speaker was Dr. Ainun Nishat who highlighted the effect of climate change on water and agriculture. He elaborated the impacts on agriculture, including total reduction in precipitation, high evaporation loss of moisture from soil and prolonged drought.

The session was concluded by the presentation from Dr. Kai Kim Chiang, Stockholm Environment Institute in Bangkok on effects of climate change to livelihoods. Dr. Kai comprehensively elaborated the livelihood terminology which have five forms of livelihood assets i.e. human, natural, social, financial and physical capital. Impacts on livelihood activities, such as tourism, thus limiting diversification of opportunities which combined with damage to infrastructure and other types of physical capital, will affect the community particularly the poor. The lack of social and political capital, along with extreme limited access to financial capital, means that the communities are least likely to be protected by investment infrastructure or disaster mitigation and relief systems.

Day 2: 31 October 2007

On the second day, the participants were divided into small groups for a discussion session using a 'Carousel' format (circulation of groups in different work stations) to focus on lessons learned in vulnerability and adaptation assessment. The Session was facilitated by Dr. Sriyanie Miththapala and intended to have outcomes on several key issues related to vulnerability and adaptation assessment. Participants were requested to respond to questions regarding adaptation and vulnerability, and comment on the responses of the previous group. Each station was assisted by one facilitator and a rapporteur. During the discussions, the participants identified vulnerable sectors in respective countries, namely agriculture, water resources and forestry, health, livelihood and biodiversity. In response to adaptation strategies, some priorities have been made i.e manage impact of climate change; protect people, livelihood, preparedness to cope with the risk of disasters (see annex 1 for outcomes of group discussions).

Mr. Yolando Velasco, UNFCCC Secretariat, presented an overview of adaptation strategies in the context of the climate change convention. He highlighted the COP 8 decision 17 which encouraged non Annex 1 party to provide information on scope of vulnerability, adaptation assessment and identifying critical vulnerable areas. They are also required to describe approaches, methodologies and tools. The need for policy frameworks such as national adaptation programmes, the national communication needs to communicate findings on vulnerability and adaptation, identify who and what is vulnerable, what need to be done et., were

highlighted. Hence, the challenges on adaptation strategies in national communications were to integrate outcomes of national communication into national development programmes. Also the need to enhance bottom up approach was emphasized.

Annie Roncerel of UNITAR, in her presentation, highlighted the process of the National Adaptation Programmes of Actions (NAPA) which should focus on the establishment of a national team. The recommended NAPA steps are (i). build multidisciplinary team, (ii) synthesize materials, (iii) participatory vulnerability assessments, (iv) consult stakeholders and public, (v) compile potential NAPA activities, (vi) prioritize criteria, (vii) screen NAPA activities, (viii) rank activities and (ix) create project profiles. The presentation also highlighted how to develop a project profile and submit NAPA project.

During the parallel sessions, participants were divided into groups to discuss tools/ methodologies in developing adaptation strategies and the formulation of NAPA. The former discussed tools and approaches in developing adaptation strategies for agriculture, water and biodiversity sectors. The latter discussed the policy introduction and status of NAPA posters / team posters. Discussion on tools/methodologies in developing adaptation strategies, the presenters explained the definition of framework, methodology and tools. There are currently four approaches in adaptation policy frameworks namely hazard, vulnerability, adaptive capacity and policy based approaches. These approaches are not self exhaustive. Top down approach was to facilitate negotiation, locate impacted region through impact analysis and bottom up approach is emerging to address impact facilities development through development. Poverty reduction as starting point to design adaptation project is also emerging.

Dr. Ainun Nishat of IUCN made a presentation on tools and approaches for adaptation strategies on water and agriculture. He stressed the need to develop adaptation strategies for this sector since events were already occurring. The probable adverse impacts on water – hydro meteorological events – i.e increase in drought, occurrence of short duration heavy rainfall, rise in temperature will be likely happening, not to mention the other impacts i.e sea level rise, increase in river erosion, coastal erosion, cyclonic weather. Adaptation strategies on water could be developed through flood management infrastructures, disaster management capacity, erosion control measures, watershed and management to reduce soil loss

In the discussion on the formulation of NAPA, participants shared their experiences on NAPA status in their respective countries. Vulnerable sectors have been identified such as water resources, agriculture, health and biodiversity. In developing NAPA, countries have been facing obstacles related to lack of technical skills, human resources, data and equipment to measure climate change. In some countries political instability also jeopardized the NAPA process.

Day 3: 1 November 2007

The first morning presentation was given by Dr. Mozaharul Alam on integrating climate adaptation strategies into national development programmes. The development programs, in many cases, may go hand in hand with adaptation strategies to address climate change, but usually in short-term strategies only. Therefore, it is important to integrate national adaptation strategies into long-term national development programmes. This has been implemented by Bangladesh which has integrated its adaptation strategies into national, local and sectoral development programs. At the national level, the integration is implemented at the formulation of National Adaptation Programme of Action (NAPA) by identifying

immediate and urgent adaptation needs. At the sectoral level is by building awareness and capacity building in early stage. At the local level the community should be involved and welcomed aboard in the decision making process.

Alex Heikens from UNDP delivered a presentation on Indonesia climate change adaptation strategies and programmes. Lack of awareness and action were considered as main obstacles in developing adaptation strategies and programmes in Indonesia. Therefore, strengthening national capacity is a matter of priority. In strengthening national capacity coordination is generally regarded as the most challenging issue where priorities must be set and agreed upon. In this regard, political consensus and multi sectoral policy coordination, national support as well as long term adaptation programme are identified as a priorities. Mr. Heikens also underlined the need to incorporate adaptation strategy into the medium and long term development process as part of national agenda.

The session continued with the presentation by Ms. Annie Roncerel of UNITAR on behalf of Ms. Bonizella Biagini (Global Environment Facility or GEF) on financing mechanism under GEF. The GEF is a multilateral environmental financing mechanism established by 1994 international agreement, is implemented by the World Bank, UN agencies, regional development banks, IFAD, FAO and currently managed \$1 billion worth of fund in 2007-2010. Projects funded under GEF financial mechanism are located in Africa, Latin America and Pacific Islands. Three types of GEF mechanism are SPA or Adaptation Project funded from GEF Trust Fund, the Special Climate Change Fund (SCCF) and Least Developed Country Fund (LDCF). The financial mechanism under LDCF imposes additional fund earmarked for vulnerable countries to meet their immediate adaptation needs. Unlike GEF Trust fund which requires submissions every three months at fixed dates and approval during council meetings twice a year, the LDCF funds is based on rolling based submission and no-objection-based approval. No incremental costs apply but only additional costs on top of the baseline scenario (development project).

The GEF discussion session started with the comment from Mr. Taito Nakelevu from the Secretariat of the Pacific Regional Environment Programme (SPREP) who explained several funds are currently managed by the Secretariat. Using Samoa as country experience, Taito informed that Samoa is using the GEF Trust Fund RAF. The Strategic Priority on Adaptation SPA is a special window to adaptation financing, but currently only small amount of fund available. Both funds are managed by the Board of the GEF, while others [LDC Fund (LDCF) and Special Climate Change Fund (SCCF)] managed by the UNFCCC Secretariat. – see diagram in Annie Roncerel's GEF presentation. Mr. Nakevalu also mentioned other source of funding such as the clean development mechanism (CDM) - that has a very specific definition regarding to reforestation and aforestation. To go on with those two tasks, need to check how CDM defines both concepts.

In developing adaptation strategy, a number of specific approaches have been identified such as developing local adaptation strategies, improve the knowledge-base, effective utilization of climate variability and initiate national dialogue to engage all stakeholders. In mobilizing resources for adaptation projects national and local budgets, overseas development assistance, corporate social responsibilities and GEF are the main sources for financing adaptation projects.

During the course of discussion participants emphasized the need to involve Ministry of Finance in terms of mobilization of funds. In the case of Indonesia, the presenter stated the supportive role of Ministry of Finance in setting up a task force to analyze the impact of climate change to the financial resources. Participants also underlined the importance to have synergy between Environment Ministry and National Disaster Management Agency.

Taito Nakalevu, representing the Secretariat of the Pacific Regional Environment Programme (SPREP), introduced the Developing Adaptation Projects from a Technology Transfer perspective. This perspective is still relevant to both adaptation and mitigation projects to countries who wish to undertake. The existence of Expert Group on Technology Transfer (EGTT), as one of the organization specialized in the sector, was established as part of the technology transfer framework and the Marrakech Accords. It provides advice to the COP through the UNFCCC Secretariat on Technology Transfer issues. The Technology Transfer Framework has five key themes and areas namely technology needs and needs for assessments; technology information; enabling environments; capacity building; mechanisms for technology transfer.

GEF project development from the incremental cost and additional cost analysis was also briefly explained by Taito, especially in the context of determining baseline which will be the development cost and the additional adaptation cost to be funded by the GEF. The third day of the Training Workshop ended with group discussion on developing adaptation strategies and application of NAPA project profiles. The former discussed on the review of adaptation strategies to identify adaptation project proposal (livelihoods, coastal zones, water sector, agriculture, health, early warning disaster management) and the latter discussed on technical needs to analyze impact and method to address issues.

Day 4: 2 November 2007

The last days' events started with the resumption of group discussions on developing adaptation strategies. The participants found many useful key outcomes from the discussion among others adaptation options and recommendations for the project proposal on several sectors namely livelihoods, coastal zones, water sector, agriculture, health, early warning disaster management. Discussion on NAPA project profiles produced substantive inputs to participants on technical aspects to analyze impacts and methods and hands-on work. Participants highlighted the importance of coordination among participants of a country who have attended various global as well as regional workshops in order to have synergy.

The training workshop on developing adaptation strategies was closed by the Deputy to Director General of Asia, Pacific and Africa Regions, Ms. Kenssy D. Ekaningsih. On her closing remarks, she emphasized the importance of adaptation issues, particularly to countries of the Asia and African Region. She said that the Yogyakarta's meeting was rich with lively discussions, and enabled to share among countries the need to develop National Adaptation Programs of Actions (NAPA), and lessons learnt on how to integrate adaptation strategies to national development program, the opportunity to gain knowledge on the different tools/methods used in assessing climate risks and developing adaptation strategies. Indonesian participants gained remarkable knowledge in developing a long-term adaptation strategy. In conclusion, she highlighted the need to provide adequate funds to support the implementation of adaptation programs. It is in this context that there is an urgent need to operationalize the Adaptation Fund as soon as possible. Therefore, she hoped that this would be raised during the Bali Meeting, in order to adopt a decision related to this issue.

ANNEXURES TO WORKSHOP REPORT:

ANNEX 1: Summary of group discussions (Carousel session) on lessons learned in vulnerability and adaptation assessments

Group 1 TASK: Identify adaptation priorities

Facilitator: Mr. Taito Nakevelu

Rapporteur: Dr. Ainun Nishat

The topic was divided into 4 sub-topics for discussion.

Sub-topic: What is adaptation?

- Process to cope with as well as to live with adverse impacts of climate change and climate variability by lowering vulnerabilities, minimisation of risks and improving resilience.
- Protection of people from natural disasters and extreme events resulting from climate change, and, ensure food security and livelihoods through people focussed strategies.
- Preparedness of people from risk of disasters and enhancement of coping capacities

Sub-topic: Current priorities

- Climate modelling to scale down from global level to local level.
- Development of early warning system
- Reforestation and afforestation of forests; mangrove afforestation (rehabilitation) in coastal belt and around small island countries.
- Campaign to save fresh water and improve water management practices.
- Improve on disaster management capacity – flood, drought, erosion etc.
- Constructions and maintenance of flood embankments and coastal dykes.
- Address issues related to desertification and rehabilitation of degraded land.
- Formulation of National Climate Change Strategy and integration of climate change concerns into all pertinent sectors including food security.

Sub-topic: Gaps

- Climate models scaled down to country and local levels.
- Lack of awareness at community level.
- Tools and methodologies to develop coping strategies
- Baseline data (data base) for all ecosystems.
- Vulnerability assessment in all regions.
- Sensitization of media.
- Development projects do not consider climate change as an issue.
- Early warning system.
- Direction of research.

Sub-topic: Challenges

- Finance and resources for actions/ activities/ projects.
- Mainstreaming "Adaptation" in national planning.
- Climate change tolerant varieties of seeds of crops.
- Population growth
- Expertise in climate change studies and modelling.
- Climate change and livelihood nexus and linking up with PRSP.
- Baseline information and development of maps
- Flow of information from expert level to local level and vice-versa.
- Sharing of experiences at regional level.
- Capacity for implementation
- Climate Change Champions are not there.
- GO-NGO collaboration and inter-institutional coordination and cooperation.

GROUP 2 TASK: Identification of emerging trends: transition from the vulnerability analysis to how the information assists in identifying climate change priorities

What are the emerging trends at country level?

- frequency of extreme events with the associated economic losses-
- flash floods
- coastal erosion
- increased desertification and drying up
- glacial retreat
- negative impacts on tourism, biodiversity, health (new diseases and epidemics), and infrastructure
- changing migration patterns
- salination of ground water
- increased uncertainties in predicting floods , rainfall and other phenomena
- increased disaster preparedness concerns particularly community-based
- institutional strengthening efforts including in the financial sector
- increased peatland management and other land use management
- increasing public awareness of climate change and possible measure to respond
- realization that there are gaps between national assessed impacts and the ipcc findings

How is the available information and data assisting to identify climate change priorities?

- seasonal forecasts at country level have proved useful
- in many cases there is no appropriate data and information – thus a need to build institutions to generate information
- data is missing in many cases
- there are gaps in information flows
- there is a need for regional and local climate scenarios
- a need to
 - to strengthen observation networks
 - disaggregate information for local level usage
 - forge synergies among institutions
- a need for appropriate tools and analysis
- a need to update v&a assessment in the light of the ipcc findings

What options are available to obtain socio-economic information relevant to climate change?

- use census data (although it has to be updated and formatted)
- obtain disaster preparedness data
- use statistical bureaus and yearbooks
- a need to mobilize universities and research institutions to obtain this information
- obtain indigenous information and knowledge and create inventories
- obtain sectoral and business data as well as livelihoods
- use data from hdrs, prsps and other major sources (caution- inconsistencies between data from international sources and national data)
- undertake data integration for climate change purposes
- generate scenario data

GROUP 3 TASK: Identify the gaps in terms of our current knowledge

Facilitator Annie Roncerel

Rapporteur: An Bollen

Summary:

1. Need to **downscale** global CC models/data to regional/national/local levels (average values of large regions are not detailed enough to base decisions on)
2. **Lack of data:** both quality (incompatibility, different georeferencing) and quantity (number of stations)
3. Need for **cross sectoral analysis** (water, health, agriculture, fisheries, forestry etc.) and **multidisciplinary teams** for analyses (not just meteorologists but also experts on other environmental, social and economic issues). This includes identifying relevance/role of climate change within multiple drivers responsible for certain impacts. Understand clearly the cause-effect relationships that trigger cascading effects.
4. Translating **science into policy level** (practical for developing strategies and implementation)
5. Overcome barriers to develop **both long and short term CC adaptation** strategies and the role of different levels of the government (f.ex. central vs local government)
6. **Lack of funding** for CC Adaptation research and project implementation
7. **Both top down and bottom up awareness raising** of CC adaptation): national level CC issues need to be translated down to community level and experience from related traditional knowledge or cultural practices locally should be integrated in natl policies
8. **Lack of capacity** 1) Government –lack of human capacity and institutional framework, 2) Local communities in dealing with CC adaptation on the ground

Group 4 Task: Identify the needs for data, analytical tools, and interpretation

Facilitator – Fernanda Zermoglio (SEI)

Rapporteur – Channa Bambaradeniya (IUCN)

Prioritisation of needs (Order)

Interpretation tools > Analytical tools > Data availability

Data needs (issues)

- Need to understand the minimum data requirements (under different sectors such as water, agriculture, forestry etc.)
- Access to available data (clearing house mechanisms at international and national levels, platforms)
- Systematic data records
- Infrastructure to collect data

Tools:

- Downscaling of Global Climate Change Models to Regional/Local level
- Infrastructure for sharing
- Impact models

Interpretation tools:

- Translation mechanisms to translate global scientific models and information into local level for awareness raising
- Understanding links

Crosscutting and overriding needs:

- Funding requirements
- Capacity needs for data, tools and analytical aspects

Other cross-cutting issues

- Government willingness, support and commitment is inadequate in some countries

Suggestions:

- Centers of excellence for training

Annex 2: Summary of group work related to adaptation projects

(A) COASTAL ZONE GROUP

Issues and impacts related to climate change:

1. Sea level rise
2. increased frequency of extreme events in the coastal zones
3. coastal erosion
4. salinity intrusion
5. coral bleaching
6. decline in fish catch
7. impact on coastal tourism
8. increase of sea surface temperature
9. loss of marine bio diversity, agriculture, fisheries, infrastructure, tourism
10. impact on coastal wetlands
11. productivity of the seas as a system
12. coastal agriculture

SEA LEVEL RISE	EXTREME EVENTS	RISE IN SURFACE TEMPERATURE	COASTAL MARINE BIO DIVERISTY, AGRICULTURE, FISHERIES, INFRASTRUCTURE TOURISM, HEALTH
<ol style="list-style-type: none"> 1. Coastal Erosion 2. Salinity Intrusion 3. Impact on Mangroves 4. Flooding 5. Livelihood 6. Fishing 7. land loss (Countries + culture may disappear) 8. change in land use in availability of fresh water 	<p>Cyclones, storm surges, strong wind, short heavy rainfall</p> <ol style="list-style-type: none"> 1. lost off lives and livelihoods, (catastrophic) 2. nfrastructure damage 	<ol style="list-style-type: none"> 1. Coral bleaching 2. Depletion of fish stock 3. Promote IAS creating loss of bio diversity 4. Primary productivity - plankton reduced 	<ul style="list-style-type: none"> - change in population dynamics of bio Diversity - lost of crop - decline in fish catch (tropics) - -displacement, adjustment and rehabilitation of infrastructure - Population migration - increase in water range.

MEASURES TO AVOID IMPACTS

SEA LEVEL RISE	EXTREME EVENTS	SURFACE TEMPERATURE	COASTAL MARINE BIO DIVERISTY, AGRICULTURE, FISHERIES, INFRASTRUCTURE TOURISM, HEALTH
<ul style="list-style-type: none"> - No measures presently - Rock Armoring (sea wall) - Land reclamation - Research 	<ul style="list-style-type: none"> - Early warning system - Mangrove replantation - Building codes/good practice - Evaluation awareness activities - Research 	Research	Research

Adaptation Options

1. Sea Wall/Sea Dyke	<ol style="list-style-type: none"> 1. Strengthen forecasting 2. strengthen early warning sytem 3. education, awareness and public participation 4. Regional cooperation and coordination 	<ol style="list-style-type: none"> 1. Establish sea surface temperature 2. Temperature seasons 3. Technology transfer in managing IAS 	<ol style="list-style-type: none"> 1. Increasing number of marine protected areas 2. Climate tolerant crops 3. Diversification of economic activity 4. Develop building codes (eg. Heat resistant buildings) 5. Desalination plants 6. Introduce marine aquaculture 7. R and D on health and warning
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CRITERIA FOR PRIORITIZATION OF INTERVENTIONS

1. Lives and livelihood saved	10
2. Visibility	6
3. Feasibility – socio economic (Social + cultural acceptance level of population)	9
4. Ecosystem protection	10
5. Endemic Species Protection	11
6. Social and cultural acceptance	
7. Technical Feasibility	6
8. Financial feasibility	6
9 Sustainability / durability of ecosystem	10
10. Ownership (local and government)	7

Prioritized intervention: Reforestation of mangroves as bio shields and symbiotic links between land and sea

Anticipated outcomes:

1. Reduce impacts of extreme events
2. Reduce impacts of normal storm surges causing coastal erosion
3. Conserve + augment flora and fauna bio diversity (afforest open + barren mudflats)
4. Generate supplementary + alternative livelihood in view of additional stain / burden of CC on traditional livelihood
5. Carbon sequestration

Outcome	Activities	Institutional Arrangement
1. Create a bio shield / buffer zone against extreme effects	<ul style="list-style-type: none"> • survey + demonstration of area • nursery development • participation of local people in raising nursery + plantation method • (JMM committee b/w forest department + local) • -Alternative energy sources (provide to locals) • protection of + maintenance of plantation • creation of broadwalk + eco tourism • sustainable harvest • Management of carbon 	Micro credit facility Revolving fund

(B) AGRICULTURE / FOOD SECURITY (DROUGHT PRONE AREAS) GROUP

CC Impact	Present Measure/Practice	Adaptation Options
<ol style="list-style-type: none"> 1. Reduce Yield 2. Reduce Income 3. Livestock/ population reduces 4. Limited water resources 5. Malnutrition 6. Increase of pest disease/ public health issue 7. Social conflict due to food and water resources scarcity. 8. Immigration 9. Vulnerability to desert 	<ol style="list-style-type: none"> 1. Shifting cultivation 2. Drought tolerant – crop varieties 3. Irrigation system 4. Extension services 5. Food aid supply 6. Pesticide application 7. Conservation tillage 8. Community negotiation for equality on resource utilization 9. Water 	<ol style="list-style-type: none"> 1. Alternative livelihood 2. Establishing food banks 3. Gathering / pilot forecasting agrometeorological information availability for farmers 4. Improved irrigation system for efficiency 5. Improved seed variety for yield and drought tolerance 6. Promotion of water conservation practices 7. Improvement of excess to grow supplies by pump installation 8. Diversification of agriculture

condition	harvesting 10. Differential pricing in volume of water usage.	
	11. Water transfer and pumping scheme bln watershed	

Criteria for prioritization:

AOS	Criteria 1	Criteria 2	Criteria 3	
1-10				
Alternative livelihood	3/3	4/2	18/6	25
Food Banks	7/7	4/2	15/5	26
Climate Forecasting Agrometereology	6/6	12/6	15/5	33
Irrigation (In hands)	5/5	12/6	21/7	38
Improved seed variety	7/7	8/4	12/4	27
Water conservation practices	4/4	12/6	21/7	37
Access to gw supplies	3/3	10/5	24/8	37

Prioritized Intervention: Improved water management for agriculture

Objective

To enhance sustainability water supply for improve food security

Outcomes

- Sustained optimum yield of agriculture produce
- Community health improvement achieved
- Adaptive capacity of community in hand
- Improved access to water supply – equity
- Sustained livelihood

Project Activities

- Training for farmers on proper water management technique, community based management in the context of CC
- Agriculture products planning and capacity building
- Establishing physical infrastructure for irrigation and other water management technique
- Survey for agriculture market access
- Capacity building for community on sanitation and public health
- Provision of bed net
- Monitoring and evaluation for project success
- International arrangement for project supervision and management (Project flow chart and structure)
- International – GEF and UN Country FAO

Domestic Institutional arrangements

- National development planning commission
- Ministry of Agriculture and water, ministry of national and environment
- Local administration community based management
- NGOs
- Higher education institutions

(C) AGRICULTURE / FOOD SECURITY (FLOOD PRONE AREAS) GROUP

Climate Change Impacts	Present measures/practices	Future actions/Adaptation Options
Decrease yield	Shifting Cultivation	Alternative Livelihoods
Reduced Income	Irrigation systems	Establishing food banks
Livestock Population Reduction	Extension services	Climate forecasting for agric. Pdtn. planning
Limited water supply	Food aid supply	Improve irrigation systems for efficiency
Malnutrition	Pesticide application	Seed variety for yield n drought tolerance
Increase of pest n diseases – public health issues	Conservation Tillage	Promotion of water conservation practices
Social conflicts due to resource scarcity	Community negotiations for equity on resource utilization	Accessing groundwater supply by pumps
Emigration	Water Harvesting	

PRIORITIZATION

Adaptation Options	Cost Effectiveness / 1	Environmental Sustainability /2	Livelihood Security /3	Total/ Rank
Alternative Livelihoods	3	4	18	25 /6
Food banks	7	4	15	26 /5
Climate Forecasting/ Agro meteorology	6	12	15	33 /3
Enhanced Irrigation	5	12	21	38 /1
Improved seed variety	7	8	12	27 /4
Water Conservation Practices	4	12	21	37 /2
Access to GW Supplies	3	10	24	37 /2

Project Title: Water Management for Agricultural Production

Objective:

To enhance sustainable water supply for improved agricultural production and food security

Key Outcomes

- Sustained optimum yield of agricultural produce
- Community health improvement achieved
- Adaptive capacity of community enhanced
- Improved access to water supply and equitable distribution of the resource
- Sustained livelihoods

Activities

- Training for farmers on proper water management techniques, community based project mgt in the context of Climate Change
- Capacity building on agricultural production planning for farmers
- Establishing physical infrastructure for irrigation and other water mgt techniques
- Survey for agricultural products market for access
- Capacity building for community on public health and sanitation
- Provision of bed nets
- Monitoring and Evaluation for project progress tracking

Institutional Arrangement for Project Supervision and Management

International

- GEF
- UNDP Country Office

Domestic

- National Development Planning Commissions
- Ministry of Agriculture
- Ministry of Water Resources
- Ministry of Environment and Natural Resources
- Higher Education Institutions
- Local Administration – Community based project mgt teams
- NGOs