Scoping Assessment for National Implementation in Cambodia

Summary

October 2010

ADAPTATION KNOWLEDGE PLATFORM

REGIONAL CLIMATE CHANGE ADAPTATIONKNOWLEDGEPLATFORM for Asia

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Bangkok, Thailand
October 2010

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ABBREVIATIONS & ACRONYMS

ADB	ASIAN DEVELOPMENT BANK
ADPC	ASIAN DISASTER PREPAREDNESS CENTRE
AIACC	ASSESSMENT OF IMPACTS AND ADAPTATION TO CLIMATE CHANGE
ACIAR	AUSTRALIAN CENTRE FOR INTERNATIONAL AGRICULTURAL RESEARCH
ATI	ASIAN INSTITUTE OF TECHNOLOGY
AUSAID	AUSTRALIAN AGENCY FOR INTERNATIONAL DEVELOPMENT
CBDP	COMMUNITY BASED DISASTER PREPAREDNESS
CBDRM	COMMUNITY BASED DISASTER RISK MANAGEMENT
CBDRR	COMMUNITY BASED DISASTER RISK REDUCTION
CCA	CLIMATE CHANGE ADAPTATION
CCBA	CLIMATE COMMUNITY AND BIODIVERSITY ALLIANCE
CCCO	CAMBODIA CLIMATE CHANGE OFFICE
CCCT	CLIMATE CHANGE TECHNICAL TEAM
CCD	CLIMATE CHANGE DEPARTMENT
CCDM	COMMUNE COMMITTEES FOR DISASTER MANAGEMENT
CD4CDM	CAPACITY DEVELOPMENT FOR THE CLEAN DEVELOPMENT MECHANISM
CDM	CLEAN DEVELOPMENT MECHANISM
CEDAC	CAMBODIAN CENTER FOR STUDY AND DEVELOPMENT IN AGRICULTURE
CF	COMMUNITY FORESTRY
CIAT	INTERNATIONAL CENTER FOR TROPICAL AGRICULTURE
CER	CERTIFIED EMISSION REDUCTION
CFSP	CAMBODIAN FUELWOOD SAVING PROJECT
CMDG	CAMBODIAN MILLENNIUM DEVELOPMENT GOALS
COP	CONFERENCE OF THE PARTIES
CRC	CAMBODIAN RED CROSS
CRCD	CAMBODIAN RESEARCH CENTRE FOR DEVELOPMENT
DIPECHO	DISASTER PREPAREDNESS EUROPEAN COMMISSION'S HUMANITARIAN AID DEPARTMENT
DM	DISASTER MANAGEMENT
DNA	DESIGNATED NATIONAL AUTHORITY
DNA-CDM	DESIGNATED NATIONAL AUTHORITY FOR THE CLEAN DEVELOPMENT MECHANISM
DOM	DEPARTMENT OF METEOROLOGY
DPP	DEVELOPMENT PLAN PROPOSAL
DRC	DANISH RED CROSS
DRR	DISASTER RISK REDUCTION
EBA	ECOSYSTEM-BASED ADAPTATION

ERPA EMISSION REDUCTION PURCHASE AGREEMENT

ESPSEA ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA (EEPSEA)

FAO FOOD AND AGRICULTURAL ORGANIZATION

FERP FLOOD EMERGENCY REHABILITATION PROJECT

FMMP FLOOD MANAGEMENT AND MITIGATION PROGRAMME

FWUC FARMER'S WATER USER COMMUNITIES

GERES GROUPE ENERGIES RENOUVELABLES, ENVIRONNEMENT ET SOLIDARITÉS

GEF GLOBAL ENVIRONMENTAL FACILITY

GHG GREEN HOUSE GAS

HSP2 SECOND HEALTH SECTOR STRATEGIC PLAN 2008-2015

ICM INTEGRATED COASTAL MANAGEMENT

IDRC INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

IETA INTERNATIONAL EMISSIONS TRADING ASSOCIATION

IFI INTERNATIONAL FINANCING INSTITUTION

IFRC INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCIETIES

IFRC-RCS INTERNATIONAL FEDERATION OF RED CROSS AND RED CRESCENT SOCIETIES

IGES INSTITUTE FOR GLOBAL ENVIRONMENT STRATEGIES

IPCC INTERNATIONAL PANEL ON CLIMATE CHANGE

ISC-CDM INTEGRATE CAPACITY STRENGTHENING FOR THE CLEAN DEVELOPMENT MECHANISM

ISET INTERNATIONAL SCIENTIFIC ENVIRONMENTAL TECHNOLOGY

IUCN WORLD CONSERVATION UNION

IWRM INTEGRATED WATER RESOURCE MANAGEMENT

LCDEG LEAST DEVELOPED COUNTRIES EXPERT GROUP

LDCF LEAST DEVELOPED COUNTRIES FUND

LWF LUTHERAN WORLD FEDERATION

MAFF MINISTRY OF AGRICULTURE, FORESTS, AND FISHERIES

MAFF-FA MINISTRY OF AGRICULTURE, FORESTS, AND FISHERIES – FISHERIES ADMINISTRATION

MBSAP NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

MPWT MINISTRY OF PUBLIC WORKS AND TRANSPORT

MOE MINISTRY OF ENVIRONMENT

MOEYS MINISTRY OF EDUCATION YOUTH AND SPORTS

MOH MINISTRY OF HEALTH

MOLMUPC MINISTRY OF LAND MANAGEMENT, URBAN PLANNING AND CONSTRUCTION

MORD MINISTRY OF RURAL DEVELOPMENT

MOWRAM MINISTRY OF WATER RESOURCES AND METEOROLOGY

NAHRIM NATIONAL HYDRAULIC RESEARCH INSTITUTE OF MALAYSIA

NAPA NATIONAL ADAPTATION PROGRAM OF ACTION TO CLIMATE CHANGE

NBP	NATIONAL BIODIGESTER PROGRAMME
NBSAP	NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN
NCCAP	NATIONAL CLIMATE CHANGE ACTION PLAN
NCCC	NATIONAL CLIMATE CHANGE COMMITTEE
NCDM	NATIONAL COMMITTEE FOR DISASTER MANAGEMENT
NCSC	NATIONAL COASTAL STEERING COMMITTEE
NGO	NON GOVERNMENT ORGANIZATIONS
NPRS	NATIONAL POVERTY REDUCTION STRATEGY
NRML	NATURAL RESOURCE MANAGEMENT AND LIVELIHOODS
NSDP	NATIONAL STRATEGIC DEVELOPMENT PLAN
OCHA	OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS
PADEK	PARTNERSHIP FOR DEVELOPMENT IN KAMPUCHEA
PDD	PROJECT DEVELOPMENT DESIGN
PROLINNOVA	PROMOTING LOCAL INNOVATION IN AGRICULTURAL AND NATURAL RESOURCE MANAGEMENT
REDD	REDUCING EMISSIONS FROM DEFORESTATION AND DEGRADATION
RGC	ROYAL GOVERNMENT OF CAMBODIA
RRCAP	REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
SCCF	SPECIAL CLIMATE CHANGE FUND
SEI	STOCKHOLM ENVIRONMENT INSTITUTE
SENSA	SWEDISH ENVIRONMENT SECRETARIAT FOR ASIA
SIDA	SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
SNAP-DRR	STRATEGIC NATIONAL ACTION PLAN – DISASTER RISK REDUCTION
SNV	NETHERLANDS DEVELOPMENT ORGANIZATION
SRI	SYSTEMS OF RICE INTENSIFICATION
TA	TECHNICAL ASSISTANCE
TWG-AW	TECHNICAL WORKING GROUP – AGRICULTURAL AND WATER
UNDMT	UNITED NATIONS DISASTER MANAGEMENT TEAM
UNDP	UNITED NATIONS DEVELOPMENT PROGRAM
UNEP	UNITED NATIONS ENVIRONMENT PROGRAM
UNESCAP	UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA PACIFIC
UNFCCC	UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE
UNITAR	UNITED NATIONS INSTITUTE FOR TRAINING AND RESEARCH
VCS	VOLUNTARY CARBON STANDARD
VER	VERIFIED EMISSIONS REDUCTION
WFP	WORLD FOOD PROGRAM
WMO	WORLD METEOROLOGICAL ORGANIZATION

EXECUTIVE SUMMARY

Seeking to better facilitate climate change adaptation knowledge at local and national levels in Cambodia, the Regional Climate Change Adaptation Knowledge Platform, through the support of the Swedish International Development Cooperation Agency, has commissioned this scoping study on climate change adaptation in Cambodia. With the help of international partners such as the Stockholm Environment Institute and others, the scoping study covers a comprehensive review of current literature and invited perspective from government agencies, Non Government Organizations, the academe, and importantly, the community related to current national and international institutional mandates and arrangements, local to national responses, and knowledge acquisition in the context of climate change adaptation.

Climate change adaptation activity in Cambodia is coordinated through four (4) central bodies, the National Committee for Disaster Management, Climate Change Department, Designated National Authority for the Clean Development Mechanism, and the National Climate Change Committee. These bodies work in concert primarily, but not limited to, the Ministries of Water Resources and Meteorology, Environment, Ministry of Health, Planning, and the Ministry of Agricultural, Forestry, and Fisheries. Key support for these Ministries comes from the Least Developed Countries Expert Group, the United Nations Environment Programme, the United Nations Development Programme, and numerous international organizations such as the Danish International Development Assistance, the Swedish International Development Cooperation Agency, and the International Federation of Red Cross and Red Crescent Societies. Actions are primarily guided by the Strategic National Action Plan 2008-2013 for Disaster Risk Reduction, the National Adaptation Program of Action strategic plan, and the Medium Term Strategy for Agriculture and Water 2006-2010. These plans are a concerted response to the countries commitment to the United Nations Framework Convention on Climate Change and the Kyoto Protocol which both have been ratified by the Royal Cambodian Government.

Internally, climate change adaptation is loosely supported through ministry level policies related to environmental protection, natural resource management, disaster management, rural development, and through the Royal Government of Cambodia's Rectangular Strategy for Growth, Employment, Equity, and Efficiency.

Climate change adaptation is taking place in Cambodia. Autonomous adaptations by communities is reflected as shifts in cultivation periods and the storage of staple foods, but these are seen largely as coping strategies rather than adaptations. However, communities are actively involved in planned adaptations, e.g. dike building, irrigation infrastructure, water storage, and the cultivating of drought and flood resistant crops. Notably, most active in climate change adaptation has been the water, agriculture, and disaster risk management sectors vis-à-vis projects related to the National Adaptation Program of Action, implemented through Ministries and through national non-government organizations. Adaptation activity includes the improvement of rainwater harvesting facilities at the village level, modifications to the design of reservoirs and irrigation channels, and the management of these features. A focal project example is the Building Capacities to Integrate Water Resources Planning in Agricultural Development program supported through the UNDP. In addition, drought management planning, floodplain management and early warning systems, more efficient water supply and irrigation technologies, and institutional reforms have helped to sustain water and food supplies under varying climate conditions.

Organizations such as the Cambodian Center for Study and Development in Agriculture, and the Development Partnership in Action work at the field level in building Farmer to Farmer Extension groups, innovation in farming systems, crop research, and in disaster preparedness and risk management. At scale, organizations like the Australian Centre for International Agricultural Research, are taking the lead through technical research with local people, while others support forums and networks geared to climate change adaptation, and the development of capacities within government ministries in areas of risk reduction planning and disaster response, e.g. climate modeling, forecasting, and vulnerability assessments.

Climate change adaptation is also occurring in the natural resource management sector. Focusing on capacity development in adaptive management strategies in ecosystem conservation, coastal protection, and

livelihood, efforts are being made to secure food and options for rural communities as adaptation strategies to climate change. Additional efforts are being mainstreamed related to Reducing Emissions from Deforestation and Degradation (REDD). REDD is not just about storing carbon, it is also about building the capacity of forest dwellers to mitigate and adapt to climate change impacts through slope protection, flood control, and the safeguarding their livelihood options for their continued resilience.

Respective of climate change adaptation, challenges for Cambodia will be in how it addresses water scarcity that jeopardizes sources of safe drinking water and agriculture; conversely how it copes with excessive water. This will entail the need for more infrastructure, more interagency coordination, more research identified through the perspective of knowledge users, and more capacities. As Cambodia moves through short term responses to climate change, it will also have to focus on knowledge needs for planned adaptation as a long term response, e.g. developing improved climate modeling, to the development of monitoring indicators not only associated with sector risks, but also those to monitor the adaptive capacity of people and its ministerial bodies and committees. A plausible starting point identified in this study is to identify drivers of socio-ecological change through participatory scenario developments, and to enhance dialogue and co-planning with all stakeholders. The following are just some of the prominent areas for capacity development needs identified in this study:

Knowledge that…

- Generates quality user friendly climate data integrated with hydrological and weather features to enable the generation of improved climate change scenarios and projections – geared to national and local level use;
- Further develops of capacities of Cambodian rice-based farming systems to respond to climate change, e.g. on-farm crop modeling, drought and flood resistant seed varieties, the use of residual moisture - late-season rainfall or supplementary irrigation, and water and soil and nutrient management;
- Builds a clear understanding of how social networks and informal institutions operate to facilitate adaptive measures, e.g. social equity, fairness and gender equality issues in the adaptation context; and
- Identifies barriers to successful health and natural resource management-related planned and autonomous adaptations to climate change stressors.

To operationalized knowledge built, there is a need to build a clear understanding amongst stakeholders of how social networks and informal institutions operate. This will ensure that any climate change adaptation measures taken will at a minimum take social and gender equity into consideration, i.e. rooting 'climate change' in the context of sustainable development.

Systems that…

- Integrate climate and weather forecasting with hydrological features useable and applicable to national, provincial and community institutions;
- Ensure cross sector data analysis, planning, and implementation of climate change adaptation initiatives and knowledge dissemination;
- Mainstream environment, livelihood, education, and health and nutrition into disaster risk management planning and responses;
- Institute 'codes of standards' respective of research methodologies and for those engaged in climate change adaptation;
- Enhance the accessibility and usability of scientific information on climate and weather patterns at the local level and for decision making purposes nationally;
- Improve women's access to land and control of credit, agricultural inputs, storage facilities and technologies; and
- Institute social, technological, institutional and policy measures to overcome barriers hindering full participation by all stakeholders.

Noted is that no applicable system to integrate climate and weather forecasting with hydrological features for national, provincial and community use – as one element exists. The purpose of this is paramount to ensure that knowledge created is moved to the application level efficiently, consistently, and contextually. To facilitate this movement, created systems must facilitate cross sector data analysis, knowledge dissemination, planning, and implementation of climate change adaptation initiatives.

Structures that…

- House and support the generation and flow of climate change adaptation knowledge;
- Provide for consistent platforms and networks to operate – each dedicated to climate change adaptation for development workers and policy makers to interact with; and
- Coordinate and facilitate capacity development at national to commune levels to improve access to, and responsiveness to climate change adaptation project designs and decision making processes.

Although some may say that there is a wealth of climate change adaptation information available, this study has noted difficulties in gather even basic data. This scenario is seen to hinder the use of adaptation knowledge emerging. Prioritized for action by stakeholders engaged in this study is a need for a 'one-stop-shop' for climate change adaptation knowledge and capacity development support; support key to the development of responsive climate change adaptation project designs, implementation and decision making processes.

Policies that…

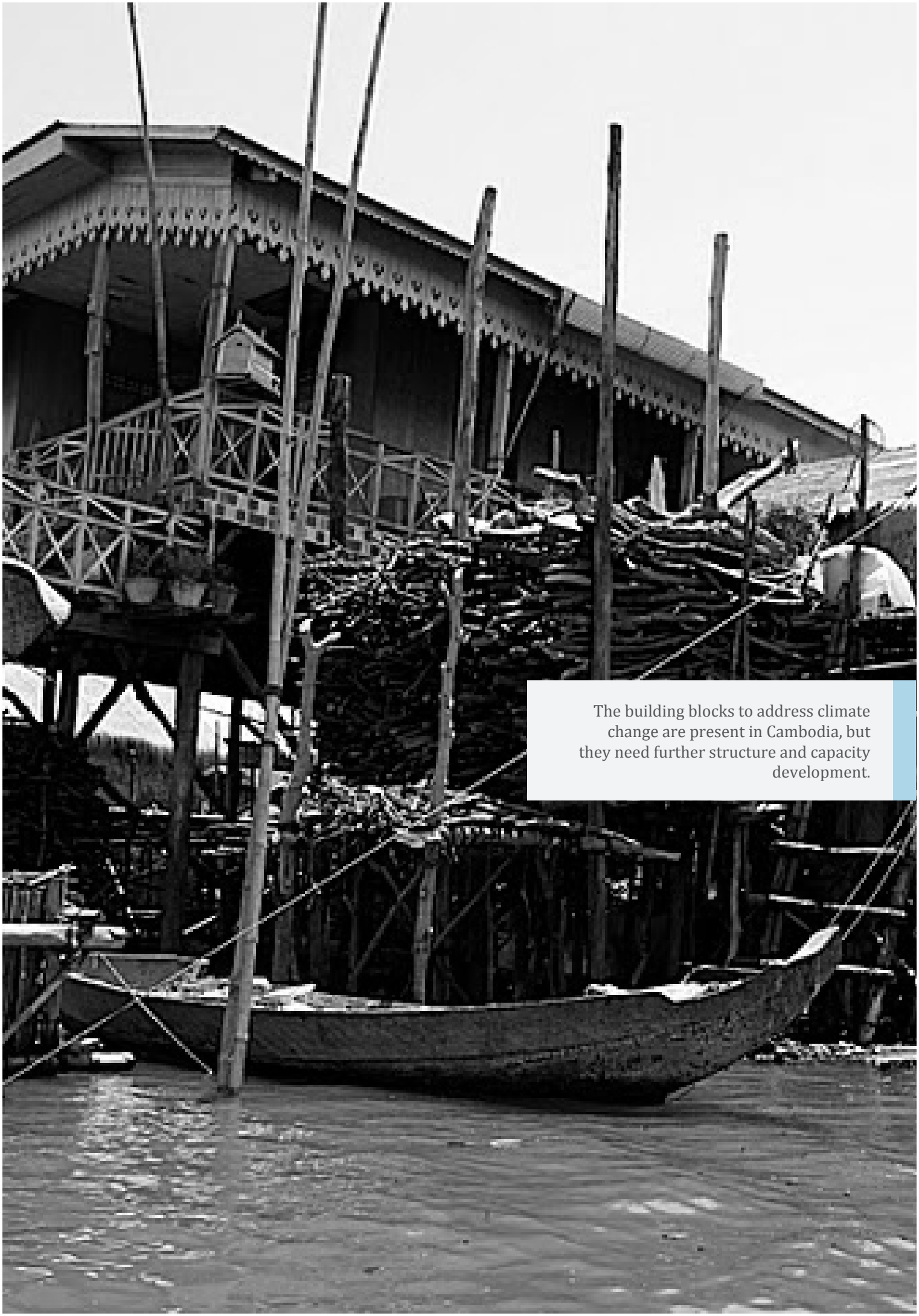
- Support the Climate Change Adaptation mainstreaming into national and sub-national policy, planning, and budgeting processes;
- Encourage private sector involvement in climate change adaptation;
- Support the inclusion of adaptation plans for sub sectors like fisheries and aquaculture in the National Plans of Adaptation to Climate Change;
- Support the participation of farming and fishing dependent communities into national and decentralized economic planning;
- Provide for the incorporation of the natural resource management sector into disaster response policy and planning development;
- Institute formal and informal/ locally derived research-based decision making in all disciplines.; and
- Ensure collaboration and information sharing amongst all climate change adaptation stakeholders – government line agencies to the academe, NGO and community.

Noted clear is that there is a policy gap to support climate change adaptation mainstreaming into national and sub national policies, planning and budgetary processes. This study has underlined the importance of doing so to ensure that the intent of climate change adaptation knowledge, systems and structures are effectively utilized and sustainably funded. Additionally, policy support must highlight equitable stakeholder participation, beginning with that of farming and fishing dependent communities, as a priority, into national and decentralized economic planning. This will effectively move 'policy' closer to implementing and supporting applicable practices in the field, i.e. improving on relevance and sustainability of interventions.

All the aforementioned will entail reducing risks by improving agricultural practices and diversifying agricultural livelihoods; improving health systems to address climate-related diseases and other health impacts; and importantly, finding ways to addressing social impacts that stem from climate challenges, including migration and conflicts over natural resources.

Through the literature reviewed, and the perspectives of those consulted, it is clear that climate change adaptation knowledge is being developed, but such is still in the 'learning' stage. Users of knowledge created, for the most part, are still in the hands of those generating it. However, what is encouraging is that this 'generation of knowledge' is moving towards coordination with multi-stakeholders in mind. What is not clear are the driving forces of knowledge creation and use at the field level; how prioritization is done, and if extension processes to support adaptation are effective.

The building blocks to address climate change are present in Cambodia, but they need further structure and capacity development. Currently activities are planned on the bases of mandates associated with two development frameworks; food security and livelihood. Hence, adaptation to changing climate conditions is not proactive but rather reactive to past events, i.e. lacking perspective on climate change context. Needed is a fundamental change in approach to climate change adaptation –beyond addressing immediate needs… and towards innovation to meet future climate scenarios. This can only come about by building collectively the knowledge base of what it is Cambodia needs to adapt to and how it can succeed at doing so with resources at hand.



The building blocks to address climate change are present in Cambodia, but they need further structure and capacity development.

Photo credit: UNEP/Serena Fortuna

SCOPING STUDY ON CLIMATE CHANGE ADAPTATION IN CAMBODIA

LITERATURE REVIEW AND INVITED PERSPECTIVES

BACKGROUND

Seeking to better facilitate climate change adaptation knowledge at local and national levels in Cambodia, the Regional Climate Change Adaptation Knowledge Platform (or Adaptation Platform), through the support of the Swedish International Development Cooperation Agency (Sida), has commissioned this scoping study on climate change adaptation in Cambodia. With the help of international partners: the Stockholm Environment Institute (SEI), the Swedish Environment Secretariat for Asia (SENSA), the United Nations Environment Program (UNEP), and the Asian Institute of Technology (ATI) Regional Resource Centre for Asia and the Pacific (RRCAP), and the local Cambodian partner – Community Based Natural Resource Management Learning Institute (CBNRM Learning Institute), the scoping study covers a comprehensive review of current literature and perspectives from government agencies, Non Government Organizations (NGO), the academic institutions, and importantly, the community level institutions.

The context of 'Adaptation' in this scoping study has been understood as the accumulation of processes, autonomous and or planned, that result in adjustments to new conditions, stresses, and natural hazards respective of the development and use of knowledge, systems, and structures that enhance people's resilience to climate change. Note that adjustments to new conditions, in a broader sense, also encompass specific 'mitigation' strategies in the context of adaptation for the purpose of this study.

INSTITUTIONAL RESPONSE TO CLIMATE CHANGE ADAPTATION

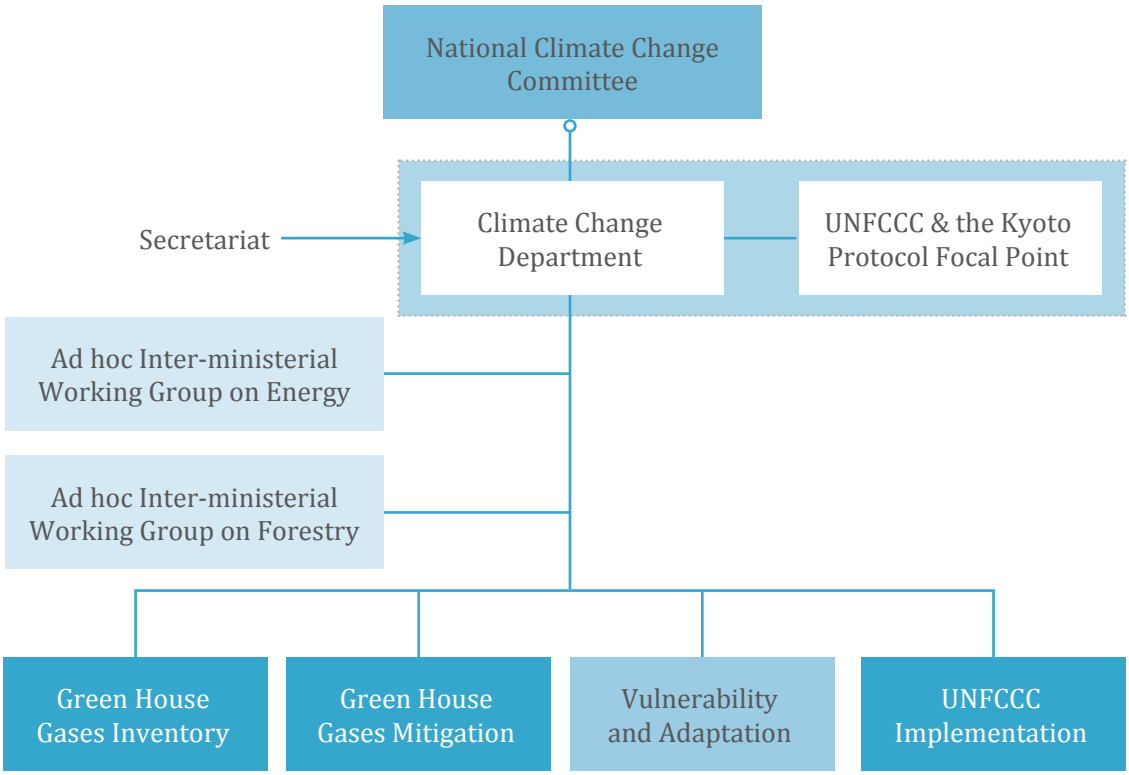
Cambodia's National Poverty Reduction Strategy (NPRS) explicitly identifies natural disasters, particularly floods and droughts, as critical factors that have and continue to increase socio-economic vulnerabilities of the rural poor, including placing a disproportionate burden of coping on women. Taken in perspective, climate change is not just an environmental, but also a development issue. In this context, a series of collaboration and coordination mechanisms have been enacted to facilitate an integration of efforts to better understand the impacts of climate change and to respond to these appropriately across all sectors of society. This section outlines key government institutional actors involved in this process.

Key national coordination bodies involved in climate change and adaptation

National climate change committee

The National Climate Change Committee (NCCC), was established by Ministerial Sub-decree on 24 April 2006. The NCCC is an inter-ministerial mechanism with the mandate to prepare, coordinate and monitor the implementation of policies, strategies, legal instruments, plans and programs of the Royal Government to address climate change issues within the country, thus contributing to the protection of the environment and natural resources and foreseeing and preventing man-made changes in climate that might have adverse impacts on the peoples well-being. The NCCC is inter-ministerial committee, chaired by the Prime Minister – Mr. Hun Sen and is composed of Secretaries and Under-Secretaries of State from 19 Ministries and government agencies (Mony, K., and C. Thou, 2007). See Figure 1 for the NCCC's organizational relationships.

FIGURE_1 National Climate Change Committee's organizational relationships (pers com. CCD)



Source:

Cambodian Climate Change Office

In June, 2003, the Cambodian Government established the Cambodia Climate Change Office (CCCO), now the Climate Change Department (CCD), is solely dedicated to climate change issues. The CCD's technical body is embedded with the Ministry of Environment (MoE) mandated with the task of carrying out all technical activities related to the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and those related to other international environmental conventions. The CCD supports and organizes inter-ministerial technical working groups specialized in various sectors, e.g. energy and forestry, and along climate change themes, e.g. Green

BOX_1 Ministry of Environment - mandated areas for action related to climate change adaptation

- To develop an environmental policy based on sustainable development and to implement the National and Regional Environmental Action Plans in cooperation with other ministries;
- To prepare and implement legal instruments to ensure sustainable development;
- To advise relevant ministries on the conservation, development and management of natural resources as prescribed in Article 59 of the Constitution;
- To administer the National Protected Areas System following the Royal Decree on the Creation and Designation of Protected Areas and to propose new areas for the system;
- Protection and Natural Resources Management;
- To prepare and conduct education programs at all levels, including local communities, in cooperation with relevant ministries and national and international organizations;
- To compile, analyze and manage environmental data;
- To initiate and prepare proposals for the government that fulfill international agreements, conventions and memoranda of understanding related to environmental protection and to implement such international agreements;
- To promote incentives for investment projects which facilitate environmental protection and nature conservation; and
- To cooperate with national organizations, NGOs, foreign governments and local communities in order to ensure the environment is protected in the Kingdom.

MoE, 2005

House Gas (GHG) inventory, mitigation, vulnerability and adaptation, the Clean Development Mechanism (CDM), and in the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) .

The National Committee for Disaster Management

The National Committee for Disaster Management (NCDM) is the national agency responsible for providing emergency relief and developing preventive measures to reduce loss of life and property from disasters. The NCDM was established in 1995 as an inter-ministerial body comprised of members from relevant ministries and the armed forces. Further, committees for disaster management have been established at the province and the district level. In 2006, the Royal Government of Cambodia (RGC) issued a royal decree for the establishment of Commune Committees for Disaster Management (CCDMs) to strengthen local level institutional systems.

Designated National Authority for the Clean Development Mechanism

The RGC appointed the MoE as the Designated National Authority (DNA) for the Clean Development Mechanism on July 15, 2003. The CCD acts as the secretariat of the UNFCCC National Focal Point and of the Designated National Authority under the Kyoto Protocol. There is institutional overlap between the Cambodian DNA, the National Climate Change Committee (NCCC) and the Cooperation Committee of Cambodia (CCC).

Key ministerial actors involved in climate change and adaptation

Ministry of Water Resources and Meteorology (MOWRAM)

Ministry of Water Resources and Meteorology (MoWRAM) plays a central role in mitigating the impacts of natural disasters such as floods and droughts

through the implementation of long term adaptive measures related to flood management.

Ministry of Water Resources and Meteorology, Department of Meteorology

The Department of Meteorology (DoM) under the Ministry of Water Resources and Meteorology (MoWRAM) is the focal point for providing weather and climate information to the Royal Government of Cambodia (RGC) and the public related to climate and weather information (Danida, 2008).

Ministry of Environment (MOE)

With the exceptions of the National Climate Change Action Plan and the National Biodiversity Strategy and Action Plan (NBSAP), links to climate change adaptation in coastal areas through government policy or legislation are very few. In the National Climate Change Action Plan and the National Adaptation Program of Action to Climate Change (NAPA), recommended actions are limited in scope – mostly highlighting research activities to assess the potential impacts and possible responses to sea level rise (MoE, 2005). See Box 1 for MoE mandate.

Ministry of Health (MOH)

The Ministry of Health, guided by its Second Health Sector Strategic Plan 2008-2015 (HSP2) understandably plays a cross cutting role in climate change adaptation – that is related to gender and the health of minorities. Central to its mandate is to strengthen public health interventions and to promote effective public and private partnerships in service provision for the poor and vulnerable groups in areas of hygiene and sanitation, school health, environmental health risks, and to reduced environmental risks and health impacts from disasters (MoH, 2008).

Ministry of Planning (MOP)

The Ministry of Planning (MoP) play a key role in climate change adaptation for it is responsible guiding the development of the NSDP Update 2009-2013 (Chhieng Yanara, H. E., 2009). Box 2 indicates their roles and responsibilities.

BOX_2 Ministry of Planning – roles and responsibilities areas for action related to climate change adaptation

- Provide technical guidance to the line ministries and agencies on the development of input and the overall processes for the development of NSDP Update 2019-2013;
- Provides a national framework for integrating NAPA and addressing climate change across all sectors;
- Ensure submission of input by all line ministries and agencies, and that Cambodia's aid management structures, principles and priorities are suited to the integration and promotion of climate change adaptation; and
- Develop and review the draft document based on input, suggestions and recommendations received from all relevant stakeholders at each stage of its development – including climate change adaptation interests.

Chhieng Yanara, H. E., 2009

Other focal ministries and associated administrations

Coastal ecosystems and fisheries: Key agencies involved in the development and management of coastal areas include the Ministries of Land Management, Urban Planning and Construction; Ministry of Agriculture, Forestry, and Fishery; Industry, Mines and Energy; Tourism; Public Works and Transport; Rural Development; and Environment. To deal with cross cutting issues, the government has established a National Coastal Steering Committee (NCSC). The NCSC is responsible for setting the overall direction of coastal projects and activities related to natural resources in line with current national policies amongst the aforementioned Ministries.

Focal groups and non-governmental organizations involved in climate change adaptation

Least developed countries expert group

The Least Developed Countries Expert Group (LEG), which was established by decision 29/CP.7 in 2001, is mandated in its terms of reference to facilitate the exchange of information and to promote synergy with other multilateral environmental conventions. The Group played a key role in the preparation of National Adaptation Programs of Action (NAPA) strategy, and has focal involvements in its implementation (Danida, 2008).

International Panel On Climate Change (IPCC), World Meteorological Organization (WMO) And The United Nations Environment Programme (UNEP)

As a joint effort under the Assessment of Impacts and Adaptation to Climate Change (AIACC) initiative, the International Panel on Climate Change (IPCC), World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) share the following mandate:

- Integrate assessments of climate change impacts, adaptation and vulnerability in watershed areas and communities in Southeast Asia (Philippines, Indonesia, Laos, Cambodia and Vietnam); and
- Assess the regional vulnerability to changing water resources, and extreme hydrological events due to Climate Change (Cambodia, Vietnam, Laos and Thailand) (AIACC, 2007).

United Nations Development Program

Respective of climate change adaptation, the United Nations Development Program (UNDP) mandate places significant focus on developing capacity of national and local authorities, civil society and private sectors to promote climate change adaptation and mitigation.

World Bank – Global Fund for Disaster Risk Reduction

The World Bank – Global Fund for Disaster Risk Reduction is actively involved in providing Technical Assistance (TA) packages to ensure better coordination and implementation of Strategic National Action Plan – Disaster Risk Reduction (SNAP-DRR), and the integration of disaster risk reduction into national development planning; including the development of guidelines for integration of DRR into local development plans and the initiation of mainstreaming DRR into policies and programs of ministries.

Danish International Development Assistance (DANIDA)

Danida is contributing to sub-national democratic development in support of poverty and vulnerability reduction of the rural poor by providing support to the RGC through three sub-sectors related to Natural Resource Management and Livelihoods: the Land Management, Environment - Forestry and Fisheries sectors.

International Federation of Red Cross and Red Crescent Societies

The International Federation of Red Cross and Red Crescent Societies' (IFRC-RCS) role in climate change adaptation is primarily related to the coordination and cooperation in the following:

- Capability building focused on government officials at provincial, district, commune and village levels, staffs of international organizations and non-government organizations;
- Emergency Relief Assistance – Mobilization of resources and provision of relief goods to affected people working with Ministries, authorities, IFRC, UNDMT, OCHA, International Organizations and some NGOs; and
- Community based disaster risk management capacity building.

Swedish International Development Cooperation Agency (SIDA)

Sida's cooperation is focused on supporting reforms for decentralization and democratization, and human rights through support for the development of civil society and education. Support to national environment and climate-related programs are targeted and linked to regional measures so that synergies can be achieved between regional and bilateral means. Noted, as seen by supporting democratic governance, Sida is indirectly helping to develop and strengthen institutions and systems that enable a larger proportion of the national budget to reach the local level and be used for local development, such as agriculture efficiency, land use, and adaptation to climate change (Sida, 2008).

Sida is also supporting a Joint Climate Change Project (JCCP) aimed to help local NGOs integrate climate change adaptation programmatically. This is an extensive capacity development efforts now moving towards the establishment of ten (10) field-based Climate Change Participator Action Research initiatives.

Groupe Energies Renouvelables, Environnement Et Solidarités (GERES) Cambodia

GERES Cambodia, a NGO whose primary focus is in both climate change and development, is a French non-profit NGO created in 1976 after the first Oil Shock. Today, GERES Cambodia is particularly involved in the implementation of engineering solutions for development and providing specific technical expertise for environmental conservation, climate change mitigation and adaptation, reducing energy poverty, and improving the livelihood of the poor.

PLAN Cambodia

Plan Cambodia is implementing a Poverty Reduction Validated in Drought Prone Environment (PROVIDE) Project which supports villagers to increase their rice yields in drought prone areas. They conduct experimentation trials on the rice seed varieties which are resistant to drought in partnership with the International Rice Research Institute and Cambodian Agricultural Research and Development Institute.

OXFAM America

Oxfam America's climate change agenda focuses on raise public awareness on climate change, agro-meteorological foresting to provide farmers with timely and user-friendly weather information, and the provision of platforms for dialog and networking, e.g. the National Climate Change Network.

Strategic action plans supporting climate change adaptation

Strategic National Action Plan 2008-2013 for Disaster Risk Reduction (SNAP-DRR)

Cambodia launched its Strategic National Action Plan 2008-2013 for Disaster Risk Reduction (SNAP-DRR) in March 2009, which integrates DRR elements into sector policies and investment planning. Priority actions use a 'a matrix approach' to integrating DRR elements into key ministries (such as the Ministry of Land Management, Urban Planning, and Construction, the Ministry of Water Resources, the Ministry of Forestry and Fisheries (MAFF), the Ministry of Rural Development and the Ministry of Health) (Rinbo, E., 2009). See Box 3 for key features of the SNAP-DRR (Danida, 2008).

BOX_3 The Strategic National Action Plan for 2008-2013 for Disaster Risk Reduction mandate

- Contribute to a common understanding, knowledge and awareness of disaster risk reduction;
- Provide a comprehensive framework to guide and monitor the implementation of disaster risk reduction initiatives in the country;
- Create a conducive environment for the mainstreaming of disaster risk reduction into development plans, policies and projects of the RGC;
- Enhance coordination and cooperation between disaster management stakeholders;
- Improve the efficiency of resource allocation and utilization in disaster reduction; and
- Orient donor support in disaster risk reduction to nationally-identified priorities.

Danida, 2008

National Adaptation Program of Action to Climate Change

The National Adaptation Programme of Action to Climate Change (NAPA) for Cambodia is based on Decision 28 of the 7th Conference of the Parties (CoP) of the United Nations Framework Convention on Climate Change (UNFCCC). The formulation of the NAPA follows a participatory process that involves those who are most affected by climatic impacts, i.e. rural people and the poor.

Key NAPA objectives:

- To understand the main characteristics of climate hazards in Cambodia (flood, drought, windstorm, high tide, salt water intrusion, and malaria);
- To understand coping mechanisms to climate hazards and climate change at the grassroots level;
- To improve agricultural productivity through the expansion of irrigation and the management of water resources to reduce vulnerability to natural disasters; and
- To identify and prioritize adaptation activities to climate hazards and climate change impact.

The Cambodian NAPA is supportive of the Government's development objectives as outlined in the "Rectangular Strategy for Growth, Employment, Equity and Efficiency" adopted in July 2004 (RGC, 2004), as well as in the "National Strategic Development Plan 2006-2010 (NSDP)" adopted in May 2006.

Medium Term Strategy for Agriculture And Water 2006-2010

Based on National Strategic Development Plan 2006-2010; National Poverty Reduction Strategy, Royal Government's Strategic Framework for Decentralization and Deconcentration reform and existing MAFF and MoWRAM strategies, a proposed Medium Term Strategy for Agriculture

and Water (2006-2010) has been formulated jointly by donors and members of the Technical Working Group – Agricultural and Water (TWG-AW). Such was approved by two Ministers, Minister of MAFF and MoWRAM on 30th March 2007 (Veng Sakhon, H. E., 2007). To achieve this medium term strategy, it incorporates five main program areas: 1) The Institutional Capacity Building and Management and Support Program for Agriculture and Water Resources; 2) The Food Security Support Program; 3) The Agricultural and Agri-business; 4) The Water Resources, Irrigation and Land Management Program; and 5) the Agricultural and Water Resources and Land Management Program (Veng Sakhon, H. E., 2007).

Overview of arrangements and policies supporting climate change adaptation

International arrangements

- UNFCCC ratified December 18 1995, entered it into force on March 16 1996.
- Kyoto Protocol ratified July 4 2002, entered into force on August 22 2002 .

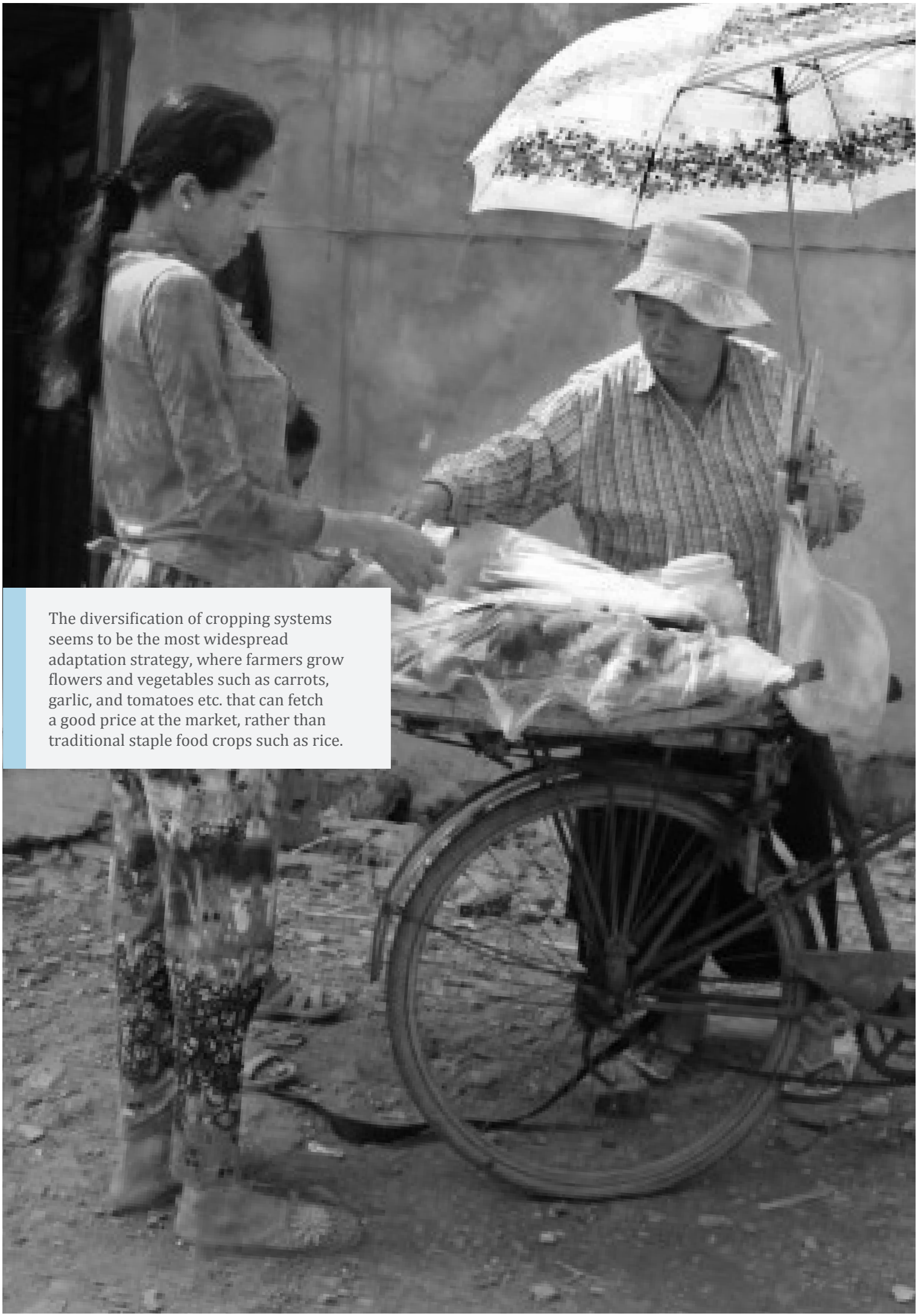
National policies and arrangements

- Royal Krom No. 02-94 dated 24 December 1996 promulgating the Law on Environmental Protection and Natural Resource Management;
- Royal Krom No. ¬¬¬0196-21 dated 24 January 1996 on the Establishment of the Ministry of Environment;
- Royal Krom No. 1296-35 dated 24 December 1996 on the ratification of the United Nations Framework Convention on Climate Change;
- Sub-Decree No. 57 dated 25 September 1997 on the Organizations and Functions of the Ministry of Environment;
- Sub-Decree No. 30 dated 2002 on the Organization and Functions of the National Committee for Disaster Management; and
- The Royal Government of Cambodia: The Rectangular Strategy for Growth, Employment, Equity, and Efficiency (RGC, 2004).

BOX_3 The Strategic National Action Plan for 2008-2013 for Disaster Risk Reduction mandate

- National Committee for Disaster Management
- National Climate Change Committee
- Commune Committee for Disaster Management
- Climate Change Department
- Cambodia Millennium Development Goals
- District Committee for Disaster Management
- Disaster Risks Reduction FMMP Flood Management and Mitigation Programme
- Millennium Development Goals
- Mekong Integrated Water Resources Management Project
- Action to Climate Change
- National Poverty Reduction Strategy
- National Strategic Development Plan
- Provincial Committee for Disaster Management
- Provincial Department of Water Resources and Meteorology
- Strategic National Action Plan for Disaster Risk Reduction
- United Nations Disaster Assessment and Coordination Team

pers com., collective response



The diversification of cropping systems seems to be the most widespread adaptation strategy, where farmers grow flowers and vegetables such as carrots, garlic, and tomatoes etc. that can fetch a good price at the market, rather than traditional staple food crops such as rice.

Photo credit: AIT-UNEP RRC.AP/Lekha Ratnayake

RESPONSES TO CLIMATE CHANGE ADAPTATION: KNOWLEDGE, SYSTEMS, AND STRUCTURES

Community responses to climate change

Autonomous Adaptation Strategies: The most commonly cited adaptation strategies across Cambodia are the selection of appropriate crop varieties and cropping systems, e.g. adopting the use of rice cultivars that can withstand up to one week of flooding or the delaying of cultivation periods. The diversification of cropping systems seems to be the most widespread adaptation strategy, where farmers grow flowers and vegetables such as carrots, garlic, and tomatoes etc. that can fetch a good price at the market, rather than traditional staple food crops such as rice. Storing rice for use during lean seasons seems to be a 'safe practice' in communities as a means to cope with shortages in the future. Also noted in the literature is the taking up animal husbandry practices such as culling, which give villagers a 'buffer' against fluctuations in income from agriculture. Storing fodder is also a common strategy to safeguard against scarcity during dry seasons. Other coping strategies noted are the reduction of water use domestically, e.g. bathing twice a week in times of drought (MoE, Global Environmental Facility [GEF], and UNDP, 2005).

Planned Adaptation Strategies: This form of adaptation relies on inputs from external actors such as government and non government institutions in the provision of better crop seeds, digging wells, and training on agricultural techniques. Direct examples are pump wells provided by Santi Sena, rice seed provided by the Partnership for Development in Kampuchea (PADEK), water pumps provided by Oxfam, and pump wells provided by private companies. Schemes have been implemented by various NGOs such as PADEK and the Cambodia Red Cross's food-for-work programs related to the digging of water storage ponds and irrigation canals, and in the provision of chickens and ducks to promote poultry rearing (MoE, GEF, and UNDP, 2005).

Adaptation practices to flooding include the construction of dikes by NGOs and moving animals to roads and higher grounds. Water pumping during drought is also used to irrigate fields located close to the Tonle Sap River. Dikes have also been built to prevent seawater intrusion in coastal areas.

Local authorities in the Tonle Sap lake region and others have used local resource management tools such as closed seasoning for fishing in lakes to ensure stable fish stocks for surrounding agricultural fields; as fish migrate in and out of the lake during floods. Some authorities have also established community forest buffers, approved by central authorities, to provide for additional food security, and prevent soil erosion. Farmers have also attempted to expand irrigation of dry season rice crops by digging wells reaching 30-40 m into groundwater resources. Note that villagers may be aware of possible coping and adaptation mechanisms such as rehabilitating water storage structures and irrigation canals, building dikes and water control structures, strengthening dwellings against windstorm etc., however, the lack of financial resources has generally prevented local communities from implementing these projects (pers com, collective response).

Sector responses to climate change

Agriculture: National Adaptation Program of Action to Climate Change (NAPA) projects allocated to the agricultural sector comprises approximately 38% of all its related activities. The primary implementing partner is the Ministry of Agriculture, Forestry, and Fisheries (MAFF) and local NGOs in the Srae Ambel District, Koh Kong Province. Activities are centered on the promotion of household integrated farming, and the development and improvement of community irrigation systems. With a cross sector focus, NAPA-MAFF have aligned five (5) projects aimed at improving farmers' incomes, food security and livelihoods in areas affected by flood and drought. Partnered to this is a Rehabilitation of Coastal Protection Infrastructure projects to increase agricultural production in coastal areas and reduce coastal erosion.

Overall, NAPA facilitates activities related to climate change adaptation through the improvement of rainwater harvesting facilities at the village level; System of Rice Intensification (SRI) to reduce vulnerability to changing rainfall amounts and patterns; modifications to the designs of reservoirs and irrigation channels, and the management of these features and natural ponds to better manage climate change induced risks. A focal project for these activities is titled: Building Capacities to Integrate Water Resources Planning in Agricultural Development (pers com., CEDAC). Oxfam America has also been undertaking complementary efforts by supporting the development of agro-meteorological foresting which will provide farmers with timely and user-friendly weather information together with phenomena indicators such as occurrence of insects and frogs that hinder the performance of their farming system (pers com., Oxfam America).

The Cambodian Center for Study and Development in Agriculture (CEDAC) is the hub for Cambodia's involvement in the Promoting Local Innovation in Agricultural and Natural Resource Management (Prolinnova) global network. The network focuses on informational exchanges in farmer to farmer extension and innovation. Current activities focus on experiments into how to grow vegetables year round considering wind, rain, and water logging, as well as community awareness building related to climate change, the introduction of System of Rice Intensification, and participation in climate change adaptation networks and national level forums, e.g. the "National Fund for Farmer Research and Farmer to Farmer Extension" which connects the farmer to the national level in local research (CEDAC, 2008).

The Development Partnership in Action (DPA), a national NGO, as with others mentioned, have been helping communities cope with climate change impacts on their health and livelihoods by assisting communities to adapt their agricultural practices to changing climatic conditions through the introduction of more resilient strains of rice, but also by taking a disaster risk reduction lens to their initiatives, e.g. encouraging communities to develop disaster preparedness and disaster response plans to reduce their vulnerability to sudden disasters, such as crop loss (Van Aalst, M. K., T. Cannon, and I. Burton, 2008). (see Box 5 for the general scope of climate change adaptation strategies in the agriculture sector).

BOX_5 General scope of climate change adaptation actives in the agriculture sector

- Improved crop and grazing land management to increase soil carbon storage;
- Restoration of cultivated peaty soils and degraded lands;
- Improved rice cultivation, livestock, and manure management to reduce CH4 emissions;
- Improved nitrogen fertilizer application to reduce N2O emissions;
- Dedicated energy crops to replace fossil fuel use; and
- Mulch farming, conservation tillage, cover cropping, and recycling of bio-solids.

pers com., collective response

Water Resources: Facilitated by NAPA initiatives, activities related to climate change adaptation include the improvement of rainwater harvesting facilities at the village level, modifications to the design of reservoirs and irrigation channels, and the management of these features and natural ponds. A focal project example is the Building Capacities to Integrate Water Resources Planning in Agricultural Development supported through the UNDP. In addition, drought management planning, floodplain management and early warning systems, more efficient water supply and irrigation technologies, and institutional reforms through the Integrated Water Resource Management (IWRM) framework has helped to sustain water and food supplies under varying climate conditions. These efforts are coordinated through the MoWRAM.

For many of the initiative reviewed for this study, much are still in their capacity development stages. As Cambodia's agriculture sector is prone to both drought and floods, adaptation measures are limited to: training of 'adaptation experts' in agricultural extension; implementation of pilot projects in local communities; rainwater harvesting techniques; measures to decrease soil erosion and preserve genetic diversity in rice agriculture; changed design of reservoirs and irrigation channels to prevent risks from increased peak flows; and lessons learned disseminated to national and international levels. These projects are being implemented by UNDP through the support of the Global Environmental Facility in partnership with local NGOs (GEF, 2009). A key tool in use is a trainer's manual to support and strengthen capacities related to the UNFCCC process, particularly in the domain of vulnerability and adaptation. The tool has been developed in collaboration with CIAT, SEI, and UNITAR.

Capacity building is also taking place respective of information and coordination systems being developed by the Department of Meteorology (DoM). Ongoing programs and projects include twenty-one (21) manual weather stations, the development of a Forecast Model for coastal areas, and the development of a Numerical Weather Prediction product for Cambodia. In collaboration with the National Hydraulic Research Institute of Malaysia (NAHRIM), capacities are be built in areas of data collection and observations related to weather and climate. The collaboration is also active in developing pilot adaptation models at level to integrate with local development process and joint assessments of climate change impacts on the water resources in the Mekong Delta and Tonle Sap River (MoWRAM, 2008).

Disaster Risk Management: Climate change adaptation is most active in Cambodia when considering Disaster Risk Management (DRM) amongst all sectors, importantly; it is also the most active in integrating sector cooperation. This can be noted by the following list of donor and International Financing Institutions (IFIs) involvements, and in what (GEF, 2009):

- AusAID: Reducing the vulnerability of the poor to natural disasters is one of the three themes for Australia's engagement in development cooperation with Cambodia;
- DIPECHO: Ongoing funded projects include Promoting and Strengthening Disaster Resilience in Cambodia form communities through to the education sector. DIPECHO Partners include several NGOs, e.g. Action Aid, Lutheran World Federation (LWF-Cambodia), Cambodian Red Cross, Danish Red Cross, and Netherlands Save the Earth, etc.;

- ADB - Community Based Disaster Risk Reduction Strategy for Flood and Drought (2007 – 2012) implemented with ADPC, in partnership with MoWRAM. Primary efforts are in the promotion of community level action and developing CBDRM plans;
- UNDP is engaged in supporting the NCDM and the Mekong River Commission as well as in developing climate forecasts and applications, flood mapping, and early warning initiatives;
- World Bank: Global Facility for Disaster Risk Reduction (GFDRR) has prepared a Technical Assistance (TA) package to ensure better coordination and implementation of SNAP-DRR, and the integration of disaster risk reduction into national development planning; support to implement the national Community Based Disaster Risk Reduction (CBDRR) strategy and develop guidelines for integration of DRR into local development plans; initiating the mainstreaming DRR into policies and programs of two ministries, supporting the development of provincial multi hazard DRR plans; and implementing partnerships in at least two new provinces in 2009; strengthening the management of the NCDM. Note worthy, past World bank engagement under the completed Flood Emergency Rehabilitation Project (FERP) repaired and rehabilitated infrastructure damaged by floods in 2000, and provided TA to help build capacities to more effectively manage and mitigate future water disasters;
- GTZ has provided major support to the Mekong River Commission (MRC) and the Asian Disaster Preparedness Centre (ADPC) for flood emergency management strengthening;
- WFP has provided food aid through a Food For Work program targeting the poorest communities; as well as developing Damage And Needs Assessment (DANA) guidelines and tools for NCDM; and
- UNESCAP: Implementing a Partnership for Disaster Reduction in Southeast Asia.

In the case of the Cambodian Community Based Disaster Preparedness (CBDP) program, DRR assessments have been followed by micro-projects constructed with local contributions. These included small bridges to facilitate evacuations; culverts to help floodwaters recede faster; dams that facilitate evacuation, but also allow the impounding of water to irrigate a second crop. The latter example highlights community focus on livelihoods. Local communities report an increase in social and organizational capacity and higher motivation to contribute to the village's disaster preparedness, and a reduced sense of dependency on external assistance. These sentiments were strongest in areas where the micro-investments – micro-projects had actually proven to be effective in reducing the effects of flooding (Van Aalst, M. K., T. Cannon, and I. Burton, 2008).

The embedding of climate risk assessments has taken the form of vulnerability capacity assessments in Cambodia, which have already been embedded in larger-scale programs. For example, the Cambodia Red Cross has been cooperating with the Cambodian government to formulate appropriate national disaster management plans, and the institutional development of the National Committee for Disaster Management (NCDM) (Van Aalst, M. K., T. Cannon, and I. Burton, 2008.) Respective of NAPA's involvement in this sector, supported activities are focused on the strengthening of community disaster preparedness and response capacities; implemented through the efforts of the NCDM, Oxfam GB and Oxfam America (pers com., Oxfam America).

Several NGOs involved in managing disaster (risks) have created a Disaster Risk Reduction Forum with support from DIPECHO. With assistance from DIPECHO and ADPC, the Ministry of Education Youth and Sports has piloted the integration of disaster risk reduction measures into the education sector. The work includes developing and integrating DRR into school curricula. Partnered to this, the NCDM has formulated a national disaster risk communication strategy that facilitates local NGOs in the conducted of public awareness campaigns.

Education, knowledge and awareness building: As previously mentioned, the Disaster Risk Reduction Forum with assistance from DIPECHO and ADPC, the Ministry of Education Youth and Sports has piloted the mainstreaming of disaster risk reduction measures into the education sector.

From a broader view, the Assessment of Impacts and Adaptation to Climate Change (AIACC) initiative has funded collaborative research, training and technical support to enhance the scientific capacity of Cambodia to assess climate change vulnerabilities and adaptations, and communicate information useful for adaptation planning and action. AIACC was implemented by the United Nations Environment Programme and executed jointly by The Southeast Asia START Regional Center (START) and The Academy of Sciences for the Developing Worlds. AIACC has provided financial support to 24 regional study teams to conduct three-year investigations of climate change impacts, adaptation and vulnerability in Southeast Asian countries, Cambodia being one of these. The research activities address a range of questions about vulnerabilities to climate change and their implications for human development and future policies (AIACC, 2006).

The aforementioned initiatives were also completed through the help of the Royal University of Phnom Penh (RUPP) – Faculty of Environmental Science. The RUPP was also a content contributor to First National Communication to the UNFCCC and NAPA. Additional efforts include the mainstreaming of climate change and adaption learnings from these studies into course curriculum. Notably the faculty applies a problem based framework to learning which continually allows for new course materials and focused internships directed towards climate change issues (pers com., RUPP).

Oxfam America is raising public awareness on climate change in collaboration with the Department of Meteorology, Department of Rice of the Ministry of Agriculture, Fisheries and Forestry, and the Climate Change Department of the Ministry of Environment. Proposed for 2010 are the following activities (pers com., Oxfam America):

- Launching of a public awareness campaign that will include the production of visual communication materials (photos) to record the impact of climate change in the community including indigenous knowledge on impact and adaptation;
- Enhancement of the National Climate Change Network with the aim to share 'best practices' and create a forum for capacity building and awareness campaigning; and
- Strengthening awareness building initiatives in coordination with the Climate Change Department to build the capacity of the relevant government officials and awareness campaign which will also include a perception study on climate change.

Energy: Responding to 'new conditions' globally, and to the need for adaptive capacity development in climate change adaptation and mitigation, the Clean Development Mechanism (CDM) has been operationalized in the context of linking economic investment with climate change adaptation. For Cambodia, CDM principles provide guidelines for countries (state) and private companies in how to invest in relatively low-cost abatement opportunities in Cambodia. In return, they receive credits for the emission reductions from the projects (so-called "Certified Emission Reductions" or CERs). The investor country subsequently adds these CERs to its Green House Gas (GHG) emissions budget under the Kyoto Protocol. The energy sector in Cambodia is seen to have the largest potential of CDM, e.g. in renewable energy, energy efficiency, landfill gas capturing (EU-ASIA, 2008), and afforestation and reforestation; and in the Voluntary Carbon System respective of Reducing Emissions from Deforestation and Degradation + (REDD+) (Bradley, 2009)

To prepare for CDM investment in Cambodia, being implemented are:

- The Capacity Development for the Clean Development Mechanism (CD4CDM) project, funded by the Netherlands Government through the UNEP Collaborating Centre on Energy, Climate and Sustainable Development;
- The Integrate Capacity Strengthening for the CDM (ICS-CDM) project, funded by the Japanese Government through the Institute for Global Environment Strategies (IGES); and
- The "Asia EU Dialogue on the CDM" under the Asia Pro-Eco program.

Note that renewable energy, energy efficiency, landfill gas capture, afforestation and reforestation have been identified as practical CDM projects in Cambodia. Box 6 lists examples of key efforts of the CCCO respective of CDM activities in Cambodia.

BOX_6 Examples of Clean Development Mechanism initiatives in Cambodia

- Japanese project developer Mitsubishi Securities has completed a Project Development Design (PDD) on a 1.5 Metric Ton rice husk power plant generating 45,000 CERs annually. The PDD is now posted in the UNFCCC's website for review and comment. The estimate of Greenhouse Gas reduction up to a period of 7 years is 320 Kilo Ton of CO2 equivalent;
- A Letter of Endorsement has been signed for a Japanese investor on methane capture from pig farms to produce electricity. The electricity produced from the plant may replace grid electricity which emits CO2 into the atmosphere from heavy fuel oil and diesel power plants;
- An afforestation project of 7,900 ha is envisaged by Japanese company Marubeni in northeastern Mondulkiri Province and will sequester 2.9 Metric Ton of CO2 equivalent over 30 years. In addition, Marubeni Company has developed a PDD on renewable energy project using wind and solar power with the estimated total CO2 emission reductions of 57,939 Metric Ton CO2 equivalent over 21 years; and
- An Italian company, Actelios, has developed a Project Idea Note for a landfill gas collection project in Stung Meanchey, Phnom Penh. This 90,000 CERs p.a. landfill gas collection project has received formal support from the Ministry of Environment of Cambodia. The company may also consider using captured methane for power generation in the future. The estimated GHG abated for the period of 10 years is 858,000 Metric Ton CO2 equivalent (EU-ASIA, 2008).

Danida, 2008

Addressing adaptation needs at the local level is Cambodia's National Biodigester Programme (NBP), implemented by the Netherlands Development

Organization (SNV) in cooperation with national authorities. Its main objective was to disseminate 17,500 family-sized biodigesters over the period 2006-2009 (Danida, 2008). Building from here, the Cambodian Fuelwood Saving Project (CFSP) was established by the French NGO, Groupe Energies Renouvelables, Environnement et Solidarités (GERES) that commercialized an improved cook stove that consumes about 20% less charcoal than traditional stoves. Other efforts by GERES include experimentation with solar thermal energy, cooking technologies, biofuels, biomass fuel development; much of which is integrated with social forestry initiatives in Cambodia, e.g. REDD+. Outcomes are documented, shared and used as a basis for policy development.

Health: Health related climate change adaptation strategies have been focused on Malaria Education and Mosquito Habitat Clearance Campaigns, the production of bio-pesticides, the development of Healthcare Centers and Posts, the provision of Safe Water in High Risk Malaria Regions, the strengthening of the DoH's Malaria Surveillance Programme, and the distribution of treated mosquito nets by various NGOs (Mony, K. E., and C. C. Thou (MoE), 2007). The Ministry of Health has also been actively developing a 'Climate Change and Health' action plan with the assistance of the World Health Organization.

NAPA's distribution of priority activities in this sector comprises six (6) malaria reduction projects entitled 'Safer Water Supply for Rural Communities' to reduce the risk of contracting water-related diseases. Local authorities and NGOs such as CONCERN, CRCD, FAO, UNICEF, WFP, have focused on the development of healthcare centers and posts to assist the Ministry of Health in combat malaria in high risk areas that are especially vulnerable to climate change. These efforts have been hampered by the lack of financial resources to meet current targets. Finally, the provision of safe water again in high risk malaria regions is being executed by the Ministry of Rural Development (MoRD) in collaboration with NGOs and international organizations such as the WHO; focused on the surveillance of Anopheles mosquitoes, improving the education and treatment processes for Village Malaria Workers, and in the provision of bed nets and residual spraying of houses.

"With over 400 million of the world's poorest depending on fish for food, 'climate-proofing' fisheries and aquaculture needs to be high on the climate change agenda. Yet fisheries and aquaculture are conspicuously absent from the climate change debate, even though science shows that climate change poses huge threats to aquatic food production and the poor who depend on it."

World Fish Center, 2009

Renewable natural resources – Coastal ecosystems and fisheries, lowland and upland forests: Cambodia's National Biodiversity Strategy and Action Plan (NBSAP) operationalized by the MoE and MAFF, proposed a series of strategic objectives and priority actions, whereby climate change is recognized as a key threat to biodiversity. The NBSAP is addressing the links between the nature of implementing commitments under both the CBD and the UNFCCC. In addition, the NBSAP has included within Cambodia's NAPA various adaptation measures that are based on vulnerability and adaptation assessments in priority sectors, such as agriculture and land-use changes in forest and coastal zones (Danida 2008).

The Cambodia National Capacity Self-Assessment project, through the MoE, is addressing three (3) thematic areas: Biodiversity, Climate Change, and Land Degradation, as well as cross cutting issues and synergies between those focal areas. The primary objective is to identify country level priorities and

To date, multi-stakeholder collaborations have resulted in defining how to protect human needs essential for continued development, e.g. water resources and drinking water supplies, food security, and health when threatened by the adverse impacts of climate change.

needs for capacity development to address Global Environmental Management requirements. Key to its climate change agenda is in the integration of biodiversity conservation and sustainable concerns into the National Climate Change Action Plan (CBEA, 2009).

Although the Least Developed Countries Fund (LCDF) and the Special Climate Change Fund (SCCF) have been operational for only a few years, the use of funds in Cambodia have been to support projects that reduce vulnerability and increase adaptive capacity to climate change through financing 'climate-resilient development and ecosystem resiliency' initiatives. Approved projects for LCDF-SCCF funding are 1) Building Capacities to Integrate Water Resources Planning in Agricultural Development – UNDP implemented, and 2) Vulnerability Assessment and Adaptation Programme for Climate Change in the Coastal Zone of Cambodia considering livelihood improvement and ecosystems – UNEP implemented (GEF, 2010). To date, multi-stakeholder collaborations have resulted in defining how to protect human needs essential for continued development, e.g. water resources and drinking water supplies, food security, and health when threatened by the adverse impacts of climate change. This information has been fed into the NAPA list of priority activities. For example, three (3) coastal protection projects have been implemented under the Mangrove Restoration and Sustainable Use of Natural Resources program to stabilize coastal shorelines and reduce erosion, to reduce sea water intrusion, and to protect coastal areas from storm damage. The lead executing agency is MAFF and MoE through financial aid from the International Development and Research Centre (IDRC), and DANIDA. These activities underscore the shift in NAPA funded initiatives from Integrated Coastal Management (ICM) to a more robust ecosystem-based approach to fisheries (GEF, 2009).

The World Conservation Union (IUCN) is promoting the recognition of Ecosystem-based Adaptation (EbA) in Cambodia as an 'element' of response

Phot credit: UNEP/Serena Fortuna

to climate change. A number of initiatives are taking place in terms of protection and efficient use of natural resources, which have relevance for adaptation, e.g. projects on sustainable community fisheries. These projects work to restore natural fire and hydrological regimes in wetlands. Several community level actions that have been put into place in response to climate variability elsewhere in the Mekong Delta as adaptation measures responding to greater scales of change such as innovative solutions to flooding by the building of lower earthen dykes which enable the harvesting of fish (IUCN, 2009).

the vein of thought expressed in the consultation processes for this study is that these efforts facilitate climate change adaptations, or that they are closely related to the working definition of 'adaptation' expressed in this study for inevitable they will proved communities with options and resources to facilitate needed climate change adaptations.

The Royal Government of Cambodia and the Forestry Administration, along with Community Forestry International and Terra Global Capital have developed the first Cambodian "avoided deforestation" project. The project involves 12 Community Forestry (CF) groups, comprised of 55 villages, which protect 60,245 hectares of forest land in the Northwestern province of Oddar Meanchey. The project will be one of the first to use a new methodology for submission under the Voluntary Carbon Standard (VCS) combined with the Climate Community and Biodiversity Alliance (CCBA) guidelines. The project is expected to sequester 8.7 million metric tons of CO2 over 30 years, demonstrating how developing countries can generate income from carbon markets and positively impact climate change, as well as utilizing the situation to adapt to climate change impacts (Pact, 2009).

In May 2008, Reducing Emissions by Deforestation and Degradation (REDD) was officially endorsed by H.E. Prime Minister Hun Sen through Sar Chhor Nor 699. The guiding principles ensure that carbon revenues are used to 1) improve forest quality, 2) provide maximum benefits to local communities with participate in project activities and, 3) study the potential for new REDD projects in Cambodia. In some contexts, this effort may be seen as a mitigation strategy, however, safe guarding the forest results in soil stabilization that safeguards communities from landslides, excess effects of flooding, and protects community livelihoods that equate to income to be used in times of calamity, thus the project is also considered as an adaptation to new conditions (Bradley, 2009).

A multitude of national and local NGOs are active in forms of community based natural resource management and livelihood activities. For some, these initiatives may not be considered as 'adaptations' to climate change. However, if taken indicatively, many of these NGOs, e.g. the Community Base Natural Resource Management Learning Institute, initiatives encompass the conservation and rehabilitation of ecosystems partnered to livelihood advancements in Non Timber Forest Products, capacity building for poverty reduction, and rural development research; the vein of thought expressed in the consultation processes for this study is that these efforts facilitate climate change adaptations, or that they are closely related to the working definition of 'adaptation' expressed in this study for inevitable they will proved communities with options and resources to facilitate needed climate change adaptations.

CLIMATE CHANGE KNOWLEDGE, RESEARCH AND NEEDED ACTIONS

Existing knowledge and research availability

The napa research builds upon existing coping strategies implemented by local communities in order to enhance their adaptation capacity. Their research work has focused on enhancing understandings related to: 1) the main characteristics of climate hazards in Cambodia (flood, drought, windstorm, high tide, salt water intrusion and malaria), 2) coping mechanisms to climate hazards and climate change at the grassroots level, and 3) existing programs and institutional arrangements for addressing climate hazards and climate change (RGC, 2006). Facilitating this research agenda have been studies conducted in conjunction with the Royal University of Phnom Penh (RUPP) along the lines of vulnerability and adaptation in climate change prediction, impacts of climate change on national development, a review of water regimes in Phnom Penh (collaborative work with the Stockholm Environment Institute), and an ongoing study on water vulnerability in sub-urban areas. Use of these studies is focus at the ministerial planning and reporting level, and for the purpose of lobbying for resource support; to a lesser degree by those at the forefront of adaptation implementation initiatives.

Facilitating this research agenda have been studies conducted in conjunction with the Royal University of Phnom Penh (RUPP) along the lines of vulnerability and adaptation in climate change prediction, impacts of climate change on national development, a review of water regimes in Phnom Penh (collaborative work with the Stockholm Environment Institute), and an ongoing study on water vulnerability in sub-urban areas.

The Ministry of Environment, with assistance from various representatives from the RUPP and others, led the production of the 'Analysis of Policies to Address Climate Change Impacts in Cambodia' and the 'Vulnerability and Adaptation to Climate hazards and to Climate Change: A Survey of Rural Cambodian Households (MoE, GEF, and UNDP, 2005). The later study has proven to be very valuable as it expresses well local level adaptation to climate change using meteorological trends. It is hope that the information would be applied to assessments on future climate change impacts in key vulnerable sectors, to describe links between climate, environment and socio-economic conditions in vulnerable sectors, and to identify other priority adaptation strategies. The uses of this paper, and those mentioned, have been strategic in the development of the NAPA.

Recognizing the vulnerability of Cambodian agriculture, particularly rain fed cropping, to climate variability and change, the Australian Centre for International Agricultural Research (ACIAR) has implemented a new program of research to assist adaptation to climate change at the farm scale; developing capacity for more efficient use of soil and water resources in Takeo, Kampot and Kampong Thom provinces (ACIAR, 2009). CEDAC is also involved in farm level research focused on small farm holdings. Their research entails looking at carbon storage capacities between traditional methods of rice farming verse a Systems of Rice Intensification (SRI) approach to rice farming. SRI is a method of rice farming that focuses on organic farming practices, e.g. use of composting, under tilling rice husk, and seed selection (pers com., CEDAC).

Further research into SRI is also being conducted by Oxfam America. In 2010 Oxfam America with be taking a specific focus on understanding the relationship between SRI and its potential for climate change adaptation and

mitigation. Additional studies to be conducted, not directly related to SRI, will be the inception of a 'Saving for Change' participatory action research project that links micro-savings to groups vulnerable to climate change (pers com., Oxfam America).

Through the Assessment of Impacts and Adaptation to Climate Change (AIACC) funding, collaborative research has been focused on enhancing the scientific capacity of developing countries to assess climate change vulnerabilities and adaptations, and generate and communicate information useful for adaptation planning and action by relevant government ministries and their local counterparts. The following two (2) papers have been produced as a result of their efforts in Cambodia:

Chinvanno, S., et al., 2006. Climate risks and rice farming in the lower Mekong River countries. AIACC Working Paper No. 40

Wehbe, M. B., et al., 2005. Social Methods for Assessing Agricultural Producers' Vulnerability to Climate Variability and Change based on the Notion of Sustainability. AIACC Working Paper No.19

As part of its Subprogram 3, the Australian Centre for International Agricultural Research has conducted the following research (ACIAR 2009):

- Assessment of the biophysical and policy constraints and opportunities for climate adaptation at the farm level;
- Assessment of the efficacies of agro-meteorological and extension services in the context of climate change adaptation in Cambodia;
- Assessment of the scope of other donor programs and the potential for linkages to Australian climate adaptation programs;
- Assessment of the ability of selected farming systems modeling tools to adequately capture biophysical and socioeconomic dimensions of rice-based cropping and mixed crop–livestock systems in the context of climate variability and climate change; and
- Developed and test benchmarking methods and data collection and survey protocols to underpin a framework to assess impacts of climate change adaptation.

Conceivably, the primary users of this research would be facilitating government administrations, NGOs and communities; however community use seems restricted to those involved directly in the research as recipients/ testers.

There are many examples of decentralization in land and water management. Southeast Asia START Regional Center, together with national and regional partners, has supported some of the initial scientific research on climate change impacts and adaptation strategies in Cambodia. These projects had strong emphasis on agriculture, water, and forest-related impacts and adaptation strategies. Research results are similar to that of Kirby, M., M. Mainuddin, and J. Eastham (2009) of the Mekong Climate Change Project which focused on agricultural impacts and adaptation through an assessment of climate change impacts vis-à-vis hydrological regimes in the Mekong using the AQUACROP model developed by FAO. This research was also integrated with the other research that studied the impact of climate change on agriculture, fish and food security, and adaptations strategies Kirby, M., M. Mainuddin, and J. Eastham (2009).

Disaster risk management sector research is centered on programs akin to the Economy and Environment Program for Southeast Asia (EEPSEA). The EEPSEA has produced several pieces of research that has generated component maps for vulnerability assessments: Climate-related hazard maps, human and ecological sensitivity maps, and adaptive capacity mapping in alignment with the vulnerability assessment framework of the United Nations' Inter-governmental Panel on Climate Change (IPCC).

The energy sector, although active, has not kept pace with research being done in the agricultural and water resources sector respective. The Groupe Energies Renouvelables, Environnement et Solidarités (GERES) is active in experimenting with solar thermal energy, cooking technologies, biofuels, biomass fuel development and social forestry, to that of agricultural intensification, land and water management, and an assortment of assessment technologies related to prediction and vulnerability in the climate change and adaptation context.

It is important to note that a wealth of research is ongoing related to the 'human' side of climate change adaptation. Such can be looked upon as a supportive feature to the more 'hard' adaptation technologies covered so far. For example, the CBNRM LI, in the process of implementing community fisheries and forestry related projects, has also focused its research agenda on how community fisheries and forestry practices are perceived by communities and at the national scale. They have also placed emphasis on how the rights, roles, responsibilities, and returns of small scale fishers can be enhance, in particular, those of women. For the Institute, it is felt that these types of studies are of particular importance to, and use by the natural resource management community when considering scaling up and out of best practices, practices that provide options to poor rural communities for coping and increasing their resilience in a climate change scenario (pers com., CBNRM LI).

Strengthening climate change adaptation needs

Beginning with climate knowledge itself, Cambodia in general and the Climate Change Department (CCD) in particular need quality climate data to enable the generation of improved climate change scenarios and projections. Some data since the 1980s available with the Department of Meteorology (DoM) are only in hard copy. Digitization of data by the DoM would be relevant for the Second National Communication in preparation by the CCD. The observation capacities of the DoM could then be further improved since accurate data would enable better projections, e.g. for climate modeling, project prioritization, and early warning. There will be continued scope for further improvements, e.g. climate data management, forecasting and automated weather stations (Danida, 2008).

The challenge to the further development of this climate modeling knowledge is getting the system to integrate with hydrological features to make it more useable and applicable to institutions such as MoWRAM, and the MAFF. It has also been suggested that the operational side of climate modeling take on a more user friendly stance, i.e. it took almost two years to learn how to use (pers com., RUPP). It has also been suggested that advances be made in bringing the knowledge/ user system to the field level for community/ farmer use to help farmers make real time adjustments in their productivity initiatives in accordance to prevailing climate conditions (pers com., MAFF–Fisheries Administration).

It has been suggested that the National Climate Change Committee (NCCC) establishes a concrete integrated data gathering and analysis processes and a

supported mechanism for dissemination to those concerned. The process should be aligned with climate change adaptation as a framework for assessing and devising responses, at the same time flexible-robust enough to be integrated into a functioning system for cross-sector planning and budgeting, i.e. an integrated system for development planning (pers com., UNDP).

From the consultation process, strongly noted is that research of this kind must be applicable and able to reach the community farmer at scale, where often it is not. Additional problems to solve are to have research results operationalized through common – local language materials that will not necessarily need 'reading' as a capability to make use of such. All sectors greatly value the efforts of agricultural researchers and request more in all areas of applied technology. However, the analysis of research data is often hard for the user to understand or not consistent respective of 'codes of standard' which in turn makes data shared with others hard to analyze; rendering the usefulness of its content and context challenging to replicate at scale, or even learn from, i.e. where to apply, how to apply. It has also been put forth that improvement in research competencies themselves are needed across all sectors (pers com., RUPP).

Respective of fisheries and aquaculture production systems, there is a strong need to build on past and current experience to improve climate resilience. Current research gaps entail productivity enhancement in brackish water and estuarine systems - technologies that pay close attention to ecological, tenure, and institutional learning. To do so, investments in marginal production systems will be needed – balanced between livestock operations and small-scale fisheries – the how to is where knowledge is needed (pers com., MAFF-Fisheries Administration).

Relating to small-scale and subsistence farmers and fishers, climate change adaption is really about gaining livelihood security. This will first entail identifying the potential and needs for livelihoods to transition to a climate change adaptation framework, e.g. skills upgrading and education, but more importantly, understanding the factors and conditions that work to under-represent and exclude the voices of small producers in national and intermediate-level planning for adaptation.

It has been suggested that both knowledge and systems/mechanisms are required to strengthen small scale producers adaptive capacities in areas of field based adaptation and innovation in agriculture and fisheries production systems, particularly in increasingly saline environments. Also needed are instruments for tenure security and equitable access to other productive assets and infrastructure; and a means to enhance accessibility and usability of scientific information on climate and weather patterns at the local level. Hence, there are still significant grey areas in how livelihood security of small-scale fishers and farmers may be threatened by climate change adaptation responses when combined with other social and environmental stressors (pers com., MAFF-Fisheries Administration).

As discussed, there is also a strong need for enhanced knowledge bases for decision-making support. This would include: 1) improved monitoring, 2) improved groundwater mapping, and compilation of existing (but scattered) knowledge about groundwater availability and quality, 3) improved availability and accessibility of data for decision making processes, and 4) a supporting system for the consolidation and expansion of management capacity at the province and commune level, and at the irrigation scheme level. Enhanced

knowledge and capacities along these lines can support an appropriate operational scheme, as well as helping farm producers decide on when and how to cultivate, e.g. real-time information about rainfall and water level; short-term forecasts of rainfall and water level; and flood forecasts in the wet season (Watt, B., 2009) (personal com. collective consultation response).

Shifting focus to disaster risk management/ reduction, the Ministry of Education Youth and Sports (MoEYS) does provide guidelines for school building construction; however disaster risk reduction issues have not been incorporated properly in the recent construction of school buildings under World Bank and ADB funded projects. From the MoEYS, specific construction guidelines and building codes that integrate Disaster Risk Reduction (DRR) are still needed. Importantly, identified is that these guidelines be issued by the MoLMUPC in consultation with the MPWT and other relevant ministries/institutions. In conjunction with this 'gap', are further guidelines for emergency planning in the schools (ADPC, 2008). It has been suggested that this be done in consultation with the Cambodian Red Cross. Notably, consultation processes indicate the need to extend DRR education across all levels of the education system, as well as into communities; not just those that have experienced disasters or have been prioritized as high risk areas.

The community managed health and nutrition sector can be, and is a suggested entry point for DRM. Mony, K., and C. Thou, (2007) in their paper 'Health Impacts of Climate Variability and Change in Cambodia'. Among various research institutions, including the MoH, identified is the need to strengthen links between mainstream climate change adaptation practices and community resilience to health and productivity related impacts amongst all sectors (MoH, 2008, and Resurreccion, B. P., Sajor, E. E. and E. Fajber, 2008.). For Oxfam, climate change adaptation is a rural development issue that requires responses that creates positive coping strategies and options for adaptation.

With respect to the Clean Development Mechanism (CDM) clearly stated has been the need for defined links between investment priorities and sustainable development goals; mechanisms to encouraging active participation by both the private and public sectors in obtaining sustainable technology transfer related to energy production, efficiency, and conservation; and mechanisms to ensure efforts made produce clear local environmental 'side' benefit (EU-ASIA, 2008). These sentiments have been carried also by those involved in consultation processes for this scoping study. However, they take the later a step forward by calling for a process to be institutionalized (a combination of knowledge and systems), that brings communities into the realm of CDM and other carbon market mechanisms directly; as a participant with eligibility concessions.

Identifying knowledge gaps respective of climate change adaptation has been a focus to work being done by the ISET-International and ISET-Nepal group. Their studies strongly indicates significant gaps in understanding autonomous strategies at individual and household levels, and of the underlying systems that may assist or directly enable adaptive capacity (Resurreccion, B. P., Sajor, E. E. and E. Fajber, 2008). From the NGO sector, labor mobility, remittances and out-migration are seen as critical autonomous strategies for adaptation.

From a regional perspective, the Southeast Asia START Regional Center has supported some of the initial scientific research on climate change impacts and adaptation strategies related to the decentralization of land and water management within the Mekong region in cooperation with the Mekong River

Commission. Tyler, S., and L. Fajber (2009) suggest that these initiatives offer opportunities for strengthening regional climate change adaptation capacities through collaboration and learning – currently limited in number and scope as a result of national sensitivities on the sharing of information related to water resources and management. This represents a systems gap in capacity development adaptation to climate change in the Mekong River Basin. Notably, the Mekong River Commission is also challenged to balance its resource development and planning mandate with the need to manage impacts. This is particularly difficult for the organization because it has no formal political accountability to the people most affected by its resource development projects (Tyler, S., and L. Fajber, 2009).

For much of the literature reviewed, and consultation responses garnered, consistently mentioned is the need for 'Structures', those capable of housing and supporting the generation and flow of climate change adaptation knowledge. Currently there are limited platforms and networks in Cambodia dedicated to climate change adaptation for development workers to interact with, or to take active participation in. Those present are seemingly for the experts, and not for those that play an 'everyday role' in rural development outside of Phnom Penh. It can be noted that it is not just structures to house information, but also that which can coordinate and facilitate capacity development at the national level, and often mentioned, at the commune level to improve access to, and responsiveness to climate change adaptation project designs and decision making processes (pers com., collective consultation response). If this were to occur it is recommended that it be guided by 'policy' to ensure that all institutions involved in climate change adaptation initiatives, or those proposing initiatives to the donor community, have adequate skills and capacities to fulfill their obligations, i.e. the institutionalization of a qualified Community of Practice (pers com., CBNRM LI).

Currently there are limited platforms and networks in Cambodia dedicated to climate change adaptation for development workers to interact with, or to take active participation in.

A CAPACITY DEVELOPMENT STRATEGY

Defining capacity gaps and priorities

To further define climate change adaptation capacity gaps directly, the study conducted a National Consultative Workshop – guided by inputs from a literature review and key informant interviews. Participants were also asked to 1) define what capacities would be needed to meet the 'purpose of filling in the gaps', 2) who should this capacity development be focused on, 3) the users of knowledge/ capacities developed, and 4) the approach to how capacity development needs would be delivered. Although the process outputs were understood, evident was the lack of basic climate change and climate change adaptation knowledge amongst the workshop participants to provide explicit information on what is being asked of the Adaptation Platform (PA) itself. This validates the need for the 'Platform' but also sends a strong message that the development of any climate change adaptation platform for Cambodia would have to be incremental and aligned with the level of knowledge resident with Cambodian nationals – as a starting point.

In the '**Scoping Study on Climate Change Adaptation in Cambodia: Literature Review and Invited Perspectives**' written for the Adaptation

Platform, climate change adaptation capacity development gaps had been identified and grouped into Knowledge, Systems, Structures, and Policies. To provide clarity, following is a guide to contextualize how these groups are understood in the context of this document and with those consulted:

- Adaptation knowledge: Information that builds on mitigation strategies to lessen - remove the impact of climate change;
- Adaptation systems: Designed systems that develop and put climate change adaptation knowledge into widespread use efficiently and systematically;
- Adaptation structures: An entity that serves as a repository for climate change adaptation knowledge, and as a point of coordination and interaction for knowledge sharing and directed capacity development; and
- Adaptation policies: Policies that would support the development, sharing, use, and governance over climate change adaptation knowledge - including the further development of new policies as needed.

Presented are indentified capacity 'gaps' which have been prioritized during the National Consultative Workshop and follow on discussions.

Priority adaptation knowledge gaps and purpose

1 There is a need to build a clear understanding of how social networks and informal institutions operate. This will ensure that any climate change adaptation measures taken will at a minimum take social and gender equity into consideration and bring efficiency, sustainability, and applicability to processes of adaptation.

2 There is still a lack of adaptive knowledge to enhance Cambodian rice-based farming systems in a climate change context. Meeting this gap will secure 'farming' in the two (2) contexts – climate change and sustainable development.

3 There is an absence of knowledge respective of user friendly climate data integrated with hydrological and weather features. The availability of such will enable the generation of improved climate change scenarios and projections to facilitate/ guide the prioritization and application of climate change adaptation needs on the ground.

4 There is a need to identify barriers to successful health and natural resource management-related planned and autonomous adaptations to climate change stressors. By the identification and subsequent removal of barriers, climate change adaptation may move faster, and how it moves may ensure equitable benefits derived locally respective of human rights and environmental sustainability.

Priority adaptation systems gaps and purpose

1. Currently there is no applicable system to integrate climate and weather forecasting with hydrological features for national, provincial and community use – as one element. The purpose of this is to ensure that knowledge created respective of the subject is moved to the application level efficiently and consistently as it is created and recreated amongst relevant knowledge building stakeholders.

2. To ensure positive and equitable adaptations, a system to facilitate cross sector data analysis, knowledge dissemination, planning, and

implementation of climate change adaptation initiatives is needed. It is envisioned that as climate change adaptation knowledge is generated, its meaning and use may remain sector orientated. This may result in sector adaptations that could hinder other sector needs, or not facilitate collective adaptations for the greater good.

3. A system to mainstream environment, livelihood, education, and health and nutrition into disaster risk management (DRM) planning and response is needed. Value is seen in the use of a DRM framework, but without mainstreaming this across sectors, inherent gaps in climate change adaptation and subsequent gaps in climate change impact mitigation strategies may persist, or go undetected. This could result in a lowering of Cambodia's capacity to adapt to changing climate change scenarios in the future.

4. Scientific information on climate change adaptation is available, but for many, accessibility and usability of such respective of climate, weather patterns, and climate change adaptation at the local level is seen as static and abstract. Needed is a system that updates and translates given information that can be understood and used by a wider audience. By doing so, it is thought that this would also encourage the use of information in decision making locally and nationally.

5. Climate change adaptation is seen tightly aligned with the sustainable development of Cambodia's rural poor. As with many development programs, climate change adaptation included, gender equity is often in question. Thus, providing a process from the onset, i.e. this Adaptation Platform, to improve women's access to land and control of credit, agricultural inputs, storage facilities and technologies would not only further climate change adaptation goals, but avoid disparities in equity that many development frameworks still struggle to correct.

6. Clear is that the development of appropriate and doable climate change adaptation solutions will require the participation of all stakeholders – from planning to implementation to feedback evaluations of measures taken. It is also clear that social, technical, institutional and policy barriers that hinder full participation of all stakeholders exist. As these barriers are diversely rooted, a systems approach is needed to remove these so that adaptation measures are effective and benefits derived from such are equitable.
7. Currently there are no coordinated 'codes of standards' related to research methodologies/ standards to guide those engaged in climate change adaptation. Suggested is a systems approach to ensuring research standards are kept for the simple fact that standards can ensure/ enhance the usability of information generated by different interest groups and sectors.

Priority adaptation structure gaps and purpose

1. Although some may say that there is a wealth of climate change adaptation information available, most find it difficult to gather even basic data, or that newly developed according to their needs. This scenario often hinders to use of adaptation knowledge and limits context specific innovation. Needed is a 'one-stop-shop' for climate change adaptation knowledge and integration; capable of housing and supporting the generation, innovation, and flow of climate change adaptation knowledge.

2. Intuitively, the 'Climate Change Adaptation Platform' for Cambodia is seen as a council/ body to coordinate and facilitate climate change adaptation dialog and capacity development at national to commune levels. This is seen as a very large task, one that mere systems may not be able to ensure effectively. The 'Platform' also operating as a structure would be able to integrate capacity development needs as it would be a singular element close to all relevant sectors. Perhaps as a ROLE, the structure would be able to add responsiveness to climate change adaptation project designs, and improve climate change adaptation decision making processes.

Priority adaptation policy gaps and purpose

1. There is a policy gap to support climate change adaptation mainstreaming into national and sub national policies, planning and budgetary processes. By instituting such a policy, this could help to ensure that the intent of climate change adaptation knowledge, systems and structures are effectively utilized and sustainably funded.

2. A policy is needed to support the participation of farming and fishing dependent communities into national and decentralized economic planning. This will effectively move 'policy' closer to implementing and supporting applicable practices in the field, i.e. improving on relevance and sustainability of interventions.

3. A policy is needed to institute formal and informal/ locally derived research-based decision making in all disciplines. By doing so, special interest will be lessened respective of sector support, decision making will be founded on accurate and integrated information, and ultimately the impact of efforts will be improved.

4. Currently in Cambodia there is a climate change network and other associated networks and platforms arising. Because of this, confusion in intent and overlaps in efforts can result in the misdirection and efficiency of resources used. A policy is needed to provide guidance to government line agencies, the academe, (I) NGOs, and community as to how resources should be used respective of application and coherence. (Note that the 'policy' does not need to sit with government but can be a cooperative agreement overseen by a chosen entity for adherence)

5. A policy is needed to support the inclusion of adaptation plans for sub sectors like fisheries and aquaculture in the National Adaptation Program of Action to Climate Change. This will effectively move needed resources to areas/ sectors 'overlooked' by priority funding support; ultimately ensuring equity in responses taken and limiting hindrances caused by gaps in climate change adaptation needs of linked sectors.

6. A policy is needed to provide for the incorporation of the natural resource management sector into disaster response policy and planning development. It is thought by doing so, such will add value to natural resource management efforts and safe guard critical ecosystem-based environmental services during times of disaster response – services critical to the recovery phases of those impacted by the 'disaster'.

7. Policy support is needed to encourage private sector involvement in climate change adaptation. By doing so, innovation in adaptation and the needed resources to support innovation can be capitalized upon efficiently as well as provide a sustainability mechanism to drive adaptation forward on a consistent and basis.

A strategy for adaptive capacity development

Although capacity development needs have been identified in some detail respective of sector, cross sector, and Platform operational needs, noted is the need to step back and build a broader understanding for some, and an enhanced understanding for others, of climate change mitigation, climate change impact mitigation, and climate change adaptation. Deriving perspective from Annexes 2, 3, 4, and 5; where and with whom knowledge and capacities are to be developed is keenly aligned with the end-users of such in most cases. Additionally, a greater portion of end-users are situated at the field level – provincial, district, commune, and community in scope. This brings to light where and how adaptive capacity development should begin.

In the first year of a perspective 'Cambodian Climate Change Adaptation Platform (CCCAP)', while structuring is taking place, recommended is the delivery of a climate change capacity development package encompassing general knowledge of climate change mitigation, climate change impact mitigation, and climate change adaptation concepts, action frameworks and strategies known. This should be done through an integrated workshop of provincial fair process of bring together provincial, district and commune level stakeholders together with perspective NGOs that are, or have a high probability of mainstreaming climate change adaptation into their current development programming. The aim of this process is not only to build resident understanding of the subject across stakeholders, but also to prepare stakeholders to interact with a CCCAP from a common understanding and intent. Also noted is that for decision-makers/ policy makers, prominent INGOs and NGOs operating on national scales, a more than general understanding of the subject matter is assured given the need to integrate policy support and sustainable development across sectors. As this task may be very encompassing, a series of progresses learning and analytical based workshops will be needed.

Each of the aforementioned knowledge building drives should culminate in the undertaking of an institutional self assessment of their ability and capacity to mainstream climate change adaptation actions into their institutional and operational frameworks. This will help to bring specificity to identified capacity development needs amongst the various stakeholders. To be efficient, an institutional self assessment tool should be devised for stakeholder groups, and introduced at the time of the knowledge building drives. The execution of the process should be driven by stakeholder groups, e.g. relevant provincial, district, and commune disaster risk management councils, sector based INGOs and NGOs, and Ministries, backstopped by a pool of experienced climate change adaptation practitioners at the request of each 'client'. As an output, succinct capacity development needs should be identified as well as resident capacities and expertise that can be shared.

Adaptive capacity development will be needed, and this should be delivered in a coordinated and efficient manner from perhaps a Hub with an internal source of skilled human resources. This brings to light the operational context of a CCCAP. Plausible is the building of an initial group of facilitators as intern Platform representatives to meet general knowledge building needs – facilitators can then form multi-stakeholder Technical Working Groups by integration needs for backstopping, e.g. disaster risk management and climate change adaptation, gender mainstreaming and climate change adaptation, and cross sector policy and governance analysis etc. Within these activities a learning framework can be devised to form the root of the Platform's purpose and active capacity development strategy; noted as a strategy of preference. Hence, most see the

Adaptive capacity development will be needed, and this should be delivered in a coordinated and efficient manner from perhaps a Hub with an internal source of skilled human resources.

Photo credit: AIT-UNEP RRC.AP/Lekha Ratnayake

Platform as a driving force to knowledge generation and sharing, but all see it having a 'hands on approach', directly engaging in cooperative learning nationally and sub-nationally.

Strategizing an adaptive capacity development approach for needed **knowledge generation** has been surfaced irrespective of specific knowledge needs; which are too early to define at this stage. This begins with an identified need to first build the skills of researchers to conduct and coordinate appropriate and applicable research. Secondly, from a view that not enough is known about how 'local level stakeholders' will interact with knowledge building approaches and outputs, a joint training workshop built around transformational learning and the application of processes is suggested respective of 1) participatory approaches to gender mainstreaming, 2) participatory approaches to community engagement, and 3) approaches to the integration and analysis of social networks and informal institutions with climate change adaptation. Again, this strategy requires the direct delivery and co-generation of knowledge as an impetus to a greater need. Thus, to garner context specific knowledge - to Cambodia – the strategy put forth will require that financial support be applied to a series of short participatory action research projects aimed at providing a concrete guide as to how specialized knowledge building be shape respective of sector and cross sector use of the output, i.e. keeping the end user in mind.

In relation to filling specific climate change adaptation knowledge gaps, e.g. climate and weather modelling, this is viewed not so much as new knowledge that needs to be generated, but rather having the opportunity to have hands on experience working with developed 'alike' knowledge and systems in use in the region – then adapted to Cambodian needs. This can easily be done through cross visits and mentoring exchanges amongst partner ministries, e.g. south – south and south – north exchanges. Notably, needed acquisitions to put skills gained to use in the field should be a shared responsibility of those involved.

The aforementioned is very specific to the example given, but for the most part, filling knowledge gaps related to climate change adaption is a matter of how knowledge is being generated. From a strategy view, adaptive capacity development can proceed by improving the level of meaningful participation amongst the 'researcher' and the 'subject'. This can be accomplished by encouraging/ strengthening the development of competitive funding guidelines amongst the 'donor' and 'research' community to institute strategic requirements based on how institutions integrate and meet knowledge generation needs, capacity development, and outputs with stakeholder participation and usability of the knowledge at the forefront. Intuitively, this will help build an effective social learning framework and network – adding to the fabric of a perspective CCA Platform for Cambodia.

Approaching an adaptive strategy to fill in needed **systems gaps** respective of climate change adaptation can be highly complicated because of specific sector, cross sector, and entry point needs for capacity development (refer to Annexes 3 for specifics). It definitely is not a one-stop-shop scenario. In general, for systems gaps that require specific cross sector integration of capacities and actions, the Strategic National Action Plan is seen as the most plausible point in which a capacity development strategy can be planned and initiated from. By doing so, this will allow for the supported use of Technical Working Groups to facilitate the integration needs of the various sectors though output orientated technical workshops, e.g. for data assimilation, and the design of learning by doing approaches on the ground for application purposes. As Technical

Working Groups engage with the various sectors as trainers and mentors e.g. that dedicated to Disaster Risk Reduction or an Agricultural and Water, further capacity development needs can be specifically identified and a strategy to deliver be devised. As noted, the idea is to start with small ideas for integration to be used as learning vehicles to fill widespread operational need - scaling.

Highlighted as a priority systems gaps is the need for a systematic process of cross sector data analysis, planning, and implementation of climate change adaptation initiatives and knowledge dissemination. As this is more of a generalized need for now, yet taken with a specific lens, conceptually this should be a role and responsibility of the Climate Change Department (CCD) within the Ministry of Environment (MoE) to setup and maintain. To ensure cross learning amongst the 'climate change adaptation community' plausible is for an open web-based link to be established between the CCD and a CCA Platform - highlighting established CCA cross sector integration guidelines and approaches, proposed and approved CCA initiatives, and associated environmental impact assessments etc. But is this enough?

Moving to more of a – ensuing CCA sector mainstreaming with sustainable development principles view, such as livelihood equity or gender equity, this should also take a similar adaptive capacity development strategy as the aforementioned, but it is thought that such will need a more hands on multi-stakeholder 'field-based' learning approach, i.e. capacity development collectively spearheaded by established facilitators in collaboration with provincial and commune level entities where CCA mainstreaming needs should be institutionalized.

If taken in the context of mainstreaming disaster risk management (DRM) across sectors, any capacity development strategy employed should start with ensuring that amongst key stakeholders is a general knowledge of climate change mitigation, DRM climate change impact mitigation, and climate change adaptation concepts, action frameworks and strategies. This can be delivered through a series of national and sub-national sharing and learning fairs. These fairs should also incorporate the sharing of ongoing experimentation and innovation initiatives within Cambodia and the region. Fairs can also have within mini-workshops aimed at piloting DRM-CCA learning projects amongst stakeholders willing to innovate with the concept, e.g. how multi-level participation is reflected, even how new tools and technology outputs are to fit the needs of users. One way of supporting this process of action – innovation - and learning continuously is to ensure that 'DRM-CCA' initiatives are allotted for in provincial and district budgeting – institutionally mandated.

It should be noted that the aforementioned process of acquiring base knowledge, mobilizing knowledge through sharing and learning by doing, and the promotion of innovation through mentoring and institutionalized financial support has been repeatedly the capacity development strategy of choice respective of filling in systems gaps echoed by workshop participants. What varies is the entry point; perhaps the key facilitator as noted in the previous example. To emphasize a second example, if capacity development respective of ensuring gender mainstreaming in CCA initiatives is the systems gap to be filed, what changes is the principle facilitator/ Technical Working Group (TWG) based on resident knowledge and perhaps their affiliation with the mainstreaming need. In this case it is recommended that such should be collectively spearheaded by the INGO community in collaboration with Provincial, District and Commune gender committees, i.e. the multi-stakeholder composition of a TWG. But it

should be noted that to remain responsive and adaptable, ensuring cross sector integration or mainstreaming requires a multitude of various technical people to spur learning and innovation – hence a multi-disciplinary view should always be considered when building a facilitation group. And as mentioned – informational sharing links must be made and their operations supported. Combining people and information technology is seen as a very plausible and strategic role for a CCA Platform.

Strategizing an adaptive capacity development process to fill STRUCTURE GAPS needed to facilitate climate change adaptation is rather a straight forward process that begins with building financial and logistical capacities. As the main gap to be filled is a physical place/ entity to embed an active structure – perceived as a Central Coordinating Hub and subsequent structures for provincial areas (Localized Action Hubs), plausible is to engage the skills and capacities of existing structures close to the subject at hand, i.e. the Climate Change Department (CCD). Although such should be a straight forward process, it would require the setting-up of an interim multi-stakeholder steering committee within to facilitate the development of guiding principles and operational policies. What is important and repeatedly noted is that the 'climate change community' wants to be closer to the CCD, even having a supporting role within – signifying how to bring governance, policy, and activity closer to people. Hence, the multi-stakeholder CCA Platform sits within the Climate Change Department supported and strengthened by stakeholder commitments – at the same time bring a more dynamic, active, and people centred role to the Climate Change Department. It is thought that initially the integration of the Platform within the CCD structure should be funded externally, and then funded / subsidized internally through services rendered to clients (see Annex 4 for more detailed capacity development actions).

A capacity development strategy to fill POLICY GAPS in support of climate change adaptation can plausibly be done through the use of the National Strategic Development Plan as an entry point, and may well be the starting point to the institutionalization of an adaptive legislative framework for continuous policy responses to changing climate and development scenarios. Getting to this point will require that decision and policy-makers alike have a heightened sense of climate change adaptation, and climate change mitigation and impact mitigation challenges. Often coined by workshop participants is that 'we must get it right the first time' – noting policy support is key to making this happen. Thus, to deliver, required will be training for key stakeholders on the process and use of awareness raising and reflection actions inherently linked to adopting an adaptive legislative framework; one capable of monitoring and revising supporting climate change adaptation policies as needed, and perhaps the incorporation of a multi-stakeholder Adaptation Platform within the CCD (see Annex 5 for detailed needs and processes).

Noted is that the aforementioned capacities can be delivered by 1) institutionalizing a participatory monitoring and review mechanism for all CAA initiatives within the National Strategic Development Plan, and 2) partnering review processes with that of strategic learning, e.g. engaging decision and policy-makers in the design and implementation of CCA demonstration projects – not just field visits as commonly used. This active engagement could be systematized within ministerial mandates, with key roles given to Ministers, senior bureaucrats and local communities equitably – effectively linking people to policy. Intuitively, the aforementioned process should also be used to firm-up needed commitments to research-based decision making and the

institutionalization of a multi-stakeholder monitoring and review mechanism for outcome-impact assessments of policies and internal governance decisions.

The aforementioned is not an easy process to institutionalize; such will require specialized capacity development for all concerned to ensure that multi-stakeholder engagements are equitable, meaningful, and output orientated. The process to deliver capacity development to ensure such should be done as a function of the Adaptation Platform – to be seen as natural ground for capacity development by all those concerned. To ensure the 'neutral ground' perspectives, the Adaptation Platform will need external or internally generated funding (not as an appropriation) to facilitate capacity development needs, as well as sponsor periodic stakeholder policy outcome-impact reviews on a regular basis to avoid pressure from special interest groups and interference with transparency needs.

Also noted is that policies are need to support the inclusion of climate change adaptation plans in sub sectors planning, for example fisheries and aquaculture in the National Adaptation Program of Action to Climate Change, and for the natural resource management sector into disaster response policy and planning frameworks and initiatives. A recommended capacity development strategy for filling in policy gaps like these is first the clear identification of relevant national level strategic action or development plans to engage with as an entry point to spur interactions, and garner support for capacity development. Noted is that funding will be needed to execute focused capacity development assessments, and to fill the needs identified, e.g. those needed to link people and policies together through demonstration projects and to facilitate legislative actions as previously described. It should also be noted that not all policy gaps need governmental interventions. Hence, in many cases participatory workshops facilitated by the 'Platform' can help in establishing cooperation frameworks for engagements between stakeholders and sectors and between differing 'climate change' networks and platforms. Hence, surfaced during the consultative workshop is that a policy is not needed to ensure work is done right, nor can it ensure intended results, but it does help to ensure that capacities gained are to be used – eventually. This suggested process reflects the need for stakeholder capacity development in policy and policy advocacy – yes more workshops, more participatory action research projects for the 'Platform' to engage with.

Developing a climate change adaptation platform

There have been many suggestions related to the development of an institutional mechanism for operationalizing a tentative Cambodian Climate Change Adaptation Platform. Through consultations and the National Consultative Workshop conducted, suggested is that the process be started with embedding the responsibility with the Climate Change Department within the Ministry of Environment, others suggest the process should start with sector interest – Disaster Risk Management or the water resource sector. Overwhelming, most indicate that the 'Platform' should somehow stand alone or be collectively driven by stakeholders across all relevant sectors and levels of needed engagement from within a governmental structure.

Consultations and efforts made during the National Consultative Workshop on the development of a Platform strongly signify that 'Cambodia' has much yet to achieve by way of Climate Change Adaptation (CCA) knowledge. Furthering this understanding will enable CCA stakeholders to explicitly develop the purpose, role, and responsibility the Platform should undertake efficiently and in an applicable manner. To date, stakeholders consulted have a general idea of

where and how they would like the Platform to evolve, but are also looking for concrete commitments of support to ensure that their time is well used and the 'Platform' will not remain as an idea on a workshop floor.

The **purpose of the platform** has been identified as a space where knowledge can be shared, but importantly where new knowledge can be generated. The Platform should bring together and inform stakeholders - effectively creating a link between knowledge, lessons, practice and policy. This link is seen as a primary construct of the Platform to influence policy and link national initiatives appropriately with local needs on the ground.

As much as the Platform is about generating knowledge, this purpose must be dynamic in nature as it promotes CCA research, and how it links such to dialog between the grassroots levels of development practice at the same time promoting effective policy making. Hence, the Platform's purpose is also to create an active informational bridge between development practitioners – the government – and civil society groups to ensure 'policy' takes into account real situations on the ground and is accountable to the needs of climate change adaptation amongst communities.

Guiding principles to the Platform have also been surfaced. Suggested is that full consultation with relevant stakeholders must be one of its hallmarks, be it choice of themes to promote and engage with, to how it integrates/ aligns itself with other climate change and development platforms in-country and regionally. In principle, the Platform should be supportive, yet critical, of Ministry initiatives – ensuring they meet the needs on the ground with practical solutions and appropriate capacity development support. Most important, the Platform should harness the spirit of volunteerism. To further the building of purpose and guiding principles, also suggested is that an assessment of existing networks and cross sector development mechanisms in Cambodia be conducted to capitalize on their 'best practice' experiences.

The **role of the platform** has been discussed in great detail vis-à-vis functions and operations. For many the perspective Platform's most significant role is to influence decision-makers through evidence based experiences. This should begin with the development of a common goal, how it will promote wider participation, and how it will facilitate stakeholders to stay on track as to what the Platform intends to achieve. To do this, stakeholders suggest that 'rules of engagement' be developed and applied by an interim committee defining when and how stakeholders should engage the Platform. The Platform should also function as an interface between grassroots experiences and decision-makers by ensuring consultation processes – as a principle - with key stakeholders and decision-makers is adhered to.

From another line of thought, the Platform should facilitate feedback respective of dialog generated as it aims to link people to policy. This would also require the Platform to function as a communication mechanism of what some have coined 'digestible knowledge' – knowledge that can be understood by a wider audience without needing special technical knowledge. This 'communication' function should also reach regionally.

Respective of operations, a participatory approach garnering joint learning and the sharing of ideas on a regular basis should be a cornerstone. This goes beyond the collecting and dissemination of documents. Suggested is the use of participatory media to integrate ideas, the use of grassroots knowledge and

capacity development fairs in local communities, to advocacy events; all brought to life by the Platform's 'thematic and sector based TWGs' as an operational strategy. As many would like the Platform to operate mostly in the virtual world/ web-based, many would like the Platform's functions to remain dynamic and touchable by all stakeholders.

The **responsibilities of the platform** are many: 1) to provide recommendations not positions, 2) to facilitate the efficient integration and distribution of capacity development efforts, projects and programs amongst the sectors, i.e. as a hub for donors, supporters, implementers, and those in need, 3) facilitate point sources of capacity development expertise to engage, 4) facilitate the identification and development of working partnerships, and 5) provide systematic feedback to stakeholders respective of CCA engagements, outcomes, objectives, and learnings.

Notable the aforementioned is a large task that will require first the appointment of an interim committee to define the Terms of Reference for operationalizing projected roles and responsibilities, and importantly define and mobilize a financing mechanism for Platform operations and functions. It is suggested that the Platform adopt a 'partner' with keen interest in the Platform and needed capacities to act as a secretariat to begin the needed initial steps of consultation and formation and to ensure the Platform is operationalized in the near term. This naturally leads to stakeholder participation – their roles and responsibilities.

Stakeholder participation in the Platform is to be comprised of Ministries in line with CCA initiatives agreed upon within the Platform, associated government line agencies, civil society organizations, the academe, and from community based organizations, those involved in community fisheries, forestry, protected area management, and eco-tourism – as a start. Advisors to the Platform should include scientific researchers from the academe (technical and social in make-up), and INGO and NGO researchers assigned to relevant TWG to facilitate grassroots organizations and district and commune level awareness and capacity development needs.

As participation in the Platform begins to take shape, it is important to have an idea of why multi-stakeholder participation is being called for – the purpose of such; which will also define further stakeholder roles and responsibilities. As previously touched on, multi-stakeholder participation is to provide an appropriate/ applicable interface between the more technical sciences and social sciences to enhance the usability of knowledge generated, as well as ensuring community level entities are aware of national CCA initiatives and the benefits such should derive. Multi-stakeholder participation should also ensure equity in 'voices' to be heard amongst prominent actors and those that are traditionally not heard, e.g. indigenous peoples, villagers, and women. Lastly, multi-stakeholder participation is being called for to ensure a greater wealth of cross sector exchanges, resource sharing, sharing of best practices - learning, and innovation.

The roles of stakeholders in the Platform have been simple defined as: 1) to contribute to the growth of CCA knowledge and its use through the development of projects, research, case studies, policies, and the establishment of a legal framework for the Platform and CCA to be supported, 2) to verify and validate information, 3) advocate for CCA initiatives that adhere to the perspectives and needs of marginalized groups, 4) to communicate information to tentative CCA technical working and field-based user groups, and 5) to link the Platform actively to other climate change bodies.

Because the Platform is only being conceptualized at this point, and much has to be done in way basic knowledge building – moving the Platform forward towards realization will have to be directed from a specific/ appointed source. Plainly put, given the extent of CCA knowledge and coordination amongst stakeholders respective of CCA, many 'HOW TO' unknowns still exist. Further consultation is needed now with key stakeholders able to commit time and knowledge to pin down where the Platform should be embedded and how - its governance, decision making, participation, finance systems, and initially the Platform focus on. As this takes shape, defined roles and responsibilities will merge through participatory engagements – as mentioned - key guiding principle to the development of the Platform.

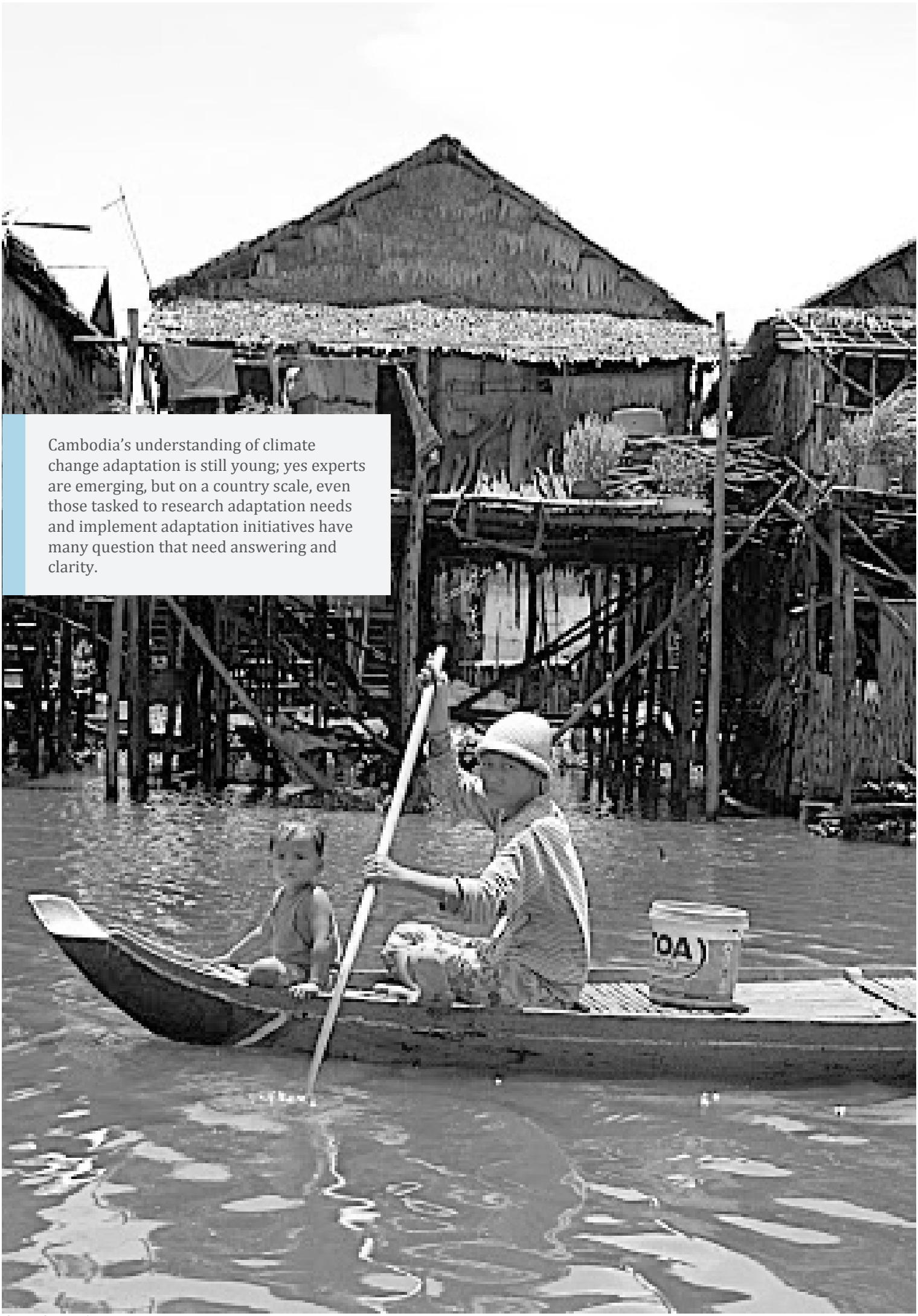
CONCLUDING OBSERVATIONS AND NEXT STEPS

Concluding this study it is clear that no one solution or approach will fit climate change adaptation needs for Cambodia. To face the impacts of climate change, the key is to build resilience at the community level; key to this is the building of multi-use knowledge basis, the development of integrated sector policies and the institutionalization of systems able to respond and adapt to the shifting and frequently unexpected conditions that climate change brings.

Through the literature reviewed, and the perspectives of those consulted, Cambodia's understanding of climate change adaptation is still young; yes experts are emerging, but on a country scale, even those tasked to research adaptation needs and implement adaptation initiatives have many question that need answering and clarity. Knowledge, for the most part, remains in the hands of those generating it. This is not to say that there is a systems failure, but rather highlights the 'newness' of the subject matter nationally, and globally.

This study has shown that much of the activity around the National Adaptation Programs of Action focus on increasing water management capacity to increase agricultural productivity, areas of action associated with understanding the country's climate change hazard vulnerabilities, disaster risk management, and to a lesser degree, the protection of coastal areas. It has been suggested that policy makers be engaged to evaluate current programs for addressing climate risks so a new research agenda can emerge and be used to redesign, enhance or revitalize current program thrusts. This study has underscored this sentiment by all sectors for it is still unclear what climate change will really look like ten-years, even twenty-years into the future. Hence, what is it we are really adapting to?

Climate change adaptation will be essential for Cambodia; specifically in the how it addresses water scarcity that jeopardizes sources of safe drinking water and agriculture; conversely how it copes with excessive water. Yes this will entail the need for more infrastructure, more interagency coordination, more research identified through the perspective of knowledge users, and more capacities. Following are prominent areas for capacity development identified in this study respective of knowledge, systems, structures, and policy.



Cambodia's understanding of climate change adaptation is still young; yes experts are emerging, but on a country scale, even those tasked to research adaptation needs and implement adaptation initiatives have many question that need answering and clarity.

Photo credit: UNEP /Serena Fortuna

Knowledge that

- Generates quality user friendly climate data integrated with hydrological and weather features to enable the generation of improved climate change scenarios and projections – geared to national and local level use;
- Develops of capacities of Cambodian rice-based farming systems to respond to climate change, e.g. on-farm crop modeling, drought and flood resistant seed varieties, the use of residual moisture - late-season rainfall or supplementary irrigation, and water and soil and nutrient management;
- Enhances brackish water and estuarine systems of productivity in line with ecological, technological, tenure, and institutional needs;
- Focuses on social networks and informal institutions on which people rely to facilitate adaptive measures, e.g. social equity, fairness and gender equality issues in the adaptation context; and
- Identifies of barriers to successful health and natural resource management-related planned and autonomous adaptations to climate change stressors.

Systems that

- Integrate climate and weather forecasting with hydrological features useable and applicable to national, provincial and community institutions;
- Ensure cross sector data analysis, planning, and implementation of climate change adaptation initiatives and knowledge dissemination;
- Ensure multi-stakeholder participation in the planning and management of irrigation at provincial and commune levels;
- Mainstream environment, livelihood, education, and health and nutrition into disaster risk management planning and responses;
- Institute 'codes of standards' respective of research methodologies and for those engaged in climate change adaptation;
- Enhance the accessibility and usability of scientific information on climate and weather patterns at the local level and for decision making purposes nationally;
- Improve women's access to land and control of credit, agricultural inputs, storage facilities and technologies;
- Strengthen women's organizations and women's leadership in organizations so that they too can benefit and partake in the creation of adaptation strategies;
- Institutes community concessions that bring local level adaptations into CDM eligibility; and
- Institute social, technological, institutional and policy measures to overcome such barriers.

Structures

- Capable of housing and supporting the generation and flow of climate change adaptation knowledge;
- That provide for consistent platforms and networks to operate – each dedicated to climate change adaptation for development workers to interact with; and
- That can coordinate and facilitate capacity development at national to commune levels to improve access to, and responsiveness to climate change adaptation project designs and decision making processes.

Policies that

- Support the Climate Change Adaptation mainstreaming into national and sub-national policy, planning, and budgeting processes;
- Encourage private sector involvement in climate change adaptation;
- Support the inclusion of adaptation plans for sub sectors like fisheries and aquaculture in the National Plans of Adaptation to Climate Change;
- Support the participation of farming and fishing dependent communities into national and decentralized economic planning;
- Provide for the incorporation of the natural resource management sector into disaster response policy and planning development;
- Institute formal and informal/ locally derived research-based decision making in all disciplines.; and
- Ensure collaboration and information sharing amongst all climate change adaptation stakeholders – government line agencies to the academe, NGO and community.

The aforementioned will entail reducing risks by improving agricultural practices and diversifying agricultural livelihoods; improving health systems to address climate-related diseases and other health impacts; and importantly, finding ways to addressing social impacts that stem from climate challenges, including migration and conflicts over natural resources.

Building resilience will mean enhancing existing development approaches. This study has touched often on fears related to merging climate change adaptation with food security and livelihood development frameworks and approaches. Can communities absorb the diversity of approaches designed to facilitate their development, or is it a question on how inter-ministerial cooperation and integration through need be realized? Challenges will be new and different. Some communities will have to adapt to unprecedented floods, scarcer potable water supplies, and for others it will be a boom or bust respective of their subsistence livelihoods. Communities will have to respond to unfamiliar conditions by harnessing early warning / forecasting systems; government agencies will have to respond by bringing their science and capacities to an applicable level of use and understanding by communities.

As Cambodia moves through short term responses to climate change, focus will have to also be on knowledge needs for planned adaptation as a long term response, e.g. developing improved climate modeling, to the development of monitoring indicators not only associated with sector risks, but also those to monitor the adaptive capacity of people and its ministerial bodies and committees. A plausible starting point is to identify drivers of socio-ecological change through participatory scenario developments, and to enhance dialogue and co-planning with all stakeholders.

The development of provincially based climate change adaptation platforms for dialog, planning, and action has been mentioned frequently, and so has been the integration of these with national line agency involvement. For now there are no existing structures to help facilitate this and institutional mechanisms to do so need greater operational support and capacity development. Identified support comes in the way of building a more robust role for the National Climate Change Committee and the Ministry of Environment respective of leading climate change adaptation learning, coordination, and action needs. Learning can start with improvements in information sharing, coordination can be helped by establishing formal institutional partnerships – an agreement of cooperation and understanding – with various non-governmental organizations, and action fostered through dynamic and creative leadership.

The next step of this study is to define a 'Cambodian Climate Change Adaptation Capacity Development Strategy' is very ambitious given the level of climate change adaptation knowledge resident in Cambodia. Accomplished to date are the identification of real needs and probable processes to deliver capacity development needs on a national scale – but neither the list nor the process is complete nor explicitly defined... the UNKNOWNs mentioned. Easily noted is that Cambodians have a low adaptive capacity to climate change, impart because of current knowledge basis. Through this document, mentioned is that knowledge must be built around climate change mitigation, and climate change impact mitigation – not just climate change adaptation. This gives credence to the connectivity of these knowledge bases, but also reflects where Cambodia needs to start its capacity development learning journey – almost from the beginning. This is not to say that highly specialized skills and knowledge are not resident in Cambodia – they are, but it is Cambodia that has to develop climate change adaptation capacities equitably – a task far too daunting for the current 'climate change adaptation community' to take on without further coordinated support. This is what has made the 'defining' process challenging.

The 'Scoping Study' engaged the capacities of those very knowledgeable and experienced in climate change adaptation, the National Consultative Workshop engaged these actors, but also widened its reach greatly to Cambodians who will need, engage with, and eventually pilot the Platform into the future. Hence, it is important that knowledge basis are built first; then succinct ideas for filling climate change adaptation gaps respective of systems, structures, and policy will flow. Widely expressed is that the platform be applicable and touchable to those who really operate in the field – with forward linkages; perhaps defining the 'Platform's' nature. Does this mean that the Platform be grassroots, allowing for an organic growth process to take hold, or be structured from the onset to ensure its grassroots intentions? Most likely a middle ground should be found that will harness simple and doable actions, not just for the first years, but always.

It will take some time for Cambodia to integrate its current climate change adaptation initiatives into a coordinated Platform for improvements towards intended impact. Knowing this, it is important to take initial preparatory and forward moving steps. There are three (3) key actions that could begin the process: 1) the building of an ad-hock group of expertise to begin coordinated actions and provide the needed inputs for the shaping of an 'Adaptation Platform', 2) knowledge building, and 3) advocacy orientated consultations with the Climate Change Department (CCD) and the 'ad-hock group' geared to the establishment of a permanent and supportive 'home' for Platform operations.

Keeping true to the multi-stakeholder consultative efforts made to date, interest among those engaged to develop an ad-hock group to take the Platform towards realization is in place. True also is that much discussion is still needed amongst those interested, e.g. finding the right skill sets to complete the group, the right actors capable of spurring interest and mobilizing needed resources, to refining the IDEA, to carrying it forward. Notably this ad-hock group will also need to place a considerable amount of its efforts on getting the message out... climate change knowledge and adaptation needs.

As repeatedly expressed, a general and better than general knowledge base is needed amongst a diversity of stakeholders. To do so efficiently, plausible is the development and dissemination of climate change adaptation knowledge through PRIMERS; a series of short four (4) page notes that provide stakeholders with the needed knowledge to spur interest in integrating 'adaptation' actions within their development programs and or to sharpen their development focus respective of achieving adaptation impact. Recently, Cord Asia - DanChurch Aid/ Christian Aid - ForumSyd, have begun a ten (10) local NGO pilot project to do just this; done through knowledge, tool and process development workshops across the spectrum of climate change actions, e.g. climate change mitigation, impact mitigation, and adaptation. As important and significant of a step this is; need and opportunity indicates that such efforts should be scaled and broaden to reach commune councils, district and provincial authorities and government line agencies respective of **their context.**

Three 'Next Steps' have been mentioned, and yes the first and second are sequential. The third should be initiated alongside knowledge and skill building activities. Recommended steps one (1) and two (2) will set the foundation for people, policy, and a Platform to being interactions. However, important is that the ad-hock group engage in advocacy orientated consultations with the CCD to find a home, support, scale, and sustainability for the Platform. This is not to say that the Platform should be imbedded within the CCD as many have indicated; rather, it is taking this recommendation/ idea to the CCD for further input and consultations, i.e. advocacy orientated consultations. The ultimate questions to answers are 1) how Cambodia can benefit from a climate change adaptation platform, and 2) how can the goals and objectives of the CCD be furthered by fully supporting and embedding a multi-stakeholder group like the proposed Platform within a government structure? Perhaps answering these two questions is where the consultation process started... can continue.

ANNEX

Annex 1
National Consultative Workshop participant list

No	Name	Sex	Position	Institution	Contact
1	Am Phirum	M	Deputy Director	MAFF	011 927 862
2	Aquilar, Macareuc	F	Advisor	UNDP	Macareuc.aquilar@undp.org
3	Atun Brad	M	Director	WFC	N/A
4	Cecila Aipra	F	Project Advisor	UNDP	Cealia.aipra@undp.org
5	Chhoeng Sotheavan	F	Volunteer	CBNRM LI	092 797 377
6	Friad, Richard	M	Consultant	UNDP	017 609 207
7	Frieson, Kate	F	Research Advisor	CBNRM LI	012 392 920
8	Ham KimKong	M	Lecturer	RUPP/DES	012 406 716
9	Heng Chan Thoeun	M	National Team Leader V & A Assessment	MoE/SNC	016 726 668
10	Hy Beangchy	F	Admin Volunteer	CBNRM LI	N/A
11	Keam Han	M	Project Manager	CBNRM LI	017 951 223
12	Kheang Seangly	F	Climate Change Intern	Oxfam America	011 206 364
13	Leng Bunlong	M	Environment Specialist	World Bank	012 946 161
14	Lic Vuthy	M	Program Staff	Danida	012 967 865
15	Ly Vuthy	M	Deputy Director	CFDD/FiA	011 660 840
16	Ma Veasna	M	Project Officer	CEDAC	012 672 721
17	Meng Monyrak	M	Learning Forum Coordinator	CBNRM LI	012 943 909
18	Oum Sopharo	M	Research Officer	CBNRM LI	011 251 176
19	Pok PeuvThola	M	ED	WDO	012 756 906
20	Pok Sokunthea	F	Admin Assistant	CBNRM LI	012 340 135
21	Por Soma	F	Project Officer	Sida	016 544 271
22	Solar, Robert	M	NRM Consultant	CBNRM LI	077 844 323
23	Teng Srey	F	Vice Director	CDC/MoH	012 836 868
24	Thol Buntha	M	Online Forum Officer	CBNRM LI	N/A
25	Tin Ponlok	M	SNC Project Coordinator	SNC Project	012 915 351
26	Sam Chanthy	M	Researcher	SEI	011 931 982
27	Sim Sambath	M	Capacity Development Advisor	Forum Syd	012 836 650
28	Thuon Try	M	-	UNDP	012 439 693
29	Tol Sokchea	M	CMLN Manager	CBNRM LI	012 322 496
30	Touch Panha	M	Communication Volunteer	CBNRM LI	012 281 652

Acronyms used: M – male, F – female; CBNRM LI – Community Based Natural Resource Management Learning Institute, CDC/ MoH - Communicable Disease Control / Ministry of Health, CEDAC - Cambodian Center for Study and Development in Agriculture, CFDD/ FiA – Community Fisheries Development Division/ Fisheries Administration, MAFF – Ministry of Agriculture Forestry and Fisheries, MoE – Ministry of Environment, RUPP/DES – Royal University of Phnom Penh/ Department of Environmental Science, SEI – Stockholm Environment Institute, SNC – Second National Communication, ¬¬¬¬¬UNDP – United Nations Development Programme, V & A - Vulnerability and Adaptation, WDO – Wholistic Development Organization, WFC – World Fish Center.

Annex 2
Climate change adaptation knowledge gaps and needed capacity development and process as identified through consultation and workshop processes.

Priority gap and purpose 1: There is a need to build a clear understanding of how social networks and informal learning institutions operate. This will ensure that any climate change adaptation measures taken will at a minimum take social and gender equity into consideration and bring efficiency, sustainability and applicability to processes of adaptation.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• A general knowledge of climate change mitigation, climate change impact mitigation, and CCA concepts, action frameworks and strategies; • Strengthening and institutionalized use of multi-disciplinary knowledge in CCA initiatives; • Improved applications of gender mainstreaming processes within all sectors and levels; • Improved applications of participatory action research approaches in CCA initiatives; and • Improved capacities of 'development practitioners' to facilitate local communities to engage effectively in multi-stakeholder initiatives, i.e. building their capacities.	• Local NGOs • Local and Provincial Gov. Authorities – planners, coordinators, technical service providers and decision makers • Communities involved in CCA initiatives	• Local NGOs • Local and Provincial Gov. Authorities – planners, coordinators, technical service providers and decision makers • Communities involved in CCA initiatives

Process to deliver capacity development:

- Joint training workshops built around transformational learning and application of processes, (1) participatory approaches to gender mainstreaming, (2) participatory approaches to community engagement, and (3) approaches to the integration and analysis of social networks and informal institutions in CCA; and
- Building of a social learning framework into a perspective Cambodian CCA Platform.

Priority gap and purpose 2: There is still a lack of adaptive knowledge to enhance Cambodian rice-based farming systems in a climate change context.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• On-farm crop modelling respective of climate content scenarios; • Research skills and capacities that lead to the development of drought and flood resistant seed varieties; • Improved knowledge in the use of water-use efficiency, e.g. with residual moistures and irrigation; and • Application of appropriate water, soil and nutrient management; and • Skills related to the conduct of technical and social research.	• Ministry of Agriculture, Forests and Fisheries technology extension workers • Academe researchers	• Ministry of Agriculture, Forests and Fisheries technology extension workers • Academe researchers • Agricultural farmers/ fishers

Process to deliver capacity development:

- Mandatory certification through skills building workshops respective of conducting and integrating research and meeting research standards;
- Improve consultation and collaboration between formal research and learning institutions and local level farmers; and

- Encourage competitive funding and institute strategic requirements based on how institutions are to integrate and meet capacity development needs and outputs of stakeholders.

Priority gap and purpose 3: There is an absence of knowledge respective of user friendly climate data integrated with hydrological and weather features. The availability of such will enable the generation of improved climate change scenarios and projections to facilitate/ guide the prioritization and application of climate change adaptation needs on the ground.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Enhancement of knowledge of needed data and equipment to measure needed 'climate and weather variables' in real time; • Knowledge to integrate and interpret/ model data that is useful to national and local level needs – short and long term; and • Achieving long term financing to maintain the movement of knowledge generated into an integrated user system.	• Ministry of Water Resources and Meteorology • Ministry of Water Resources and Meteorology, District and Commune Councils and agricultural farmers/ fishers	• Mekong River Commission • Ministry of Environment • Ministry of Water Resources and Meteorology • Ministry of Agriculture, Forests and Fisheries • District and Commune Councils • Academe • Agricultural farmers/ fishers

Process to deliver capacity development:

- Hands on experience sharing with 'alike' knowledge and systems use in the region – cross visits and mentoring exchanges;
- Discussion with primary targets and possible mentors for capacity development to identify what knowledge and equipment is available / and needed, and what user capacities are needed to make use of the aforementioned applicable – based on a define scale needed for Cambodia;
- Learning mode through multi-stakeholder participation in experimentation/ learning by doing, and acquisitions as required; and
- Targeted capacity development workshops for end users – permanent, revolving and updating year-on-year.

Priority gap and purpose 4: There is a need to identify barriers to successful health and natural resource management-related planned and autonomous adaptations to climate change stressors. By the identification and subsequent removal of barriers, climate change adaptation may move faster, and how it moves may ensure equitable benefits derived locally respective of human rights and environmental sustainability.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• A general knowledge of climate change mitigation, climate change impact mitigation, and CCA concepts, action frameworks and strategies; • Participatory action research frameworks and learning approaches; and the • Use of research analysis in decision-making at local to national levels.	• Sector actors respective of: Local NGOs, Local and Provincial Gov. Authorities – planners, coordinators, and decision makers, Communities involved in CCA initiatives, advocacy organizations • Customized for national decision makers	• Sector actors respective of: Local NGOs, Local and Provincial Gov. Authorities – planners, coordinators, and decision makers, Communities involved in CCA initiatives, advocacy organizations • National decision makers

Process to deliver capacity development:

- Direct training for select sector actors, as described; and
- Strategic financial and mentoring support to actuate a learning-by-doing project based program.

Annex 3
Climate change adaptation SYSTEMS gaps and needed capacity development process as identified through consultation and workshop processes.

Priority gap and purpose 1: Currently there is no applicable system to integrate climate and weather forecasting with hydrological features for national, provincial and community use – as one element. The purpose of this is to ensure that knowledge created respective of the subject is moved to the application level efficiently and consistently as it is created and recreated amongst relevant knowledge building stakeholders.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Operation and scaling of knowledge management systems, e.g. content management; • Simplified modelling knowledge – and modelling packages that provide integration and distribution of information; • Equipment to generate local data; • Cross sector capacities to interpret received data at provincial and community levels; and • Financial capacity to maintain data gathering efforts – national to commune level	• Department of Meteorology • Ministry of Agriculture, Forests, and Fisheries • Ministry of Water Resources and Meteorology • National Committee for Disaster Management • Commune Committees for Disaster Management • Rural farmers	• Department of Meteorology • Ministry of Agriculture, Forests, and Fisheries • Ministry of Water Resources and Meteorology • National Committee for Disaster Management • Commune Committees for Disaster Management • Rural farmers

Process to deliver capacity development:

- Two possible entry points to provide support and direction for capacity development, (1) the Strategic National Action Plan – Disaster Risk Reduction Technical Working Group, and (2) the Agricultural and Water Technical Working Group;
- Identification of explicit capacity needs for each level of stakeholders respective of equipment and data use – national workshop and financing drive to fulfil short and medium term needs;
- Output orientated workshop on data needs and the assimilation of data into knowledge management systems;
- Wide scale training initiative to operationalized the system;
- Learning by doing approach through supported pilot/ learning projects; and
- Financial funding for continuous operations.

Priority gap and purpose 2: To ensure positive and equitable adaptations, a system to facilitate cross sector data analysis, planning, and implementation of climate change adaptation initiatives and knowledge dissemination is needed. It is envisioned that as climate change adaptation knowledge is generated, its meaning and use may remain sector orientated. This may result in sector adaptations that could hinder other sector needs, or not facilitate collective adaptations for the greater good.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Institutional CCA initiative review and integration system/ commission (comprised of members from different CCA sectors, e.g. Disaster Risk Management, Water Resources, and Agriculture, Education, Health etc.; • Specialist roster to provide technical backstopping to integration needs for developing and implementing CCA initiatives; and • Information sharing data base respective of CCA sector initiatives – to including project designs and environmental impact assessments; and • Financial funding for continuous operations.	• Perspective commission and roster members	• All CCA project developers • Ministry and line agencies dealing with rural and urban development and disaster management planning • INGO – NGO community • Donor support community

Process to deliver capacity development:

- Conceptually, this should be a role and responsibility of the Climate Change Department within the Ministry of Environment to setup and maintain; For key actors, a heightened knowledge of CCA concepts, action frameworks and strategies will need to be established – focused training; and
- Development of a specific web-based information hub, e.g. sample content - CCA initiative guidelines, proposed and approved CCA initiatives, and associated environmental impact assessments.

Priority gap and purpose 3: A system to mainstream environment, livelihood, education, and health and nutrition into disaster risk management (DRM) planning and responses is needed. Value is seen in the use of a DRM framework, but without mainstreaming this across sectors, inherent gaps in climate change adaptation and subsequent gaps in climate change impact mitigation strategies may persist, or go undetected. This could result in a lowering of Cambodia's capacity to adapt to changing climate change scenarios in the future.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• The institutionalization of a DRM-CCA mainstreaming body (comprised of members from different sectors, e.g., Water Resources, and Agriculture, Education, Health etc., co-directed by National, Provincial, and Commune Disaster Risk Management Committees; • Specialist roster to provide technical backstopping to integration needs for developing CCA initiatives; • Information sharing data base respective of DRM-CCA sector initiatives; and • Financial funding for continuous operations.	• Relevant Ministry and Department managers • Perspective body representatives and co-workers of stakeholders represented within • Roster members	• All DRM-CCA project developers and implementers • Ministry and line agencies dealing with rural and urban development and disaster management planning • INGO – NGO community • Donor support community

Process to deliver capacity development:

- Capacity development should be collectively spearheaded by the National Committee for Disaster Management, Provincial and Commune Committees for Disaster Management – but done so as a multi-stakeholder learning body that includes multi-sector representation;
- Capacity development should first start by ensuring that resident amongst key actors is a general knowledge of climate change mitigation, DRM climate change impact mitigation, and CCA concepts, action frameworks and strategies – a series of national and sub-national workshops will be needed;
- Learning by doing approach through supported pilot/ DRM-CCA mainstreaming learning projects; and
- Development of a specific web-based information hub, e.g. sample content – DRM-CCA initiative guidelines and recommendations, proposed and approved DRM-CCA initiatives, and a roster of technical specialist etc.

Priority gap and purpose 4: Scientific information on climate change adaptation is available, but for many, accessibility and usability of such respective of climate, weather patterns, and CCA at the local level is seen as static and abstract. Needed is a system that updates and translates given information that can be understood and used by a wider audience. By doing so, it is thought that this would also encourage the use of information in decision making locally and nationally.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Support system for a team of specialists to transform knowledge into a simplified user context – language translation included; • Support system for a team of specialist to mentor on-site informational and skills building needs; • Development/ management system for a central web-based information hub dedicated to CCA; and • Financial funding for continuous operations.	• All relevant stakeholders • Taskforce team	• All relevant stakeholders

Process to deliver capacity development:

- Series of specialized trainings and continual updating for a given taskforce for the stated purpose;
- Needed budgeting to support continual learning needs at the field level be integrated into District annual budgeting processes; and the
- Establishment of an expertise hub/ roster where such can be identified and fielded from to meet demands.

Priority gap and purpose 5: Climate change adaptation is seen tightly aligned with the sustainable development of Cambodia's rural poor. As with many development programs, climate change adaptation included, gender equity is often in question. Thus, providing a process from the onset to improve women's access to land and control of credit, agricultural inputs, storage facilities and technologies would not only further climate change adaptation goals, but avoid disparities in equity that many development frameworks still struggle to correct.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Institutional gender responsive CCA initiative review and integration system/ commission (comprised of members from different CCA sectors, e.g. Disaster Risk Management, Water Resources, and Agriculture, Education, Health etc.; • Specialist roster to provide technical backstopping to integration needs for developing and implementing gender responsive CCA initiatives; and • Information sharing data base respective of gender responsive CCA sector initiatives – to including project designs and environmental impact assessments; and • Financial funding for continuous data base operations.	• Donor community active in Cambodia • Relevant Ministry and Department managers • District and Commune Councils • INGO – NGO community	• Donor community active in Cambodia • Relevant Ministry and Department managers • District and Commune Councils • INGO – NGO community • Community

Process to deliver capacity development:

- Capacity development should be collectively spearheaded by the INGO community in collaboration with Provincial, District and Commune Committees gender committees – but done so as a multi-stakeholder learning body that includes multi-sector representation;
- Capacity development should first start by ensuring that resident amongst key actors is a general knowledge of 'gender' and climate change mitigation, climate change impact mitigation, and CCA concepts, action frameworks and strategies – a series of national and sub-national workshops will be needed;
- Learning by doing approach through supported pilot/ DRM-CCA mainstreaming learning projects; and
- Development of a specific web-based information hub, e.g. sample content – Gender mainstreaming and CCA initiative guidelines and recommendations, proposed and approved initiatives, and a roster of technical specialist etc.

Priority gap and purpose 6: Clear is that the development of appropriate and doable climate change adaptation solutions will require the participation of all stakeholders – from planning to implementation to feedback evaluations of measures taken. It is also clear that social, technical, institutional and policy barriers that hinder full participation of all stakeholders exist – yet it is still unclear where, what, how, and the impacts of these barriers are. As these barriers are diversely rooted, a systems approach is needed to remove these so adaptation measures remain effective and benefits derived from such are equitable.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
Development of general knowledge on CCA, and climate change mitigation and impact mitigation strategies – and the benefits multi-stakeholder participation brings to project development and implementation; • Systematic and institutionalized program and project review processes for the identification of social, technical, institutional and policy barriers that hinder the full participation of all stakeholders in CAA initiatives; • Capacity to institutionalize process interventions from national to local levels – on the ground and through the development of policies to ensure barriers to participation are addressed; and • Monitoring and evaluation system that cross references stakeholder participation in decision making processes relative to all CCA initiatives; and • Financial funding for continuous operations.	• Relevant Ministry and Department managers • District and Commune Councils • INGO – NGO community	• Donor community active in Cambodia • Relevant Ministry and Department managers • District and Commune Councils • INGO – NGO community Community

Process to deliver capacity development:

- Conduct a national workshop to identify and build awareness levels to where 'barriers' to participation exist and how these are currently being addresses;
- Support for participatory action research projects that address identified barriers through cross sector collaboration and innovation – subsequent sharing and dissemination of research outputs and project outcomes; and
- Support for a national monitoring and evaluation information hub and sub-national committees that cross references stakeholder participation in decision making processes relative to all CCA initiatives – with the capacity to take binding measure to adhere to their mandate when needed.

Priority gap and purpose 7: Currently there are no coordinated 'codes of standards' related to research methodologies to guide those engaged in climate change adaptation. Suggested is a systems approach to ensuring research standards are kept for the simple fact that standards can ensure/ enhance the usability of information generated by different interest groups and sectors, i.e. effectively and efficiency.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of a National review body for CCA research approaches and codes of standards; and • Mandatory certification system to certify researchers and validate research conducted systematically; and • Financial funding for continuous operations.	• Ministries and Department level officers involved in research • INGOs – NGOs • Academe	• Ministries and Department level officers involved in research • INGOs – NGOs • Academe

Process to deliver capacity development:

- Capacity development should be collectively spearheaded by formal international research institutions representing the 'national review body', but the continual coordination of verification and certification be embedded in one academic institution; and
- Capacities should be delivered via a national information drive with mentoring support for those institutions and organization that build research into their program/ projects, e.g. National NGOs and Ministries.

Annex 4
Climate change adaptation STRUCTURE gaps and needed capacity development process as identified through consultation and workshop processes.

Priority gap and purpose 1: Although some may say that there is a wealth of climate change adaptation information available, most find it difficult to gather even basic data or that newly developed according to their needs. This scenario often hinders to use of adaptation knowledge and limits context specific innovation. Needed is a 'one-stop-shop' for climate change adaptation knowledge; capable of housing and supporting the generation and flow of climate change adaptation knowledge and integration, as well as encouraging is use and innovation with from national to provincial levels.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Efficient modus for information sharing and active mentoring; and	• Government entities, NGOs, Academe, local communities – farmers/ fishers, and the private sector	• Government entities • NGOs and INGOs • Academe • Local communities – farmers/ fishers
• Modus of the promotion of operationalizing knowledge generated.	• Government entities, local communities – farmers/ fishers, and the private sector	• Private sector

Process to deliver capacity development:

- Financial, logistical, structuring and funding support to establish a physical place/ entity to embed the main structure (Central Coordinating Hub) and subsequent structures for provincial areas (localized action Hubs); and
- Established through official stakeholder workshop (sub-committee in nature), for the set-up of a steering committee within the 'structure' to facilitate planning needs and develop guiding and operational policies.

Priority gap and purpose 2: Intuitively, the 'Climate Change Adaptation Platform' for Cambodia is seen as a council/ body to coordinate and facilitate climate change adaptation dialog and capacity development at national to commune levels. This is seen as a very large task, one that mere systems may not be able to ensure effectively. The Platform, also operating as a structure would be able to integrate capacity development needs as it would be the one element in the 'Cambodian Climate Change Adaptation Platform' close to all relevant sectors. Perhaps as a ROLE, the structure would be able to add responsiveness to climate change adaptation project designs, and improve climate change adaptation decision making processes.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Resident skills and knowledge to identify capacity development needs of its 'clients' as needed by request; • Building of a systematic process tied to the operational structure to meet the aforementioned – an active roster; • Source funding for a skills sharing network providing capacity building needs – funded roster; • Access to emerging knowledge and the translation of such into the Cambodian context – ecological, economic, educational, social and political constructs, and in the relevant language; and • Strong financial, logistical, and structuring support.	• Focused on network/ platform participants	• CCA actors in the field – implementers • Academe • Relevant decision makers • Local and provincial authorities • Government line agencies

Process to deliver capacity development:

- Developing and embedding proposed committee and roster roles and responsibilities related to 'systems' requirements within the Cambodian Climate Change Adaptation Platform;
- Building of a professional CCA roster capable of assisting in the structural setup and its functions; and
- Web and hard copy information materials for sharing and distribution – services, expertise, new news/ events etc.

Annex 5
Climate change adaptation POLICY gaps and needed capacity development process as identified through consultation and workshop processes.

Priority gap and purpose 1: There is a policy gap to support climate change adaptation mainstreaming into national, sub national policies, planning and budgetary processes. By instituting such a policy, this could help to ensure that the intent of climate change adaptation knowledge, systems and structures are effectively utilized and funded appropriately to ensure their realization and sustainability.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of enhanced knowledge on CCA, and climate change mitigation and impact mitigation strategies; • Appropriate and sustainable policy financing structures for CAA needs; • Policy advocacy; and • Scaling up of policy intents – process.	• National Climate Change Council and all applicable CCA associated parliamentary members • NGOs, INGO, Local government institutions and commune councils	• National Climate Change Council and all applicable CCA associated parliamentary members • NGOs, INGO, Local government institutions and commune councils

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Policy cross sector analysis: review – representation – integration that leads to the development of an adaptive legislative framework for support;
- Training on awareness raising and reflection;
- Financial support;
- Institutionalizing a monitoring and review mechanism for all CAA initiatives within the National Strategic Development Plan;
- Demonstration projects and field visits for policy makers to engage with – not just visit; and through a
- Knowledge, experience sharing mechanism – built around the Stockholm Environment Institute/ United Nations Environment Programme (SEI/UNEP) Platforms.

Note: SEI has been understood as the Regional Climate Change Adaptation Platform which SEI is a partner of.

Priority gap and purpose 2: A policy is needed to support the participation of farming and fishing dependent communities into national and decentralized economic planning. This will effectively move 'policy' closer to implementing and supporting applicable practices in the field, i.e. improving on relevance and sustainability of interventions.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Enhanced understanding of CCA and local to national policy making processes and working principles; • Policy and policy advocacy strategies; • Integration of multi-stakeholder participation in policy review and decision making processes; and • Scaling up of policy intents – process.	• Ministry of Agricultural Forestry and Fisheries (MAFF) and the Ministry of Environment (MoE) line agencies, local commune councils and communities, Local NGOs • NCCC, MAFF, MoE and all applicable CCA associated parliamentary members • NGOs, INGO, Local government institutions and commune councils	• National Climate Change Council (NCCC) and all applicable CCA associated parliamentary members • NGOs, INGO, Local government institutions and commune councils

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Use an of adaptive legislative framework;
- Financial support;
- Institutionalizing a participatory monitoring and review mechanism – with a key role given to the MAFF and local fishing communities;
- Demonstration projects and field visits for policy makers to engage with – not just visit; and
- Knowledge, experience sharing mechanism – built around the Stockholm Environment Institute/ United nations Environment Programme (SEI/UNEP) Platforms.

Note: SEI has been understood as the Regional Climate Change Adaptation Platform which SEI is a partner of.

Priority gap and purpose 3: A policy is needed to institute formal and informal/ locally derived research-based decision making in all disciplines. By doing so, special interest will be lessened respective of sector support, decision making will be founded on accurate and integrated information, and ultimately the impact of efforts will be improved.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Enhanced understanding of CCA concepts and working principles in the Cambodian context, technologies, and cross sector data analysis: review – linkage to cause and effect and integration; and • Development of a cross sector research output/ conclusion / recommendation framework done so to support policy makers in decision making processes.	• All applicable CCA associated parliamentary and decision making entities – local to national • Lobby community, Academe, Research Institutions, NGOs, INGO, Local government institutions and commune councils	• CCA and sector decision makers – all levels • Sector planners • INGO and donor support agencies • Lobby community • Academe • Research Institutions • NGO and INGO community • Local government institutions and commune councils

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Development of an adaptive legislative framework firming commitment to research based decision making – participatory workshop;
- Financial support to institutionalizing a monitoring and review mechanism for outcome use and impact assessment; and
- Demonstration projects for trial testing of the policy, and field visits for policy makers to engage with – not just visit.

Priority gap and purpose 4: Currently in Cambodia there is a climate change network and other associated networks and platforms arising. Because of this, confusion in intent and overlaps in efforts can result in the misdirection and efficiency of resources used. A policy is needed to provide guidance to government line

agencies to the academe, NGO and community as to how resources should be used respective of application and coherence. (note that the policy does not need to sit with government but can be a cooperative agreement overseen by a chosen entity for adherence)

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of enhanced knowledge on CCA, and climate change (CC) mitigation and impact mitigation strategies; • Institutionalization of guiding principles to network/ platform content associated with CC and CCA – to include sharing and purpose driven integration of information, experiences, and skills; and • Sustainable funding structure for CCA needs – perhaps integrated between CC and CCA initiatives.	• CC and CCA network participants and supports • Chosen oversight committee	• CC and CCA network participants and supports • Chosen oversight committee • Others with similar interest at regional and global levels

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Institutionalizing a monitoring and review mechanism for all Climate Change and CCA network/ platform initiatives; and
- Participatory workshop to establish a cooperation framework for engagement and content between networks/ platforms.

Priority gap and purpose 5: A policy is needed to support the inclusion of adaptation plans for sub sectors like fisheries and aquaculture in the National Adaptation Program of Action to Climate Change. This will effectively move needed resources to areas/ sectors 'overlooked' by priority funding support; ultimately ensuring equity in responses taken and limiting hindrances caused by gaps in climate change adaptation needs of linked sectors.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of enhanced knowledge on CCA, and climate change (CC) mitigation and impact mitigation strategies; • Cross sector policy analysis amongst MAFF and NAPA to Climate Change programming: review – representation – integration; • Sustainable policy financing structure to integrate MAFF – Fisheries Administration with CCA amongst linked sectors; • Policy advocacy; and • Scaling up of policy intents – process.	• National Climate Change Council (NCCC) and all applicable CCA associated parliamentary members • Ministry of Agricultural Forestry and Fisheries (MAFF) and the Ministry of Environment (MoE) • NGOs, INGO, Local government institutions	• NCCC and all applicable CCA associated parliamentary members • NGOs, INGO, Local government institutions and commune councils

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Specific integration within an adaptive legislative framework;
- Research, assessment, dissemination highlighting the benefit of focusing on sub sectors like fisheries and aquaculture in the National Adaptation Program of Action to Climate Change, i.e. benefits derived and equitability in distribution;
- Demonstration projects and field visits for policy makers to engage with – not just visit; and
- Knowledge, experience sharing mechanism for cross-sector sharing and cooperative engagements.

Priority gap and purpose 6: A policy is needed to provide for the incorporation of the natural resource management sector into disaster response policy and planning development. It is thought by doing, such will add value to natural resource management efforts and safe guard critical ecosystem based environmental services during times of disaster response decisions – services critical to the recover phases of those impacted by the 'disaster'.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of enhanced knowledge on CCA, and climate change (CC) mitigation and impact mitigation strategies; • Cross sector policy analysis with National and Commune Committees for Disaster Management programming: review – representation – integration; • Appropriate and sustainable policy financing structures to integrate Disaster Risk Management (DMR) with relevant sectors and Ministry initiatives, i.e. linked sectors; and • Scaling up of policy intents – process.	• National Climate Change Committee (NCCC) and all applicable CCA associated parliamentary members • National and Commune Committees for Disaster Management • NGOs, INGO, Local government institutions and commune councils	• NCCC and all applicable CCA associated parliamentary members • National and Commune Committees for Disaster Management • NGOs, INGO, Local government institutions and commune councils

Process to deliver capacity development:

- Use of the Strategic National Action Plan – Disaster Risk Management as an entry point to capacity development;
- Development of an adaptive legislative framework;
- Research, assessment, dissemination;
- Financial support;
- Institutionalizing a monitoring and review mechanism for all CAA initiatives;
- Demonstration projects and field visits for policy makers to engage with – not just visit; and
- Knowledge, experience sharing mechanism – built around the Stockholm Environment Institute/ United Nations Environment Programme (SEI/UNEP) and Disaster Risk Management Platforms – the integration of such is still under debate.

Note: SEI has been understood as the Regional Climate Change Adaptation Platform which SEI is a partner of.

Priority gap and purpose 7: Policy support is needed to encourage private sector involvement in climate change adaptation. By doing so, innovation in adaptation and the needed resources to support innovation can be capitalized upon efficiently as well as provide a sustainability mechanism to drive adaptation forward on a consistent and basis.

Capacity development needs...	Primary target for capacity development	Primary users of knowledge developed
• Development of enhanced knowledge on CCA, and climate change (CC) mitigation and impact mitigation strategies; • Public – Private sector policy analysis: review – representation – integration of a CDM like mechanism is requested; • Development of an incentive based funding mechanism to support policy development and implementation needs; and • Scaling up of policy intents – process development for inside and outside of Cambodia.	• NCCC and all applicable CCA associated parliamentary members • Lean Development mechanism (CDM) like representation • Private and public sector entities of interest and supports for start up funding	• NCCC and all applicable CCA associated parliamentary members • CDM like representation • Private and public sector entities of interest • NGOs, INGO, Local government institutions and commune councils

Process to deliver capacity development:

- Use of the National Strategic Development Plan as an entry point to capacity development;
- Development of an adaptive legislative framework;
- Financial support;
- Institutionalizing a monitoring and review mechanism for a CDM like mechanism; and
- Promotion mechanisms - Demonstration projects and field visits for policy makers and the development sector to engage with inside and outside of Cambodia

ANNEX 6
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ANNEX 7
List of those consulted in the literature review process

Cambodian Center for Study and Development in Agriculture
Yi Kimtha: Director of Field Programs

Climate Change Department – Ministry of Environment
Tin Ponlok: National Project Coordinator

Community Based Natural Resource Management Learning Institute
Heng Chinda: University Liaison Manager
Keam Han: CBNRM Symposiums and Volume II Manager
Meng Kimsan: Fisheries Research Assistant
Sim Bunthoeun: Research and Capacity Building Coordinator
Kate Frieson: DReST Research Advisor
Pech Sithan: DReST Research Coordinator

Ministry of Agriculture, Forestry, and Fisheries – Fisheries Administration
Tit Phearak: Project Field Team Leader

Ministry of Agriculture, Forestry, and Fisheries – Fisheries Administration
Ly Vuthy: Deputy Chief, Community Fisheries

Ministry of Agriculture, Forestry, and Fisheries
U Surita: Deputy Director – Department of International Cooperation

Oxfam America
Nop Polin: Pational Climate Change Officer

Pact Cambodia
Amanda Bradley: Director of Community Forestry

Plan Cambodia
Bun Peuvchenda: Disaster Risk Reduction Advisor

Royal University of Phone Penh
Va Danny: Department Head – Department of Environment

United Nations Development Program
Andrew Mears: Climate Change Advisor

Wholistic Development Organization
Pok Peuv Thida: Executive Director

WorldFish Center Cambodia
Yumiko Kura: Director

Secretariat

AdaptationKnowledgePlatform
AIT-UNEP Regional Resource Centre for Asia and the Pacific
Outreach Building, P.O. Box 4, Klong Luang
Pathumthani 12120, Thailand
Tel: +662 524 5386/5384
Email: info@climateadapt.asia
Website: http://www.climateadapt.asia

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