

Disaster Risk Management and Climate Change Adaptation

Policy and institutional review and analysis

In support of the project design for “FISHADAPT: strengthening the adaptive capacity and resilience of fisheries and aquaculture dependent livelihoods in Myanmar”

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Executive Summary

Myanmar is exposed to a range of disasters to its physical nature and hazard profile of Myanmar reported that Myanmar has nine frequent natural hazards present which are cyclones, storm surges, floods, tsunamis, landslides, earthquakes, drought, fires and forest fires. And Myanmar has also human made threats such as long range of civil armed conflict and communal conflict in ethnic areas.

Myanmar has 2,400 km coastal line stretching from the west Rakhine State to south Taninthayi region. It faces Bay of Bengal and Andaman Sea in the India Ocean. Myanmar is abundant with diverse aquatic systems and fisheries. Fisheries sector (F/A) is a critical contributor to Myanmar's food security and to the livelihoods of rural people. F/A comprises capture fisheries and aquaculture in both marine/coastal and inland areas. F/A sector has established its National policy into five focused areas on development of fisheries sector and management; improvement of production; improvement of marine and freshwater aquaculture; improvement of socio-economic status of fishery communities and production and distribution of natural and water resources. Aside from the policy, Myanmar has six different kinds of fisheries and freshwater laws. Department of Fisheries is the focal for fisheries sector and it has different functions on Marine fisheries, freshwater fisheries, aquaculture and different levels of management. Please see more in project proposal document in background.¹

This document makes analysis on the existing policies, practices and institutional review of disaster risk management and climate change of Myanmar in supporting of the project design for "FISHADAPT: strengthening the adaptive capacity and resilience of fisheries and aquaculture dependent livelihoods in Myanmar". This study structured into four chapters. Chapter one gives background overview of the project and three sectors. Chapter two focuses on methodology used for this study. Chapter three consist of key findings and recommendations for fisheries adaptation based on institutional arrangement of DRR, CC and fisheries sectors. Gender aspects are also look in policy and planning development through inclusive approach and actions.

The recommendations in this study have been made for fisheries sector with ten areas on policy implications, climate vulnerability and capacity assessment, adaptive measurements, response and recovery, land use, gender inclusion, information and communication, training and awareness, research and observation, and funding mechanism.

¹ FAO, *PPG documents of FISHADPAT project*, 2015.

Acronym list

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ACPF	ASEN Committee on Disaster Management Civil Society Organizations Partnership Framework
ADPC	ASIA Disaster Preparedness Center
ASSI	ASEAN Safe School Initiatives
BoB	Bay of Bengal
CBA	Community Based Adaptation
CC/CCA	Climate Change/Climate Change Adaptation
CDM	Clean Development Mechanism
CONOPS	Concept of Operations
CSO	Civil Society Organization
CVCA	Climate Vulnerability and Capacity Assessment
DMH	Department of Metrology and Hydrology
DOF	Department of Fisheries
DRR/DRM	Disaster Risk Reduction/ Disaster Risk Management
EANET	Acid Deposition monitoring in East Asia
ENSO	El-Nino Southern Oscillation
EOC	Emergency Operation Center
ERT	Emergency Response Team
F/A	Fisheries and Aquaculture
FAO	Food and Agriculture Organization
GEF	Global environmental Facility
GHG	Green House Gas
HFA	Hyogo Framework for Actions
IEC	Information, Education and Communication
IOC	International Organization for Climate
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JICA	Japanese International Corporative Agency
LDCF	Least Developed Countries Fund
MAPDRR	Myanmar Action Plan of Disaster Risk Reduction
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MoECF	Ministry of Environmental Conservation and Forest
NAPA	National Adaptation Programme of Action
NNDPCC	National Natural Disaster Preparedness Central Committee
PaCFA	Global Partnership Climate Change, Fisheries and Aquaculture
PPG	Program Preparation Grant
PRECIS	Regional Climate Impact Studies
RIMES	Regional Integrated Multi-hazard Early Warning System
RRD	Relief and Resettlement Department
SM	Sector and Mean Score
TARNS	Tsunami Alert Rapid Notification System
UNCED	United Nations Conference on Environment and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNOCHA	United Nations Office of Coordination for Humanitarian Affairs
VI	Vulnerability Index
WMO	World Metrology Organization

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1. Background

The fisheries and aquaculture sector in Myanmar is important for food and nutrition security and the economy. Climate change is forecast to have significant impact on the sector. For capture fisheries (marine and inland) these impacts include changes in sea surface temperature, higher inland water temperature, changes in ocean currents, changes in the frequency of El-Nino Southern Oscillation (ENSO) events, sea level rise and changing levels of rain and water availability. The aquaculture sector is also exposed to hazards such as salt-water intrusion, flooding of ponds, shortages in water supply, and altered local ecosystems with changes in competitors, predators and invasive species.

Myanmar is also vulnerable to disasters and experienced in significant loss of lives, damage to infrastructure and also impacted fishers and fish farmers. Climate change impacts are the major threats to fishers and farmers with forms of devastations to lives and assets. Cyclone Nargis in 2008 was the most destructive cyclones in Myanmar History and resuming of fisheries sector have been faced with numerous challenges due to lack of capacity, highly vulnerable of communities, and lack of resilient practices in the region. Cyclone destroyed 41 foreign vessels, 288 local vessels in offshore fisheries; 1,759 fishing boats in onshore fisheries; 17,876 fishers died and 9,612 missed. It caused damages to 55 cold storage and processing plants in crush down. The damages happened in inland fisheries also, 50% of inland fisheries have been destroyed and all infrastructures into zero operations. It brought losses in leasable fisheries, tender fisheries, open and other fisheries with massive devastation on 2,170 acre of fish ponds, 36,175 acre of shrimp ponds, and 515 acre of crab ponds.² The need of adaptation has been initiated in MLFRD and DoF has a lot of commitments to make effective adaptation of F/A sector through utilizing of internal and external resources in working with development partners who are working on fisheries sector.

1.1. Hazards profile of Myanmar³

Name of Disasters	Descriptive (likely between 1900 – 2000)	Risk Rank ⁴
Cyclone	Increased intensity and frequency of cyclones. 1,250 formed in BOB, 90 hit	1
Earthquake	590 events fall in Myanmar and 15 times on above 7 Richter scale. Sagaing and Mandalay event in 2013, Tarlay in 2010 are flesh events	3
Fire	Above 10,000 cases happened between 1980 and 2000	7
Tsunami	2004 Indian ocean Tsunami caused 162boats damage and 61 died	5
Drought and Dry	Average temperature increased ~0.08 C per decade (1950-2010). Means temperature (32C -15C). Rainfall has increased average by 29 mm per decade (1950-2010). Monsoon period relatively shorter (180 days in 1970 to 100 days in 2000). Six regions in dry zone experienced decrease in annual rainfall. Average precipitation of dry zone is 740.56 mm.	8
Floods	Increased in occurrence of floods 25 major events (1900-2014)	4
Landslide	10Major landslide happened	9
Storm surge	Average surge high in Bathymetry type is 2 to 5 metres and long for 3 to 10 hours duration. Seasonal wave is about 0.3 m.	6
Conflicts*	Long civil armed conflict happening over 60 years after 1948	2

² MLFRD, *Status of Fisheries and Aquaculture and adaptation on climate change, power point presentation*. 2014

³ Relief and Resettlement Department, Union of Republic of Myanmar, *Hazard profile of Myanmar*, 2009.

⁴ UNOCHA Myanmar, *Risk Assessment for Contingency Plan*, 2014.

	Independence. Communal conflicts causes 200,000 people into displaced and most cases in 2012.	
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* Conflicts mean civil unrest between the communities and armed conflicts between Government and ethnic minorities.

The National Adaptation Plan of Action for climate change adaptation (NAPA) identified adaptation priority strategies in fisheries and aquaculture to address the impacts of climate change. These are included in NAPA priority areas 1, 2, 3 and 4. Key areas of focus for the project will include for example: strengthening national capacity, fisheries co-management measures, integrated mangrove fisheries and aquaculture integrated, inland fisheries and small scale aquaculture, and issues related to land tenure.

To address these issues in the sector the project “*FishAdapt - Strengthening the adaptive capacity and resilience of fisheries and aquaculture-dependent livelihoods in Myanmar.*” has been developed under the Global Environmental Facility (GEF) Least Developed Countries’ Fund (LDCF). The project was developed in response to a formal request from MLFRD request FAO to assist in the development of a project proposal to the GEF in 2012. The formal proposal⁵ supports implementation of the Myanmar National Adaptation Programme of Action (NAPA)⁶, was made to and approved by the GEF in 2014 with the following objectives and project components:

- **Project Objective:** To enable inland and coastal fishery and aquaculture stakeholders in Myanmar to adapt to climate change by understanding and reducing vulnerabilities, piloting new practices and technologies, and sharing information.
- **Component 1:** Strengthen the National, Regional/ State and Township level regulatory and policy frameworks to facilitate the adaptive capacities of the fisheries and aquaculture sector
- **Component 2:** Enhance critical adaptation practices demonstrated by fishers and fishing communities in vulnerable coastal and inland water regions of Myanmar
- **Component 3:** Develop and apply adaptation models to strengthen the resilience of Myanmar’s aquaculture sector to the impacts of climate change.
- **Component 4.** Knowledge management, monitoring and evaluation, training and scaling up adaptation practices, lessons learned development and dissemination.

1.2. DRM, CCA, Fisheries and aquaculture review context

Stakeholder consultation during the project concept development stage revealed the need to review links between disaster risk management, CCA and the fisheries and aquaculture sectors. The purpose of this review is to describe relevant frameworks and, policies and laws and to analyse them for inclusion of CCA principles. The findings of this review are integrated into the full FISHADAPT project document. The terms of reference for the review are in Annex A.

⁵ See

[http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/Climate%20Change/Myanmar%20-%20\(5702\)%20-%20FishAdapt-%20Strengthening%20the%20Adaptive%20Capacity%20and/ID5702_Council_Notification_Letter.pdf](http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/Climate%20Change/Myanmar%20-%20(5702)%20-%20FishAdapt-%20Strengthening%20the%20Adaptive%20Capacity%20and/ID5702_Council_Notification_Letter.pdf)

⁶ Available from

https://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4585.php

2. Methodology

The review of institutions, policies and laws was undertaken through internet searches, interviews and the manual collection of documents from government offices. Relevant institutions are listed in Annex A and laws and policies in Annex B. The laws and policies collected were analysed with reference to Climate Change, Disaster risk management, fisheries and aquaculture and Gender. The analysis based on review of policy documents related to DRM, CCA and fisheries and aquaculture culture from global and local arrangements. Stakeholder consultation meetings have conducted to analyze more to get institutional arrangement of Myanmar on these three sectors. The Project stakeholder workshop has conducted with Department of Fisheries to get direct inputs on fisheries adaptation on 18 to 19 June 2015.

3. Findings of the Institutional and Policy Framework review

3.1. Institutional Arrangements and National Communication⁷

United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty negotiated at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro in June 1992. The objective of the treaty is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The treaty itself set no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms.⁸

The Kyoto Protocol was adopted at the third Conference of the Parties to the UNFCCC (COP 3) in Kyoto, Japan, on 11 December 1997. The Protocol shares the objective and institutions of the Convention (UNFCCC). The Kyoto Protocol entered into force on 16 February 2005, 192 Parties have ratified. The three Kyoto mechanisms have established Emissions Trading known as the carbon market, the Clean Development Mechanism (CDM) and Joint Implementation (JI). The carbon market spawned by these mechanisms is a key tool in reducing emissions worldwide. It was worth 30 billion USD in 2006 and is set to increase. This protocol created adaptation funds to finance concrete adaptation projects and programmes in Developing countries.⁹

Hyogo Framework for Actions (HFA) is the key instrument for implementing disaster risk reduction, adopted by the Member States of the United Nations. Its overarching goal is to build resilience of nations and communities to disasters, by achieving substantive reduction of disaster losses by 2015 – in lives, and in the social, economic, and environmental assets of communities and countries. The HFA offers five areas of priorities for action, guiding principles and practical means for achieving disaster resilience for vulnerable communities in the context of sustainable development. The priorities are “make DRR a priority, know the risk and take action, build understanding and awareness, reduce risk, and be prepared and ready to act”.¹⁰

⁷ The institutional arrangements in this document reflected global frameworks or conventions of UN and governments on Climate Change, Disaster Risk Reduction, Fishery and Aquaculture such as UNFCCC, HFA, PaFAC.

⁸ The United Nations Framework Convention on Climate Change document can be seen on the web page through this link https://www.unfccc.int/documentation/documents/advanced_search/items/3594.php

⁹ United Nations, *the Kyoto Protocol to the UNFCCC*, 1998.

¹⁰ See more on the website www.unisdr.org/hfa

ASEAN Agreement on Disaster Management and Emergency Response (AADMER) is a legal framework for all ASEAN Member States and serves as a common platform in responding to disasters within ASEAN. The objective is to reduce disaster losses in ASEAN region, and jointly respond to disaster emergencies in South East Asia regions. The AADMER provides a regional comprehensive framework to strengthen preventive, monitoring and mitigation measures to reduce disaster losses in the region. It also affirms ASEAN's commitment to the Hyogo Framework of Action (HFA) and is the first legally-binding HFA-related instrument in the world. All ten Member States have ratified "ASEAN Agreement on Disaster Management and Emergency Response" (AADMER) and it entered into force on 24 December 2009. It focuses on disaster risk assessment, monitoring and early warning; prevention and mitigation; preparedness and response; recovery; technical cooperation and scientific research and AHA center. In implementation, 21 priority projects have been undertaken in the region.¹¹

The Global Partnership Climate Change, Fisheries and Aquaculture (PaCFA) is a strategic framework for fisheries, aquaculture and climate change. PaCFA to support the process of the United Nations Framework Convention on Climate Change (UNFCCC) in response to the need for concerted action on fisheries, aquaculture and climate change. It lays the groundwork for a coordinated response from the fisheries and aquaculture sector to climate change, notably through a strategic approach to maintain or enhance the health and resilience of global oceans and waters, and strengthening the capacity of dependent people and communities, integrating these closely into broader. PaCFA is a voluntary global level initiative among international organizations and sector bodies with a common concern for climate change interactions with global waters and living resources and their social and economic consequences. PaCFA members share a commitment to raising awareness of the vital importance of these issues, developing elective tools and management approaches to address them, and building international development support to implement change and bring about lasting positive outcomes.¹²

In response to Climate Change, Myanmar ratified UNFCCC on 25 November 1994. Myanmar developed its National Adaptation Programme Actions (NAPA) in 2012 by Department of Metrology and Hydrology. It prioritized 32 adaptation projects and focused on eight key sectors namely on Agriculture, Early warning, Forest, Public Health, Water resources, Coastal zone, Energy, Industry and Biodiversity. As a country focal, the first national response to UNFCCC has been communicated in 2012 by a study report on UNFCCC after the development of NAPA. MoECF and Ministry of Transport have been assigned as country's adaptation focal.¹³

In response to Disaster Risk Reduction, Myanmar has signed HFA in 2005 and is also signatory country of AADMER and which entered into force in 2009. Relief and Resettlement Department was the country focal for AADMER and has been undertaking DRR and DRM initiatives across the country. A National Natural Disaster Preparedness Central Committee (NNDPCC) was constituted in 2009 and reconstituted in 2013. The

¹¹ AADMER has done at Vientiane and enacted on 26 July 2005 and in force from 24 December 2009.

¹² The document Global Partnership Climate Change, Fisheries and Aquaculture (PaCFA) has been developed to support the process of the United Nations Framework Convention on Climate Change (UNFCCC) in response to the need for concerted action on fisheries, aquaculture and climate change in 2011. It can be available through www.climatefish.org

¹³ Ministry of Environmental Conservation and Forestry, *Myanmar's Initial National Communication Under The United Nations Framework Convention on Climate Change*, 2012.

coordination relating to DRR theme has been undertaken by National Natural Disaster Management Working Committee (NNDMWG). In 2013, National Disaster Management Law has been endorsed. In response to international commitment of Myanmar on DRR, Myanmar Action Plan on DRR was published in 2009 and officially endorsed in 2012 by RRD. It provides institutional arrangements of DRR in Myanmar in commitment Hyogo Framework for Actions (2005-2015) and ASEAN Agreement on Disaster Management and Emergency Response. MAPDRR was a multi-hazard approach and covers the whole context of Myanmar. It has identified 64 projects under 7 components. Among the projects, MAPDRR further process has identified and prioritized 21 projects to be delivered.¹⁴

Myanmar produced HFA interim country report in 2011. The views from Frontliner (VFL) has conducted in 2013 with broader participation of DRR actors and CSOs in Myanmar. Achievements of RRD has also been made with significant impacts on country DRM arrangement. The Standing Order of Disaster Management in 2009 which outlines the responsibilities of different government ministries and departments in relation to disaster management and that was being under review and updating. DRR has been infused in the formal curriculum in working with Ministry of Education since 2009 by DRR Actors in the country. Cyclone Mahasen was a good record of Myanmar Government in making cyclone preparedness in history in 2013 and it happened across Rakhine State. Multi hazards monitoring systems in the country have been conducting on flood and earthquake risk assessment in major cities. A national level emergency operation center (EOC) has been established in 2014 to monitor the hazards and to support in effective emergency response in emergency.

RRD developed National Disaster Management Courses to provide DRM capacity to government officials from 14 states and regions with the support of Myanmar DRRWG in 2013. National Youth Volunteer program was started in 2013 and 1,300 volunteers to date across 14 states and regions have engaged. Seasonal climate forecast for pre-monsoon and onset monsoon has been undertaken through Monsoon forums since 2007 and sub-national level forums have been started in Ayeyarwaddy and Mandalay regions. Myanmar government endorsed the country's first Social Protection Strategy in 2014 and DRR has also been counted as a cross cut theme for sustainable development. That strategy has been linked with DRR in building community resilience to disasters and climate change. Progress has been made on policies relating on land use and land ownership in 2013.¹⁵ The sectoral integration has started into education sector through DRM inputs on review of National Education Sector Planning in 2014. Different collaboration mechanisms have been started with DRRWG, DPRE, EIE, etc. Implementation of different mechanisms related to AADMER also initiated such as ASEAN Safe School Initiatives (ASSI), ASEAN Committee on Disaster Management Civil Society Organizations Partnership Framework (ACPF).

In response to building and strengthening fisheries and aquaculture sector of Myanmar, FAO has strategic position to provide technical and operational supports in line with FAO's resilience framework and Climate Smart Agriculture approaches. This arrangement would be met with the need of adaptation identified by MLFRD and would be supporting in DoF commitments on effective adaptation throughout the sector. Regarding to support these initiatives, FAO has established its post 2015 development agenda and Millennium Development Goals with fourteen objectives such as food security, nutrition, poverty

¹⁴ Disaster Risk Reduction Working Group, Myanmar, *Situational Analysis of DRR in Myanmar*, 2013.

¹⁵ The Relief and Resettlement Department, *Statement of the Republic of Union of Myanmar*, Briefing kit for World Conference on DRR in Sendai, Japan, 14 to 18 March 2015.

reduction, resilience, social protection, climate change, ecosystems/biodiversity/genetics, energy, fisheries/aquaculture/oceans/seas, forestry and mountain, land and soils, sustainable agriculture, tenure rights, and water. In building fisheries sector resilience, the concepts must be embedded in institutional, social, economic and environmental dimensions of sustainable development. This agenda provides a common overarching framework for systematically linking and integrating risk reducing and crisis management. And it addresses multi-hazard risks and underlying cause of vulnerability in the country and communities in integrated ways. It encourages cross-sectoral coordination to reduce disaster and climate risks for resilience of livelihoods of the most vulnerable smallholders including fishers. And it provides synergies among technical good practices of DRR and CCA, food chain crises prevention, social protection, financial risk transfer and tenure of natural resources.¹⁶

And innovative approaches such as climate smart agriculture of FAO can be adapted into fisheries sector adaptation program in sustainable fisheries productivity, adapting and building resilience to climate change and reducing or removing greenhouse gases emissions if possible.¹⁷ Promoting adaptation of fisheries sector, FAO have studied numerous initiatives examples around the world. To reduce climate impacts on aquatic and marine ecosystem and associated livelihoods, the sector need to assess the situation of fish, food security and livelihoods, climate change impacts, green house gases contribution and status of world fisheries. And it needs to seek the contextual approaches and strategies on mitigation and adaptation. The possible interventions are recommended to meet the context specifically with activities such as:

- | | |
|--|--|
| • Reducing external stressors on natural resources | • Identification of useful information |
| • Identify and protect valuable areas | • Link regional, local, national policies and programmes |
| • Investments in safer harbour and landings | • Spatial planning required |
| • Promote disaster risk management | • Monitoring on adaptive management |
| • Mainstreaming | • Policy and management considerations |
| • Capacity building | • Safety at seas |
| • Financial mechanism | • Ghost fishing |
| • Recognition of opportunities on adaptation | • International trade |
| • Learning from the past | |

To foster the strategic position of FAO to support resilience of fisheries sector, fisheries sector is included in FAO's strategic considerations which is second only to rice and categorized into marine, coastal, river, inland and aquaculture. This sector is labor-intensive economic activities and creates jobs for the numerous families of rural and urban populations. Postharvest treatment of the catches, such as freezing, drying, smoking, salting and the preparation of fermented fish, fish paste and sauce products, provides important employment opportunities for the rural population, particularly women. A significant number of poor and vulnerable people live in the marine, coastal, river, inland areas and their livelihoods are strongly linked to small-scale fisheries and aquaculture. Development of sustainable aquaculture systems and management of small-scale fisheries are therefore essential for their well-being. Maintaining the mangrove ecosystem is necessary to protect unique biodiversity.¹⁸

¹⁶ FAO, *Post 2015 development agenda and Millennium Development Goals*, 2015.

<http://www.fao.org/post-2015-mdg/14-themes/resilience/en/>

¹⁷ FAO, *Climate-Smart Agriculture: Source Book*, 2013.

¹⁸ FAO, *Country Programming Framework 2012 – 2016 for Myanmar*.

3.2. Findings and Recommendations of DRR and CC

Myanmar has well institutional arrangements on DRM through development of DM law, national action plan and numerous efforts on country initiatives however the country has lack in having resilience policies and programs as same as national adaptation policies and programs. Collaboration and coordination among the ministries have been challenging to implement MAPDRR priorities and giving managerial decision to implement the projects. Broader collaborations and participation of key stakeholders would be needed to be more inclusiveness and comprehensive. Linkages of priorities with NAPA are also necessary on building country's resilience and adaptation across the sectors. It is challenging that institutionalizing community-based DRR and ensuring coherence and coordination across initiatives, sectors and stakeholders. Further works need to be made ensure to deliver on the legal background, rules, and procedures for ensuring adequate resources are dedicated to DRR planning and implementation at all levels. Effective mechanisms for mainstreaming of DRR into development planning across multiple sectors is recognised as a continuing gap. Local capacity building and resilience programs need broader collaboration between resilience and adaptation of communities. It required continue and sustained support from a wide range of partners to be able to achieve the comprehensive and ambitious targets laid out in MAPDRR and other policy and regulatory frameworks on DRM. The need to dedicating financial and capacity resources required for effective disaster risk governance. It is essential at different levels (community, township, district, region/state, national, sub-regional, regional, international) and different actors (government, private sector, UN, I/N/LNGOs, CSOs, communities) come together to develop and implement coherent and coordinated DRM plans, policies and frameworks. Fisheries and adaptation sector has been treated as low important sector.

Recommendation on key performance area	Expected Results
1. F/A sector adaptation policies and programs can be integrated into or with MAPDRR	Overarching of policies or planning of F/A and DRR

NAPA provides a process for Least Developed Countries (LDCs) to identify and implement priority activities/projects to address urgent and immediate adaptation needs. The concept of NAPAs emerged from multilateral discussions on adaptation within the UN Framework Convention on Climate Change (UNFCCC). Myanmar's NAPA covers 32 priority activities (hereafter referred to as Priority Adaptation Projects) for implementation in the country. This includes four Priority Adaptation Projects for eight main socio-economic sectors/themes: Agriculture; Early Warning Systems; Forest; Public Health; Water Resources; Coastal Zone; Energy and Industry; and Biodiversity. Ministry of Transportation is the executing agency of NAPA of Government of Myanmar. It has been formulated as a commitment of the convention in cooperation with UNEP. Environmental education and awareness programs have been mentioned as a need in Myanmar Agenda 21, 1997. A manual of WMO on climate change was translated into Myanmar version to be used as a reference by students and families in Myanmar; a pre-tested tool kit of climate change communication was developed for field extension agents; a climate change educational video was translated into Myanmar version for trainings purposes; and Self-examination of ecological footprint was produced. Training materials and resources are available at MoECF as it has been carried out trainings for government official on CC. To promote public engagement, CC communication and Environmental journalism has been undertaken with local media. Nation-wide public awareness campaigns, stakeholders' workshop and public awareness survey have been conducted by MoECF.

Vulnerability assessment to climate change based on different scenarios has been conducted through NAPA development process by using of the tools of MAGICC, SCENGEN and PRECIS model which studied the trends of temperature, rainfall, and weather conditions across the country. Based on the tool of vulnerability indices maps, sectors such as agriculture, water resources, public health, forestry, coastal zones and biodiversity sectors are the most vulnerable. By Using the specified equation of the Vulnerability Index (VI), Sector scores and their Mean score (SM) have been worked out for all Regions and States. The highest sector score for vulnerability have found in public health sector, followed by biodiversity, water resources, forestry, coastal zone and agriculture sectors. Mitigation to climate impacts has been studied within local capacities.¹⁹

In response to mitigation of climate change means technologies changes and substitutions that reduce green house gas emission and enhance sinks. The adaptation refers to here is to reduce the vulnerability of human or natural systems to upcoming climate impacts and threats. In terms of mitigation, Myanmar has no institutional obligation to quantify reduction of greenhouse gas (GHG) emission. However, the country did the study of mitigation options and developed the sectoral strategies for socio-economic development such as on energy sector, Agriculture and Livestock sector, and Forestry and Water sectors. DMH has been observing multi hazards and disasters since 1990s. DMH established five different kinds of observation centers in Myanmar in such as Meteorological Center in Naypyidaw and Yangon, Multi-hazard early warning center in Naypyidaw, Aviation Meteorological Office in Mingaladone, and in coastal stations. Different types of warnings systems has been practicing by DMH on Daily/monthly seasonal weather and water forecast, Aviation weather forecast, sea route forecast, squall wind weather forecast, storm warning, storm surge warning, untimely rainfall warning, fog warning, heavy rain warning, flood warning, Minimum alert in low flow period, Tsunami warning and Earthquake alert.

Myanmar established different types of climate monitoring and warning systems in collaboration with different stakeholders internationally, regionally and some in locally. The basic institution of warning systems has established with the supports of WMO on multi hazards. Seismographic network and record centers have been set up with the supports of JICA on Earthquake Warning System. Tsunami warning system has been set up with the supports of UNESCO and IOC. The operations for storm surge prediction and warnings are being coordinated through JCOMM. RIMES (ADPC) will focus on early warning of tsunami and hydro-meteorological hazards. Since 2007, monsoon forums have been organized twice a year in pre-monsoon and post-monsoon month. National Tsunami Warning centers have been established in following of TARNS and CONOPS workshops. Acid Deposition Monitoring is being working with EANET and established a national center for EANET. JICA provided two instruments for ion chromatography system and ultra pure water production system. To monitor Tsunami, Earthquake, and storms, UNESCAP is being help in setting up of warning facilities in Rakhine coastal region as real time broadband seismic station²⁰

The department of Metrology and hydrology has been conducting scientific data across the country through 161 observation stations. The observations have been undertaking on climate and weather information particularly on annual temperature, annual rainfalls, cyclones, earthquakes, tsunامي, drought, ENSO, *El-Nino*, *La-Nina*, monitoring of river waters, early warning system on natural disasters, forecasting the weather, dissemination of climate and

¹⁹Ministry of Environmental Conservation and Forestry, *Myanmar's Initial National Communication Under The United Nations Framework Convention on Climate Change*, 2012.

²⁰ Ibid, 154-156.

weather information, networking regionally and locally, promoting RSO through strengthen climate change research, improvement of infrastructure, and enhancing capacity. The research programs will be carried out to assess the climate conditions and possible impacts to the country. The specific researches namely on Climate variability, Climate change, Tropical storms, Drought and precipitation trends and Extreme climates in relation to El-Nino, among others will be conducted.²¹

Recommendation on key performance area	Expected Results
2. F/A sector adaptation policies and programs can be integrated into or with NAPA	Overarching of policies or planning of F/A and DRR

3.3. Findings and Recommendations of Fisheries and Aquaculture Sector

Myanmar has plenty of resources in land and water. The country has 2,400 km coastal line facing Bay of Bengal and Andaman Sea with extensive river systems namely Ayeyarwaddy, Chindwin, Thanlwin and Sittaung. The continental shelves covered about 228,000 sq miles through marine. But the sector has not fully integrated climate change risks and threats into its development strategies and policies. Due to the climate change, F/A is one of the vulnerable sectors which affected by climate change threats and shocks. Pollution, environmental degradation and rapid development further compound the stress on these natural resources.²² Production is also diminished by poor access to markets, inequitable fishing rights, ineffective fisheries management and conflicting policies. Small-scale fisheries need a broader range of socioeconomic benefits can be sustainably realized. Strict controls on the conversion of rice lands into other uses (especially aquaculture) and a lack of integrated water management planning, may be the largest constraints to adaptation in the aquaculture sector if applicable to the context. The impacts occur as results of both in warming and physical changes in forms of frequency, intensity, severity, levels of impacts, duration and location depends on levels of vulnerability of the context and communities. CC impacts occur sea temperature rising, appearance species, change in catches, distribution of fishes (increase and decrease). Looking at the catch system, fish catch size is getting decrease and reduce in amount of catch. The species composition has been changing and less in potential species. Loss of habitats for marine species may have impacts in leading to marine ecosystem change. The impacts are also effected on aquaculture sector with low rainfall, increased in temperature that caused negative impacts in high evaporation rate, shallowness, changes in metabolism, decreased growth rate, and difficult to control the diseases. It leads lower percentage of egg fertilization and consumers may have changes of choices due to over smell. In brackish aquaculture, this result in stunting growth of shrimps and need to spend more of operational cost to make changes of water and peddles wheels. High temperature leads causes of less moulting cycles.

To address these issues, adaptation policies and practices need to be strengthened in (i) inland aquaculture (ii) marine/coastal aquaculture (iii) inland capture fisheries and (iv) marine/coastal capture fisheries of Myanmar. Preserving mangrove and other coastal forest can be integrated in adaptation programmees through community based mangrove forestation or approaches related with community interventions.

DRM and CC sectors need more collaboration with F/A sector in building sectoral resilience at all levels. Policy reviews of DRM and CC need to host with active participation of other sector including F/A. The pilot initiatives can be tested on how to integrate DRM and CC into

²¹Ibid.

²² FAO, Project preparation documents and power point presentation of Fishadapt PPG phase.

other sectors with inclusive approaches. The programmes and projects need to be shared each other and able to create opportunities to learn what innovative approaches can be learned for fishers and farmers.

Recommendation on key performance areas	Expected Results
Policy and Institutional level 3. Develop F/A sector adaptation policies and programs to be in line Myanmar Fisheries and Aquaculture Laws (Union Fisheries Law, State/Regional Fresh water Fisheries Law...) to ensure each sector functions to be more resilience. 4. Establish coordination mechanism under Agriculture, Livestocks and Fisheries sector to get cooperation among key ministries (agriculture, forestry, environment, water, planning and home affairs...) 5. Improve F/A sector management on adaptation of (i) inland aquaculture (ii) marine/coastal aquaculture (iii) inland capture fisheries (iv) marine/coastal capture fisheries of Myanmar	<ul style="list-style-type: none"> • F/A sector adaptation policies and programs • Review of F/A sector laws • F/A sector Coordination Unit • F/A Adaptation unit put in place in the structure
Vulnerability and Capacity of F/A sector 6. Conduct national comprehensive and inclusive climate vulnerability and capacity assessment (CVCA) of F/A sector. 7. Generate F/A CVCA to all ministries and stakeholders at all levels. 8. Formulating adaptation priorities for F/A sector	<ul style="list-style-type: none"> • CVCA of F/A sector • CVCA information is shared • Adaptation priorities put in place and identified
Adaptation of F/A Sector 9. Community Based Adaptation programmes and projects (CBA) can be adapted to promote community level capacity to establish fisheries communities' coping mechanism and adaptive capacities to climate shocks, threats and impacts. 10. Inland aquaculture has great potential to increase the adaptive capacities of rural communities through, for example, livelihood and food diversification and through the development of more resilience production systems. 11. Adaptation resources can be established through developing adaptation budget for the sector and set up of human resource in existing structure to assign delegated unit which can be a focal for further coordination with internal or external and build adaptive capacity internally. 12. Self regulations: improve flexibility and make use of non-scientific knowledge for adaptation???	<ul style="list-style-type: none"> • CBA programs and projects formulated • Adaptation budget allocated • Communities innovation on adaptation created and supported
Response and Recovery 13. Form Emergency Response Team (ERT) within F/A sector in case of emergency preparedness 14. Develop emergency response plan for F/A sector	<ul style="list-style-type: none"> • ERT in place • Emergency response plan in place
Land Use 15. Review of current land and water use policies to support adaptation actions such as flexible land use planning (to allow for optimal pond siting, conversions to aquaculture from other land uses and development	<ul style="list-style-type: none"> • Review of land and water use policies

of integrated rice-fish systems)	
Gender Inclusion 16. Develop gender initiative practices and plans	<ul style="list-style-type: none"> • Gender action plan developed
Information management and Communication 17. Establish learning centers at region and state or district levels for information and communication of F/A sector	<ul style="list-style-type: none"> • # of learning centers established and functioning
Education, Training and Public Awareness 18. Develop F/A adaptation materials and documents including IECs 19. Provide Adaptation training to staffs	<ul style="list-style-type: none"> • F/A adaptation IEC developed and published • F/A adaptation training curriculums developed
Research and Observation 20. Conduct F/A sector adaptive capacity building researches 21. Establish coordination mechanism in working with DMH and Environmental conservation department on weather forecast and climate monitoring and warning	<ul style="list-style-type: none"> • # of research conducted and shared widely • Activating weather forecast and climate monitoring and warning system in department
Funding Mechanism 22. Develop adaptation budget together with national sector budget 23. Coordinate development partners in polling of resources	<ul style="list-style-type: none"> • Adaptation funds and budgets developed

4. Conclusion

Starting the adaptation into Fisheries and Aquaculture sector of Myanmar is good timing and the country economy is expected to grow and fisheries sector is expected also in production and management. The existing mechanism of DRM and CC serve as foundational path ways to adaptation across the sector improvement of management and development. Numerous initiatives of adaptation can be applied by FISHADAPT in

- (i) inland aquaculture
- (ii) marine/coastal aquaculture
- (iii) inland capture fisheries
- (iv) marine/coastal capture fisheries of Myanmar through community based interventions.

The findings and recommendation mentioned above also would be supporting necessary considerations of FISHADAPT project preparation and further interventions in Rakhine State, Ayeyarwaddy and Yangon Regions on strengthening adaptive capacity of the sector and communities.

5. References

1. ASEAN (2009), “ASEAN Agreement on Disaster Management and Emergency Response”, <http://www.asean.org/communities/asean-political-security-community/item/asean-agreement-on-disaster-management-and-emergency-response-vientiane-26-july-2005-4>
2. Disaster Risk Reduction Working Group (DRRWG) (2013), Myanmar, “Situational Analysis of DRR in Myanmar”.
3. Department of Hydrology and Meteorology, Tin Yi, Assistant Director (2012), “Climate Change Adaptation in Myanmar”.
4. DOF (2014), <http://www.unece.org/fileadmin/DAM/env/documents/2012/wat/workshops/>
5. FAO (2015), “PPG documents of FISHADPAT project”.
6. FAO (2015), “Post 2015 development agenda and Millennium Development Goals, 2015”. <http://www.fao.org/post-2015-mdg/14-themes/resilience/en/>
7. FAO (2013), “Climate-Smart Agriculture: Source Book”.
8. FAO (2012), “Country Programming Framework 2012 – 2016 for Myanmar”.
9. MLFRD (2014), “Status of Fisheries and Aquaculture and adaptation on climate change, power point presentation”.
10. MoCEF (2012), “Myanmar’s Initial National Communication under The United Nations Framework Convention on Climate Change”.
11. MOSWRR (2015) “Statement of the Republic of Union of Myanmar, Briefing kit for World Conference on DRR” in Sendai, Japan, 14 to 18 March 2015.
12. MOSWRR (2012), “Myanmar Actions Plan on Disaster Risk Reduction”.
13. MOSWRR (2009), “Hazard profile of Myanmar”.
14. MOSWRR (2009), “MAPDRR”, <http://www.preventionweb.net/english/professional/policies/v.php?id=18657>
15. MOSWRR (2011), “National Progress Report on the Implementation of the HFA”, http://www.preventionweb.net/english/hyogo/gar/2011/en/bgdocs/hfa/16315_mmr_NationalHFAprogress_2009-11.pdf
16. PaCFA, (2011). “The Global Partnership Climate Change, Fisheries and Aquaculture”. www.climatefish.org
17. United Nations (1995), “the United Nations Framework Convention on Climate Change” https://www.unfccc.int/documentation/documents/advanced_search/items/3594.php
18. United Nations (1998), “the Kyoto Protocol to the UNFCCC”.
19. UNOCHA Myanmar (2014), “Risk Assessment for Contingency Plan”.
20. UNOCHA (2012), “Myanmar Natural Disasters 2002-2012”, <http://reliefweb.int/map/myanmar/myanmar-natural-disasters-2002-2012>
21. UNISDR (2005), “Hyogo Framework for Action”, <http://www.unisdr.org/we/coordinate/hfa>

6. Annexes

Annex A - Terms of reference for the analysis

Name:		
Job Title:	National Disaster Risk Management (DRM) Expert	
Division/Department:	FAOMYA	
Programme/Project Number:	GCP/MYA/020/LDF	
Location:	Myanmar	
Expected Start Date of Assignment:	January 2015	Duration: 4 weeks (20 working days), between January and April 2015
Reports to:	<i>Name: BuThiLan</i>	<i>Title: FAO Representative, Myanmar</i>

General Description of task(s) and objectives to be achieved

Introduction

This project *FishAdapt: Strengthening the adaptive capacity and resilience of fisheries and aquaculture-dependent livelihoods in Myanmar* supports the implementation of Myanmar's National Adaptation Programme of Action (NAPA) and especially the priority areas 1-Agriculture, early warning, forestry, 2-Water resources, 3-Coastal Zone and 4-Biodiversity. The approved Project Identification Form (PIF) includes four components:

- Component 1: Strengthen the National, Regional/ State and Township level regulatory and policy frameworks to facilitate the adaptive capacities of the fisheries and aquaculture sector
- Component 2: Enhance critical adaptation practices demonstrated by fishers and fishing communities in vulnerable coastal and inland water regions of Myanmar
- Component 3: Develop and apply adaptation models to strengthen the resilience of Myanmar's aquaculture sector to the impacts of climate change.
- Component 4. Knowledge management, monitoring and evaluation, training and scaling up adaptation practices, lessons learned development and dissemination.

The PPG/project preparatory work will support the information gathering, analysis and stakeholder consultation tasks that will result in the preparation of the documentation required for submission of the Full-Size Project (FSP) for endorsement by the GEF Chief Executive Officer (CEO) and approval by FAO.

These TOR relate to the national consultant tasked with determining: (i) How DRR is incorporated into the fishery work; (ii) How fisheries are incorporated into the DRR sector; (iii) how weather monitoring and preparing weather bulletins takes place (for fisheries), and; (iv) how environmental monitoring (e.g. sea surface temp, red tides, salinity....) is taking place.

Under the overall administrative supervision of the FAO Representative in Myanmar, the Technical Supervision of the Lead Technical Unit (LTU) from FAO-FIP and the Lead Technical Officer (LTO) from FAO-RAP and in close collaboration with the Ministry of Livestock, Fisheries and Rural Development (MLFRD), Department of Fishery (DoF) and Disaster Management Agency, the project team leader and the project preparation team, the National DRM Expert will be responsible for analysing Myanmar Climate monitoring and early warning needs and policy in relation to climate change adaptation and contributing to the development of the project work plan and document.

Tasks:

- With the international and national experts, finalize the design of this study and the approach to be taken;

- Conduct a review of policy and institutional arrangements for climate monitoring, EWS and DRM to assess how they incorporate the issues of fisheries and aquaculture and identify weaknesses;
- Conduct a review of policy and institutional arrangements for fisheries, and assess how they incorporate climate monitoring, EWS and DRM and identify weaknesses;
- Describe the approach to weather forecasting and providing weather information for fishermen and identify weaknesses – and provide any information on differences between AD region, Yangon region and Rakhine State.;
- Describe the approach to environmental monitoring (SST, SLR, temperatures, salinity, red tides....) and identify weaknesses – and provide any information on differences between AD region, Yangon region and Rakhine State;
- Identification of priority activities for addressing the gaps and weaknesses identified through the above steps;
- In consultation with the international experts, propose activities with indicators of success and estimated costs;
- Support the international expert in the production of the full project document including monitoring and evaluation aspects and costing;
- Participate in national and local level workshops as required (including validation).

key performance indicators

Expected Outputs:	Required Completion Date:
1. Organize at least two consultation meetings with stakeholders on Climate Monitoring and DRM stakeholders (at least 2 workshop reports)	1) April 2015
2. A report with recommendations including full analysis of the climate monitoring and extreme events and DRM frameworks, capacities, with identified gaps and options.	2) April 2015 3) June 2015
3. Contribution to sections of draft project document	

Annex B Institutional Mapping

Stakeholders	Specific area of focus	Source of Information & projects	Approaches, Practices, and Technologies	Remarks
Government Agencies				
Internatioal, Regional	Climate Change, Environment, DRM	UNFCCC (1992), Convention on Biological Diversification (1994), The Kyoto Protocol (1997), UN Convention to Combat Desertification (1997), HFA, AFCC (2009)		TBD
National	Socio-economic development	Three National Development Plans (1988): (1) For the development of Boarder Area, (2) For 24 Special Development Zones, (3) Integrated Rural Development Plan. National Sustainable Development Strategy (2009): (1) Sustainable management of Natural Resources (2) Integrated Economic Development (3) Sustainable Social Development		TBD
Department of Fisheries (DOF)	Fisheries and aquaculture	Fishery Sector Plan? Rules and regulations? 6 Fisheries Law (1989,89, 90, 91, 93, 93), Myfish Project (2014). State and regional freshwater management law?	20 Researches grant (AD 10,CZD 10)	No management plan exists for Marine fisheries. Policy and Strategy Development. Understanding vulnerabilities and climate impacts to Fish sector
Livestock, Breeding and Veterinary Department (LBVD)	Livestock	Livestock management laws?		TBD
General Administrative Department (GAD)	Administrative and governance	Township Disaster Management Plan (2013)	TDMP, Township Development Planning Village Tract Disaster Management Planning	Linking village development planning guideline to Fishadapt
Department of Rural Development Affairs (DRD)	Development (Micro level)	Village Development Planning Guideline (being developed)	Community based development planning	Link with TDMP or CBDRR action plans to Fishadapt
Department of Agriculture	Agriculture		Climate Smart Agriculture, Solar power Tube-well Technology	TBD
Department of Irrigation	Irrigation		Small-scale water impoundments, Sustainable water supply systems,	TBD
Agricultural University, Yesin	Agricultural Research and technology		Climate Smart Agriculture, Solar power Tube-well Technology,	TBD
Relief and Resettlement Department	DRR and Emergency Response	ASEAN Committee on Disaster Management, NDPCC, Standing Order (2009), Hazard profile (2009), MAPDRR (2009, 2012), DM law (2013),	RIMES through Monsoon Forums, National Volunteer Approach,	TBD
Environmental Conservation Department	CC & Environmental conservation Climate Change Adaption (CCA)	National Environmental Policy (1994), Myanmar Agenda 21 (1997), National commission for Environmental Affairs (1990), National Environmental Conservation committee (NECC) (2011) Environmental Conservation Law (2012)	Degraded forest, community based reforestation, community based mangrove reforestation,	TBD
Department of Forestry (DOF)		Forest Law Act (1992), Wildlife Act (1994), Protected Area and Forest Policy Statement (1995);Vacant, Virgin and Fallow Land Management law (2012) Land Custom Amendment Law (2015) Farm land law (2012)		National Coordination on CC mechanism?
Department of Meterology and Hydrology (DMH)	Weather Foresting and monitoring, Early Warning,	Inland water transport organization law (2014)	Government led early warning system, River flood monitoring, Monsoon forecast, Tsunami alert,	Early warning System establishment, Access of weather information, Warden of river water, Study on Indigenous knowledge and practices on warning,
Planning Department	Planning	Framework of Economic and Social Reform (2010-15) National Planning Law (2014)		National Adaptation Planning and financing?
Departmnet of Health	Public Health and services	Disease control plan, Health Sector Master Plan? Health care laws: Health care for population and control law (2015)	Integrated health services	
Department of water resources and improvement of river systems	Water resource management	Coastal Inland Water Transportation business permit law (2015) Water resources and river system maintenance law (2006)		Inland Fisheries management
Department of Education		National Education Sector Plan?Natioal Education Law 2014)		Development of curriculums?
Donor Agencies				

Stakeholders	Specific area of focus	Source of Information & projects	Approaches, Practices, and Technologies	Remarks
World Bank	NA			
ADB	NA	Technologies to support for CCA (2014)	Sector wise key innovations	Possible funding linkages?
EU	NA			Possible funding linkages?
LIFT	Food security and livelihoods	Food and livelihoods security project (2012)		Food and livelihoods security,
BRACED	Resilience building	Project proposal (2014)	Resilience planning, SBDRR,	Community Resilience Planning?
DIPECHO 9	Resilience Building	DIPECHO 8 Evaluation (2014)	CBDRR, SBDRR,	
OFDA	DRR, CCA	DRR and CCA Project?		Preparedness and adaptation
Aus AID	NA	ACIAR/World Fish Project (2012)		Research and development
JICA		Aquaculture project (2012) Early Warning System Project (2013)		Small scale aquaculture, small scale rice-field fish culture
SWISSAID	Agri, Humanitarian,	Safe School,		Livelihoods and adaption
SIDA			Right based approach	Rights and protection
USAID	NA			Preparedness and adaptation
UKAID	NA			Resilience building
UN Agencies				
UN-Habitat	DRR and Resilience Building, WASH, Shelter,	CBDRR projects, CLAP, LAMP, MCCR, DRR in Coastal Communities, MCCA Project, National Building Code (2014)	Carpenter and Maison Trainings, Urban resilience building,	Not engaged with Agri&Fisheries sectors
UNDP	DRR, CC, Environment	Multi Hazards Risk Assessment (2011), CBDRM (2011), Mainstreaming DRR in Livelihoods (2011),		Livelihoods integrated approaches
FAO	Food & Agri, Forestry, Fishery, NRM, CCA	ESFSP project (2010), TCP project (2014), Sustainable Small-scale Fisheries and Aquaculture Livelihoods project?		Food security, Fisheries, Environment,
WFP	Food			Food distribution and security
UNICEF	Education, Nutrition,			
Professional and Private Agencies				
ADPC		Institutional arrangements for DM in Myanmar	Ecosystem Resilience, Approach to resilience,	Science and technology sharing and innovatives
Myanmar Enginnering Society				Science and technology sharing and innovatives
Myanmar Fishery Federation		Constitutions		Capacity building and training
BBCMA	Media	Climate Asia Research (2012)	Public Service Announcement	Media and warning
BANCA	Coastal zone management		Integrated coastal zone management (ICZM)	Coastal zone management
	CC and Environmental adaption		Monsoon forums (2014)	
Action Aid	DRM, CCA	Vulnerability Assessment on small-scale fishing communities at coastal region (2012). Study on existing policy and practices on DRR of coastal fishing communities in Myanmar (2011)	CBDRM, Village Book,	CBDRM
Myanmar Environmental Institue	CC and Environmental adaption		Sustainable Environmental Actions, Integrated Environmental Management Planning,	Environmental adaptation
ACTED	DRM,CCA		Ecosystem Management	CBDRM
WVI		AADMER project, ASSI project, OFDA		CBDRM
MRCS		DRR Needs in Myanmar,		CBDRM
Networks				
DRRWG	Policy, Local capacity building,	Situational Analysis of DRR (2013), DRRWG strategic plan (2013-2018)		DRM
FSWG		Strategic plan?		Food security
MERN		CLEARR Project?		Environment

Annex C Existing Mechanism

National frameworks	<ul style="list-style-type: none"> • Framework of Social Economic Reform (FESR) by MPED • National Food Security, being drafted by MoH • National Resilience Framework, Initiated by World Bank
Vulnerabilities assessment on F/A	<ul style="list-style-type: none"> • The existing policies and practices on DRR coastal fishing communities in Myanmar by Action Aid • Study on vulnerability and preparedness of small-scale fishers in coastal of Myanmar by Action Aid
Innovations to Adaptation	<ul style="list-style-type: none"> • SEA model (Strategic/sustainable Environmental Assessment) and SEI (Sustainable Environmental Impact) by Myanmar Environmental Institute • Ecosystem Management by ACTED • National Volunteer Approach by RRD
Community Based DRM	<ul style="list-style-type: none"> • Most of DRRWG member agencies are implementing community based disaster management (CBDM) approaches since 2009 and it includes awareness raising, risk/vulnerability and capacity assessment, community based disaster management action planning process. See more information in 3Ws data of MIMU. • RRD is undertaking CBDM into institutionalizing across sectors
Community Based Adaptation	<ul style="list-style-type: none"> • Child Centered Climate Change Adaptation approach by Plan International • Community based adaptation toolkit and assessment toolkit of Climate Vulnerability and Capacity Assessment (CVCA) by CARE International
Key Programmes and projects	<ul style="list-style-type: none"> • Consortium MCCR program led by Action Aid • BRACED program led by Plan International • Building Climate Resilience of Urban System through Ecosystem-based Adaptation (EbA)(Myanmar, Buhtan, Cambodia, Laos) • Ecosystem-based Adaptation in the Greater Mekong Sub-region (GMS-EBA) in the context of south-south cooperation (6 countries) • 2nd National Communication project funded by GEF with the technical support of UNEP • “Adapting Community Forestry Landscapes to a Changing Climate Change in Particular an Increase in the Frequency and Intensity of Extreme Weather Events” • Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar • Sustainable Cropland and Forest Management in Priority Agro-ecosystems of Myanmar • Implementation of Energy Efficiency in Industrial and Energy Sector