ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	REGULAR PROJECT
COUNTRY/IES:	MYANMAR
TITLE OF PROJECT/PROGRAMME:	ADDRESSING CLIMATE CHANGE RISKS ON WATER RESOURCES AND FOOD SECURITY IN THE DRY ZONE OF MYANMAR
TYPE OF IMPLEMENTING ENTITY:	MULTILATERAL IMPLEMENTING ENTITY
IMPLEMENTING ENTITY:	UNITED NATIONS DEVELOPMENT PROGRAMME
EXECUTING ENTITY/IES:	UNITED NATIONS DEVELOPMENT PROGRAMME
COUNTERPART NATIONAL INSTITUTION[1]:	MINISTRY OF ENVIRONMENTAL CONSERVATION AND FORESTRY
AMOUNT OF FINANCING REQUESTED:	US$ 7,909,026
CO-FINANCING:	US$ 624,998 (UNDP) US$ 554,181 (Government of Myanmar)
PROJECT DURATION:	4 YEARS (2013-2016)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

Geographic, Environmental and Socioeconomic Context:

The Dry Zone is one of the most climate sensitive and natural resource poor regions in Myanmar. The Dry Zone lies between latitudes 19° 20″ and 22° 50″ north and longitudes 93° 40″ and 96° 30″ east, stretching across the southern part of Sagaing Division, the western and

[1] For a detailed description of implementation arrangements, see Part III/A. of this concept

middle part of Mandalay Division and most parts of Magway Division. It is situated in the rain shadow area of the Yakhaing Yoma and obtains most of its rainfall from the southwest monsoon. According to the current rainfall patterns, the zone covers approximately 54,390 square kilometers and represents about 10% of the country's total land area. The present population in the Dry Zone is estimated at 18 million people. It constitutes 34% of the country's total population of about 53 million. The population density is 123 people per square kilometer, making it the third most densely populated region in Myanmar. Across the Dry Zone, water is scarce, vegetation cover is thin, and soil is degraded due to severe erosion. The region is characterized by low annual rainfall that ranges between 508 and 1,016 mm per annum with high variability and uneven distribution. The monsoon rain is bimodal with a dry period during July when dry desiccating winds blow from the south. The undulating land, composed mainly of sandy loam with low fertility, is subjected to severe erosion under rain and strong winds. The average mean temperature in the Dry Zone is about 27˚ C and the temperature often rises to about 43˚ C in the summer period. This dry environment with its other natural limiting factors has led to conditions of growing food insecurity and severe environmental degradation.

The major economic activities in the Dry Zone are subsistence farming such as paddy, sesame and groundnut and small scale livestock rearing. Agricultural productivity is low and the farmers are heavily dependent on products from the natural forest especially fuel wood, pole, post and fodder to support their living and livestock. Many landless people are working as seasonal farm labourers, migrating to urban regions during non-planting time to find temporary employment.

The Climate Change-induced Problem:

The proposed project will seek to reduce the increasing impacts of climate change on agricultural and livestock production cycles in the Myanmar Dry Zone - the impacts of increasing temperature and evaporation, declining water availability, and intensifying weather events especially flash floods and cyclones.

A study found that chronic poverty in Myanmar's Dry Zone is directly correlated with the effects of drought and dry spells (IHLCA, 2005 and 2010). And dry spells and droughts are expected to be more frequent and severe in the future as the global warming trend accelerates.

Drought and water scarcity are the dominant climate-related hazards in Myanmar's Dry Zone. Analysis of drought occurrence over the past few decades has confirmed that the Dry Zone has turned into the most food insecure region in the country. Irregular dry spells and drought[2] have resulted in recurring extreme water shortages which in turn constitute a constant threat to the livelihoods of the rural poor. A study by Aung (1997) observed a general warming trend since the 1970s, with a total average increase of annual mean temperature of 0.2˚C. Rainfall patterns during the southwest monsoon of Myanmar are variable, generally following the monsoon

[2] In Myanmar, drought is defined as the 'dekad' (10 days) with below normal rainfall preceded by at least two dekads with below normal rainfall recorded by the nearest hydro-meteorological station (Sub-States/Sub-Divisions) of interest. In Myanmar the third dekad of May and the third dekad of October have the highest likelihood of drought. Drought is most unlikely in the second dekad of September, followed by the first and second dekads of August, the third dekad of June and the third dekad of July.

intensity in the Bay of Bengal. The onset of the southwest monsoon, however, has been recorded with continued delays since the 1970s whereas its withdrawal from the country is advancing earlier (Lwin, 2002). The duration of the southwest monsoon during 1988-2000 was shortened by three weeks in northern Myanmar and one week in other parts of the country, when compared to 1951-2000. Superimposed on the trend of shortening monsoon periods, the duration of rainfall events is decreasing while its intensity in the Dry Zone has been recorded to increase. These trends of shorter, more intensive cloudbursts increase risks of flooding and farmland erosion.

At present, according the Food Security Working Group (Ohnmar Khaing, 2010), the Dry Zone receives an annual precipitation of no more than about 700 mm. 2009 monsoon rains were extremely scarce, which epitomizes an observed decrease of about 45-65% of rainfall over the last 5 years. According to a 2009 report by Save the Children and a WFP Food Security assessment (2009), agricultural yields over the past few years have been declining drastically as a result of continued water shortages. The crops most severely affected in 2009 were those planted in the pre-monsoon and monsoon phases, mainly rice (***50% - 70% drop in transplanted areas***), sesame, and sunflower (***80% - 90%*** drop in crop yield – practically a crop collapse). This, in turn, has negatively affected farm labor opportunities and rural livelihoods. Cereal prices have increased **by 10-20% in 2009**, which is in line with expected market volatility (WFP, 2009). Farmers are facing increasing expenses on buying fodder during dry periods. Livestock health has deteriorated over the past decade, and the trade for cattle has decreased by 30% (International Development Enterprise, 2009). This was an indication of difficulties for animal breeding, although it was still not critical. With regards to drinking water availability during dry periods, water sources and reservoirs are sufficient for household consumption, but not for livestock and agriculture. Families often practice autonomous adaptation by digging deeper wells or traveling longer distances for accessing water. However, severe water scarcity sometimes requires families to sell tools and livestock and migrate from their homes.

Analysis of climate models and scenarios:

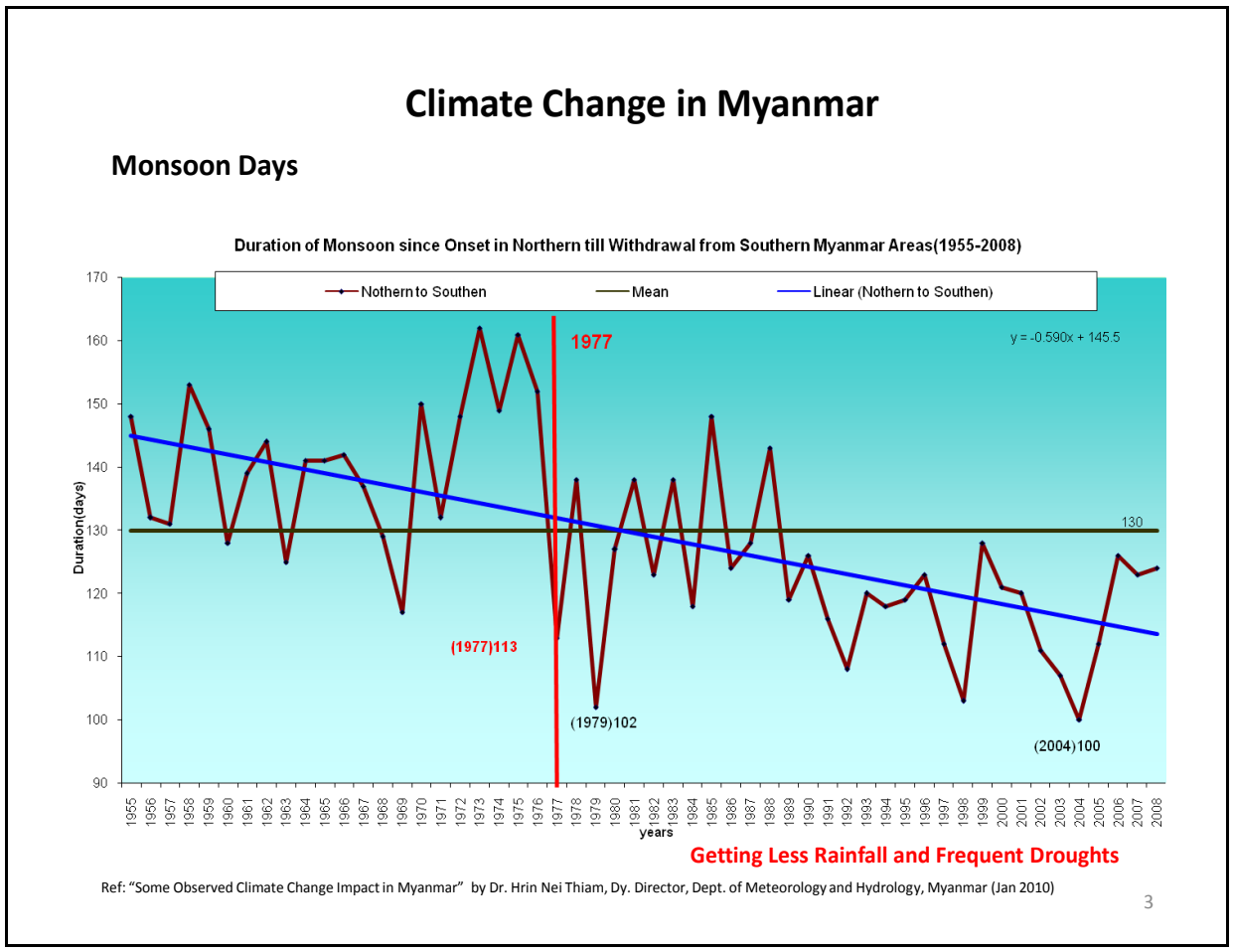
The current trends of drought and water scarcity in the Dry Zone are expected to intensify with the effects of global warming. Erratic rainfall and constantly rising temperature in the Central Dry Zone have been recorded by 45 reporting stations for the period of 1950-2008, and are confirmed by the ECHAM5 model simulation at the early, middle and end of the 21st century[3]. As evident from analysis conducted since the late 1970s (Lwin T, 2000), there is a strong link between global climatic phenomena, such as the El Nino Southern Oscillation (ENSO) and climate extremes in the Dry Zone.

The Food Security Working Group (Khaing, 2010) has observed that the trend of rising temperatures will continue to affect the variability, duration, and intensity of rainfall. Longer

[3] Conducted by the Department of Meteorology and Hydrology (DMH), which is a primary contributor with regard to the climate change projection data.

periods of severe drought are expected to alternate with shorter periods of excessive rainfall, which in turn is expected to result in heightened livelihood insecurity in semi-arid areas. The analysis of climatic trends is well documented, as shown in a rainfall and temperature trend analysis for the past 50 years (see Fig.1, DMH, 2010). On the basis of climatic atlas data for the period of 1950-2011, DMH also reported that the highest extreme day temperature was recorded across the Central Dry Zone (Mandalay Division, Magway Division and Sagaing Division, which all feature as core target areas of the proposed project). In the last six decades, the highest extreme day temperatures were measured in Monywa and Myingyan, which are 2 townships targeted under the proposed project. Drought years associated with ENSO events were recorded more frequently in the period 1980-90s. During the occurrence of the 1998 “El Nino” year, 69% of weather stations recorded low rainfall extremes, while 91% recorded minimal rainfall.

Extrapolation of observational data from hydro-meteorological records is used to project climate-related risks and hazards in the project area. Results from General Circulation Models (GCMs) confirm increased drying and soil evaporation over the Dry Zone.



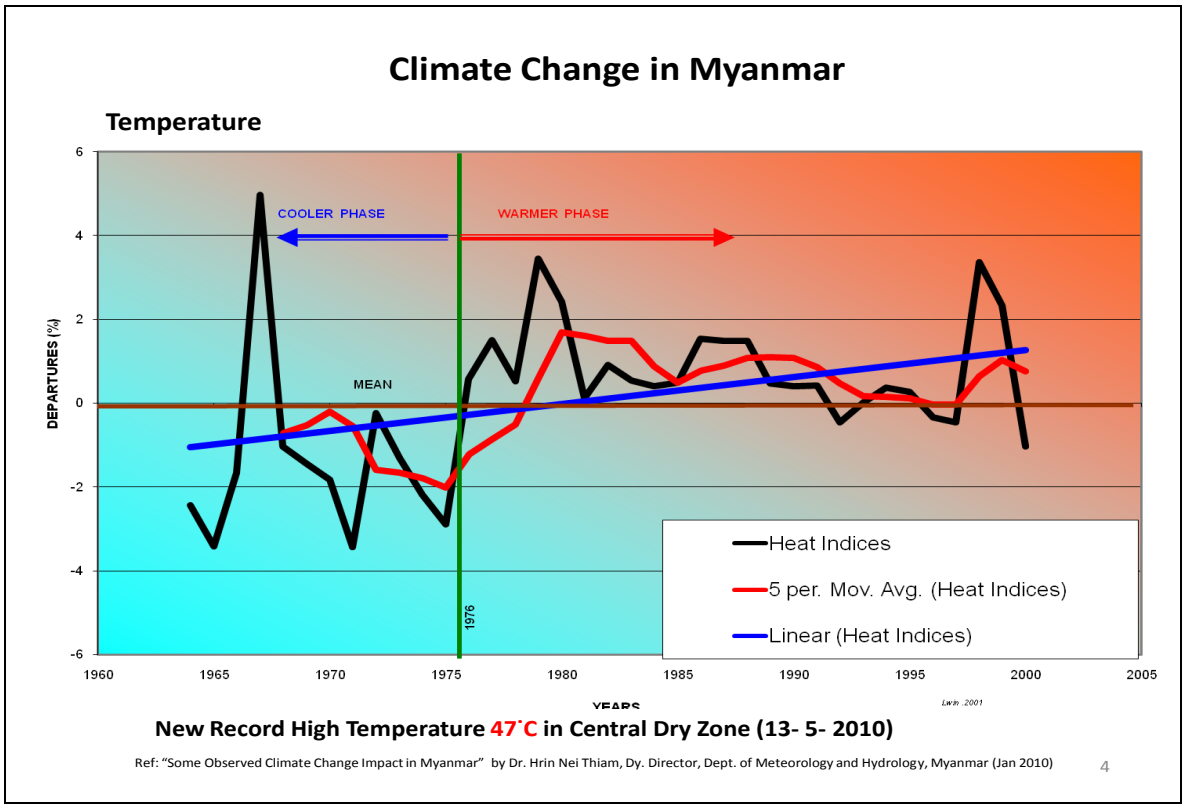


Fig.1: Climate change trends in Myanmar's Dry Zone: Rising temperatures and shorter rainfall periods

GCM information for Myanmar has been derived from the IPCC AR4 report (Christensen et al. 2007, Chapter 11, WG1, IPCC 2007) and a number of additional scientific sources[4]. The corresponding analysis is briefly discussed below, with the A2 scenario representing a 'high' global emissions scenario and B1 representing a 'low' global emissions scenario.

- Temperature:

A2 scenario: Over central Myanmar, minimum and maximum temperatures are projected to increase by 1.5 - 3 ºC throughout the year

B1 scenario: Over central Myanmar, minimum and maximum temperatures are projected to increase by 1.5 - 2.5 ºC throughout the year

The frequency of hot days and nights will increase in both scenarios, while the frequency of cold days/nights will decrease. Soil evaporation is expected to increase, with existing dry areas projected to become drier.

[4] http://www.climatewizard.org; http://sdwebx.worldbank.org/climateportal/home.cfm?page=country_profile; http://cip.csag.uct.ac.za; http://country-profiles.geog.ox.ac.uk

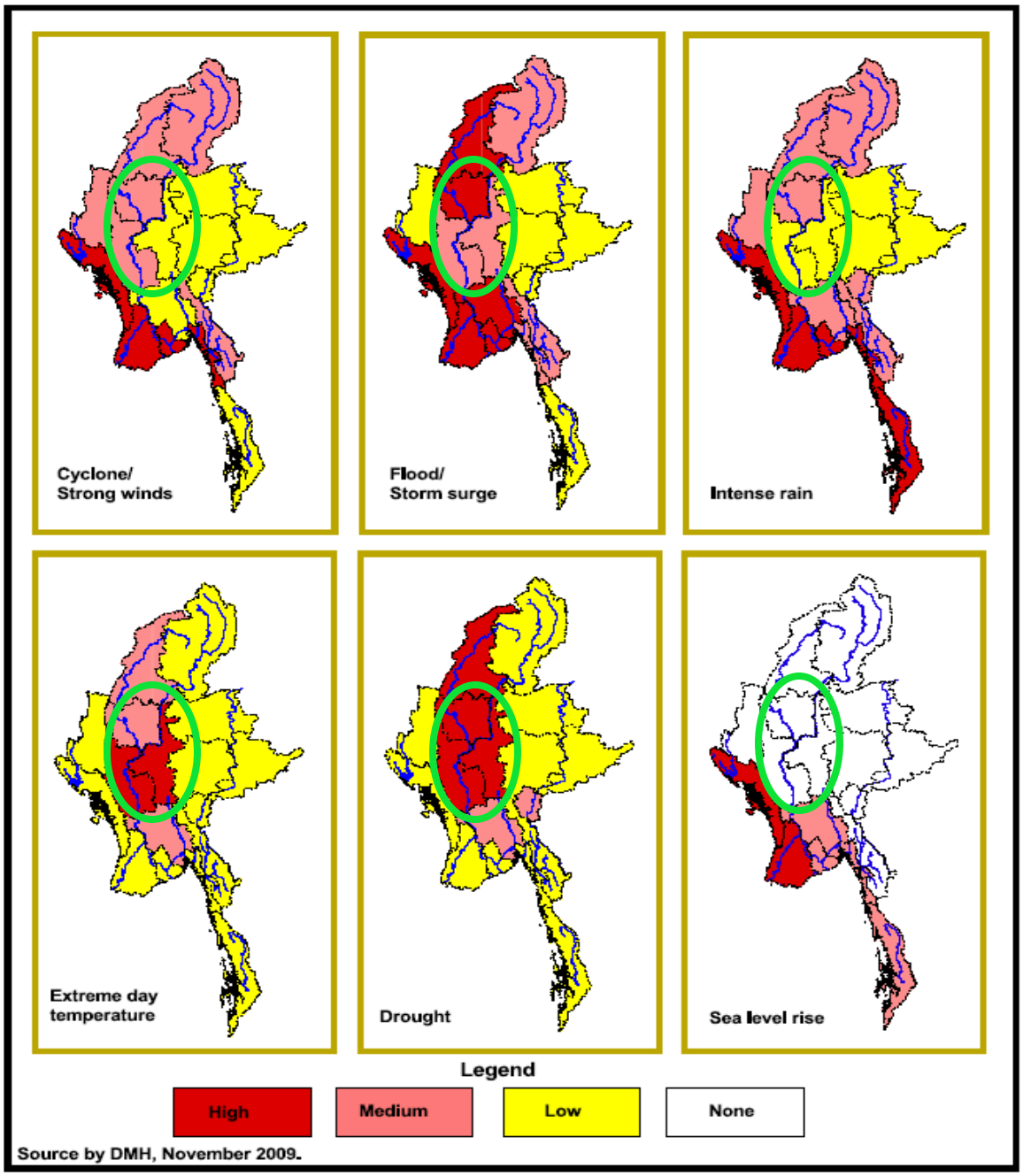


Fig.2: Risk levels for different climate-related hazards in Myanmar, based on extrapolation of observational time-series data and confirmed by GCMs. Project area (Dry Zone) encircled in green.

In the DMH-computed ECHAM5 model simulation, scenarios for Average Surface Air Temperature for the two hottest months (April, May) were simulated as follows:

- *100 years average surface air temperature changes for 21th Century in April*
  - 0.6˚C to1.6˚C during the first thirty year (3 decades) projection period (2010s-2039s),
  - 1.63˚C to 3.2˚C in the middle phase thirty years (mid 3 decades) period (2040s-2069s)
  - 3.34˚C to 5.27˚C for the last thrifty years of century (last 3 decades) (2070s-2099s)

- *100 years average surface air temperature changes for 21th Century in May*

    - 0.8˚C to1.6˚C during the first thirty year projection period (2010s-2039s),
    - 1.6˚C to 2.6˚C in the middle phase thirty years period (2040s-2069s)
    - 3.29˚C to 4.23˚C for the last thirty years of century (2070s-2099s)

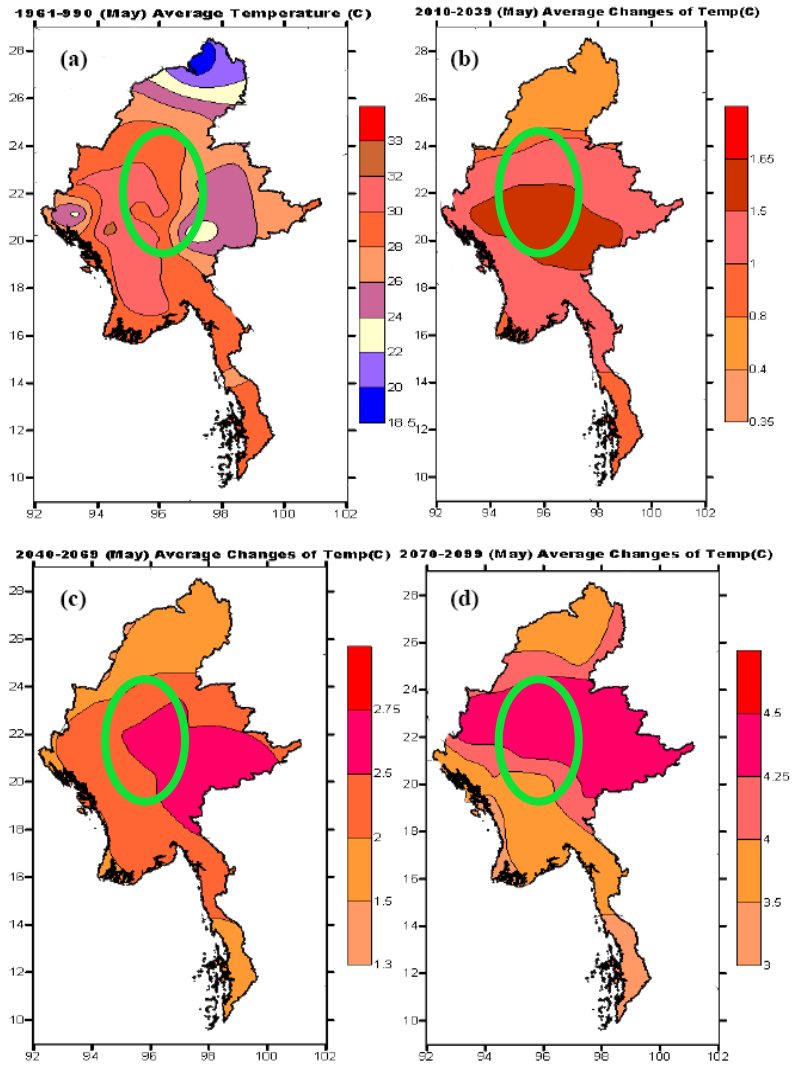


Figure 3. (a) 1961-1990 average Temperature in May; Average Changes of Temperature for (b) 2010-2039, (c) 2040-2069, (d) 2070-2099 by SRES A2. Dry Zone Project Area encircled in green (DMH, 2010).

- Rainfall (Median model):

A2 scenario: Projections in rainfall changes under the A2 scenario are inconclusive during the early rainfall season. There is an indication of drying over the project area in central Myanmar during the month of June, which may be followed by increased rainfall intensity in July and August as indicated by the median model. Increasing rainfall intensity after dry periods is

commonly associated with exacerbated soil erosion and denudation. The A2 scenario shows little change from September-October.

B1 scenario: Little difference to the A2 scenario within a similar range of model predictions up to 2050.

- Cyclones:

Projections of cyclone tracks and cyclone frequency are inconclusive from GCMs, but the intensity of cyclones is likely to increase (as summarized by Christensen et al. (2007) in Chapter 11, WG1 of the 2007 IPCC report).

In summary, analysis of observational data from the past 50 years in combination with model-based climate scenarios shows that the climatic conditions in Myanmar's central Dry Zone will not only be characterized by a significant increase in temperature (as depicted in Fig 1. and Fig.3), but also a decreasing number of rainy days which will increase in intensity. Shorter rainy seasons with more irregular monsoon patterns (as depicted in Fig 2.) are expected to have profound effects on crop productivity, food security, poverty, and environmental degradation. With natural weather cycles becoming more extreme, anomalies in weather patterns will create frequent natural disasters such as flash floods, drought, and landslides along river banks and unstable slopes. These shocks and stresses will primarily affect the poor and most vulnerable inhabitants of the Dry Zone, whose livelihoods depend on small plots of exposed, marginal lands and forests.

Underlying Causes behind the Climate Change-induced Problem:

- **Inherent physical vulnerability**. Myanmar's Dry Zone is inherently vulnerable to climate and other natural hazards due to its geophysical characteristics. As presented above, the region is geophysically characterized with lowest amount of rainfall in the country which is concentrated in the monsoon period of May to October. Shallow and poor soils and sparse natural vegetation in the Dry Zone have limited ability to retain rainfall and prevent surface runoff. At the same time, the region usually records highest temperature during the dry season which increases evapotranspiration from the soil and vegetation. The prevailing climate condition in the Dry Zone renders the region among the most vulnerable in the country to climate variability and change as it is characterized by more frequent and severe extremes – higher temperature and drier seasons punctuated by more intense rainfall during the dry seasons.
- **Anthropogenic pressure on fragile ecosystems**. Population density in Myanmar's Dry Zone is three times higher than the national average and large proportion of its 18 million residents engages in subsistence rain-fed agriculture or livestock rearing. Population pressure, exacerbated by poverty, leads clearing of remaining forests and increasing use of more marginal lands for agricultural use. Apart from clearing of forests for agricultural purposes, collection of fuelwood for household use is one of the main causes of deforestation and degradation of existing patches of forests. Sustainable forest

management, with community involvement, with the view to satisfy competing use of forest resources has begun triggered by the 1995 Community Forestry Instructions. Over the last 15 years, approximately 42,000 hectares of forests have been converted as community-managed forests. However, the progress needs to expand significantly to meet the target set in the Forestry Master Plan (2001) of 2.27 million acres (919,028 hectares) by 2030 (Tint, Springate-Baginski, and Gye. 2011). Despite these positive movements in some areas, overall, current land use practices by individual farmers in the Dry Zone do not take into account the benefits and costs of maintaining intact ecosystems in a changing climate and are conducted with a view to optimizing yields and incomes, primarily driven by poverty, rather than harnessing and maintaining ecosystem services and functions over the long term.

- **Widespread mono-crop practices in the Dry Zone**. Soil type and rainfall patterns are generally not conducive to rice cultivation despite rice being the staple food crop; therefore peas, beans, maize, sesame and groundnuts are the commonly grown crops. In a 2009 study by the WFP, pea was most commonly cited by households that reported growing only one crop. Mono-crop choices can make farmers extremely vulnerable to climate-induced shocks: during the 2009 growing season which was characterized by extreme drought, rice harvests suffered a 50-70% drop in yields, while sesame and sunflower suffered a complete crop collapse at 80-90% of yield losses. While multi-cropping is the preferred practice, with 35% of farming households reporting the cultivation of four or more crops, 18% of households with access to land in the Dry Zone still report the cultivation of only one crop.
- **Poorly managed livestock rearing practices undermining ecosystems; fragile ecosystems rendering livestock rearing a high risk activity**. 99.6% of the national sheep herd, 71% of the goats, and 40% of the cattle are located in the Dry Zone. Only about 10% of livestock owners are operating at a commercial scale and the rest is small-scale or at the subsistence level largely by the impoverished (and landless). Poorly managed grazing practices on fragile ecosystems exacerbate the overall vulnerability of the region and its residents. Subsistence-level livestock rearing is often free-ranging and it exerts tremendous pressure on remaining vegetation (UNDP, 2006). On the other hand, livestock mortality has increased considerably over the past decade, mainly due to scarcity of water and fodder, and farmers have reported extraordinary expenses for buying fodder during dry periods. Livestock health also shows a deteriorating trend, and trade for cattle is decreasing by up to 30% (IDE, 2009). This indicates that farmers are facing growing difficulties in animal breeding, which carries over to the production of meat and the ploughing of farmland and to limited source of income and asset accumulation.

Preferred Solutions and Barriers to Achieving Them:

The desired state at the end of the project is to have increased the resilience of livelihood options and underlying ecosystems to climate variability and change. With a view on these climate-induced problems and pressures, research on and dissemination of drought resistant crop varieties, resilient cropping and livestock rearing systems, intercropping (the practice of growing two or more crops simultaneously in the same field), effective application of an

agroforestry practice, management of shifting growing seasons, soil fertility management and animal husbandry, enhanced knowledge on and skills for post-harvest handling, and improved access to agricultural input (most critically fresh water) can help farmers to maintain critical resilience of agricultural practices across the Dry Zone in a changing climate. However, the following presents key barriers to achieving all of the above:

a) Insufficient diffusion of climate-resilient irrigation and water management measures and practices

At present, Dry Zone farmers have limited access to physical water infrastructure that is required to maintain resilient rural livelihoods in a changing climate. Increasing the water storage capacity of soils, improving the management of potable water, and introducing more efficient/alternative irrigation techniques and practices are recognized as key measures to increase the adaptive capacity and resilience of rural farming systems (Goedhart, 2010): Rainwater storage systems can reduce water extraction of over-stretched groundwater aquifers during dry periods, and thereby provide buffer capacities in times of extreme need. In some cases, riverbank filtration may provide a suitable alternative to groundwater extraction (water from rivers can be pumped into the ground under riverbanks and later extracted when sufficiently filtered through sands and clays in the sub-soil). Communal ponds can be established or re-dredged to remove sand and silt and prepare for forthcoming rains; household-level rain catchments, such as tube wells, can be built in alluvial soil with carbon-neutral treadle pumps sourcing the water. Access to these micro-scale water infrastructure has been augmented through several initiatives in and outside the Dry Zone, notably the government-led "Ten Year Project for Rural Water Supply by Development Committees of Sagaing, Magway and Mandalay Divisions (From 2000/2001 to 2009/2010)," and UNDP-supported ICDP project. The low-cost and community-managed micro water infrastructures built through these initiatives need to be replicated and upscaled at a greater scale. With impending climate change, the locations of these investments need to be informed by localized assessments of climate-induced drought and flood risks and vulnerability. Moreover, the management practices need to accompany with increased community understanding and awareness of creeping water resource scarcity and variability in a changing climate, as well as the understanding of the direct linkage between ecosystem functions of hydrological regulation and increased resilience to climate impacts..

b) Insufficient knowledge of, and access to, climate-resilient crop and livestock rearing practices

Given that the diversification of crops provides a number of resilience and adaptation benefits, including an economic buffer in case of crop failure, and recognized benefits for soil fertility, multi-cropping has potential to be up-scaled as an adaptation practice across the Dry Zone. However, there are multiple barriers that prevent poor farmers and the landless from diverting away from mono-cropping practices to multi-cropping and improving livestock rearing and management practices. First, at present, there are no concerted efforts to promote and support the diffusion and uptake of these practices on a critical scale. A seed bank (or agricultural research farm) that attempts to diffuse a range of certified seeds, including a few drought-tolerant species, is present in every township within the project target area. However, the level

of outreach is significantly limited as the physical distance to the township centre is beyond the reach of many farmers as a township is a cluster of about 40-70 villages. The Livestock Department also offers vaccination and disease control services and organizes trainings on fodder preservation techniques. However, this is also limited at the township level and often to large scale contractual livestock owners. Secondly, despite various past initiatives including ICDP, awareness about and technical capacity to implement measures such as drought resistant crop varieties, resilient cropping and livestock rearing systems, intercropping (the practice of growing two or more crops simultaneously in the same field), management of shifting growing seasons, soil fertility management and animal husbandry is still limited. In addition, limited experience in ecological restoration work in Myanmar and a lack of knowledge that has been accumulating in other countries but not shared with Myanmar due to its international isolation, have contributed to hindering the application of ecosystem based adaptation measures in areas where decisive ecosystem restoration is required.

c) Access to relevant climate information that enables Dry Zone farmers to prepare for climate change and reap benefits from adaptation measures

Due to its inherent vulnerability, a number of development initiatives have operated in the Dry Zone of Myanmar. While some of the assistance such as improved and diversified livelihood options and access to water resources has contributed to reducing the underlying vulnerability of poor farmers, the degree of their exposure to climate risks continues to be high and likely to be increasing. This is due to a combination of the level of awareness about projected climate change impacts in the Dry Zone, limited models and examples of how to effectively harness ecosystem services for climate change adaptation and climate risk management, and how limited climate/weather information is disseminated to and effectively used by end users. The Department of Meteorology and Hydrology currently produces daily, weekly and seasonal weather forecasts, but they are not effectively used by farmers in changing their livelihood behaviors – for example, selecting different crop varieties at the sowing season, adjusting sowing or harvesting schedules, or obtaining extra forage in preparation for a projected dry spell or early arrival of monsoon. Such information is disseminated by DMH through public TV and radio, which precludes many poor farmers without access to such equipment from receiving it in the first place, and it is not disseminated in such a way that is tailored for agricultural purposes or understandable to farmers. The situation is similar as for early warning information for sudden onset of natural disasters. In recent Cyclone Nargis in 2008, early warning information on upcoming cyclone was disseminated only through TV and radio and hence never reached to people in rural villages. What ensued was the loss of human lives and livelihood assets for a large number of people. To deliver climate risk information in such a way to reduce exposure and/or increase resilience of Dry Zone farmers and their livelihood assets to both slow and sudden onset of climate extremes, an effective integration of community-based networks into the existing dissemination channel that analyzes, synthesizes and relays such information is crucial. Such information then needs to be applied in the specific local context (with localized sources of risks and vulnerabilities) so that the co-benefits of livelihood adaptation measures (such as improved access to micro-scale water infrastructure, diversified and resilient farming and livestock practices, improved soil protection and rehabilitation, etc) and improved access to

information can be realized. During this process, effective partnerships and collaboration with local NGOs and CBOs are also crucial as the public service delivery in rural Myanmar is severely constrained by the lack of human resource capacity and outreach within the local government.

Project location:

The project will operate in five townships in the Sagaing, Mandalay and Magway Regions – Shwebo and Moneywa townships in the Sagaing region, Myingyan and Nyaung Oo townships in the Mandalay Region, and Chauk township in the Magway Region (Fig. 3). The townships were selected on the basis of observed temperature extremes, frequency of drought[5] per year, and the impacts of climatic parameters on food security. An additional criterion for township selection was the potential to access ground and surface water resources – vital prerequisites for small irrigation and water management schemes. The direct beneficiaries of the project are marginal farmers in rain-fed areas and landless workers whose access to arable land is severely threatened by erosion and land degradation. Special emphasis is placed on women and female-headed households within this vulnerable group.

The project target sites consist of approximately 50,000 households from 280 villages with a high percentage of landless households and marginal/small farmers. Many of these landless and marginal/small farmers will benefit directly from the proposed project. Among them, approximately 85% of the total population is estimated to be impoverished landless[6] and marginal farmers' households on rain-fed lands who are prone to critical losses of livelihood assets from recurring droughts and crop failures. While impoverished and marginal farmers with land-use rights will benefit from the project through additional investments in natural and productive capital (such as improved water supply on drought-prone fields; access to diversified and improved crops for fields and home gardens; expanded agro-forestry services; diversified livestock rearing; arrested soil erosion and watershed protection), landless people will benefit from diversified livestock assets, improved ecosystem services (such as greater availability of non-forest products and more reliable freshwater supply), as well as through greater opportunities for manual labor in water-, forestry- and agroforestry-related components of the project. During the project formulation, an assessment of primary information as well as secondary sources (from Department of Agriculture; General Administrative Department; Department of Forests) on the proportion of the landless and farmers with land-use rights was undertaken and it confirmed that approximately 60% of the target population is landless; among the farmers with land access, approximately 63% owns only 0.4-0.8 hectares. An important element of the proposed project is to strengthen the participation and stakes of landless people in Community-based Organizations, especially Forest User Groups.

[5] From 2004 to 2010, the registered frequency of drought events was 33, 24, 21, 17 and 20 in Shwebo, Monywa, Myingyan, Nyaung Oo and Chauk respectively.

[6] Landless people are those people without arable land of their own and who must supplement their income with a variety of off-farm activities and thus depend mainly on casual labour. Subsistence livestock raising mainly of goat and sheep is one of the coping strategies to earn their living. Traditionally, landless participate in village development activities in the Dry Zone.

The following table shows the targeted townships and the size of village and population:

Regions	Townships	Villages	No. of Households	Population
Sagaing	Shwebo	60	12,318	64,906
	Moneywa	50	8,347	48,759
Mandalay	Myin Chan	60	12,447	51,579
	Nyaung Oo	70	12,455	63,140
Magway	Chauk	40	5,072	26,176
Total		280	50,639	254,560

Table.3: Household status of targeted townships (updated during project preparation phase, June 2012)

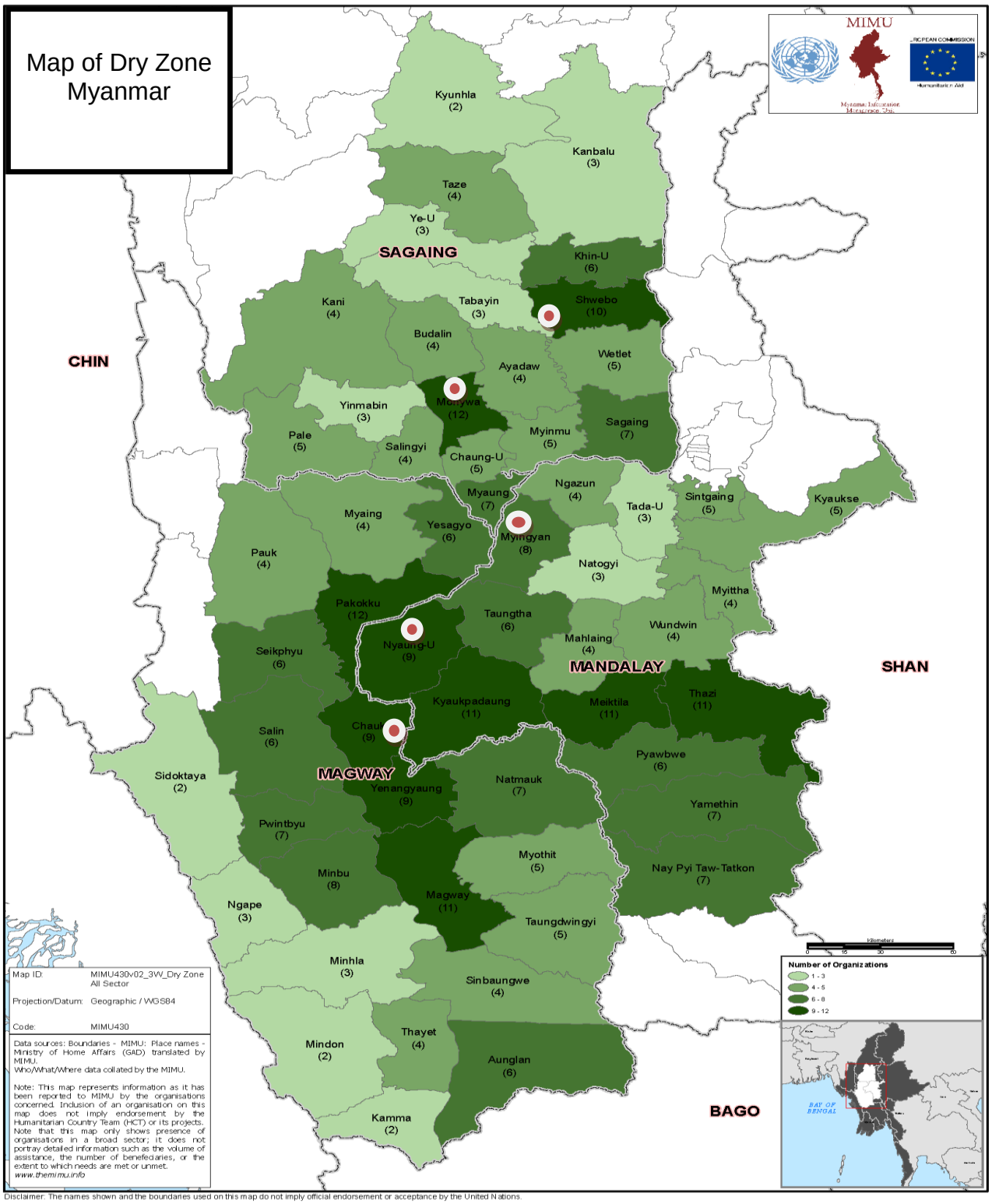


Fig.3: Targeted project locations in Myanmar's Dry Zone

PROJECT / PROGRAMME OBJECTIVES:

The objective of the proposed project is **to reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security.**

This objective is aligned with the Objective spelled out by the Adaptation Fund[7] to "Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels". (Please see ANNEX K for the Fund outcome level alignment).

The strategy of the project to achieve this objective is to reduce the risks and effects from the increasingly recurring incidents of drought through an improved water management, crop and livestock adaptation programme in five of the most vulnerable townships of Myanmar's Dry Zone. The programme is based on principles of local empowerment and implemented by community-based organizations (CBOs) such as Village Development Committees, Water User Committees, farmer groups, communal forest user groups, and local Non-Governmental Organizations (NGOs). The anticipated impact of the project is the reduction of food insecurity and losses from extreme climate events in 50,639 households.

In line with UNDP's operational mandate in Myanmar as reflected in UNDP Governing Council Decision 93/21[8], the proposed project is addressing climate risk resilience through community-based and community-driven adaptation in decentralized settings. At the same time, the project is anticipated to contribute to the implementation of national policies and programmes that are in line with Myanmar's obligations under the UNFCCC.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Programme components relate to three main Outcomes and composed of lower-level Outputs to achieve them. The proposed Outcomes reflect the programme objective, while the Outputs are the deliverables of the project produced by its proposed activities. Details of Outputs and Activities and their rationale are provided in Part II, Section A. The specific Output budgets for AF resources, summarized below, will be explained in Part III, Section D and ANNEX A.

[7] "Project Level Results Framework and Baseline Guidance Document" (AFB/EFC.4/3), proposed by the AF Ethics and Finance Committee in its 4th Meeting (Bonn, March 16, 2011)

[8] Recognizing that there are *critical humanitarian and basic human development needs of all the people of Myanmar at the community level* which require focused external assistance and continuation of UNDP assistance at an operationally cost-effective level … decides that, until a country programme for Myanmar is considered at an appropriate time, all future assistance from the United Nations Development Programme and related funds to Myanmar should be clearly *targeted towards programmes having grass-roots-level impact in a sustainable manner* … particularly in the areas of primary health care, the environment, HIV/AIDS, training and education, and food security.

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUT	EXPECTED OUTCOME	AMOUNT (US$)
1. Response to the climate-induced reduction of freshwater supply	1.1. Water capture and storage capacities in 280 villages enhanced to ensure sufficient irrigation and potable water supply during dry periods	1. Continuous freshwater availability is ensured during the dry seasons in 280 villages in the Dry Zone	1,625,681
	1.2. 4,200 hectares of micro-watersheds are protected and rehabilitated through Farmer- Managed Natural Regeneration (FMNR) to increase natural water retention and reduce erosion		1,374,000
	1.3. Community-based agro-forestry plots are established on 5,100 hectares of private and communal lands to conserve soil and water		1,084,960
			Component 1 Total: 4,084,641
2. Climate-resilient food and livestock production systems	2.1. Drought-resilient farming methods introduced to farmers to enhance the resilience of subsistent agriculture in the Dry Zone	2. Climate-resilient agricultural and livestock practices enhanced in Myanmar's Dry Zone	977,400
	2.2. Resilient post-harvest processing and storage systems introduced to reduce climate-induced post-harvest losses (drought and floods)		477,600
	2.3. Diversified livestock production systems introduced to buffer the effects of drought on rural livelihoods		861,760

			Component 2 Total: 2,316,760
3. Improved climate risk information dissemination	3.1. Climate hazard maps and risk scenarios are developed in each township to support community-based climate risk management and preparedness planning	3. Timeliness and quality of climate risk information disseminated to Dry Zone farmers enhanced through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-term climate scenario planning	259,000
	3.2. Local level information dissemination framework strengthened for climate and disaster risk management		523,000
			Component 3 Total: 782,000
4. Project/programme implementation total cost			7,183,401
5. Project/Programme executing cost requested from AF [9]			106,024
6. Total project/programme cost			7,289,425
7. Project cycle management fee charged by Implementing Entity (8.5%)[10]			619,601
Amount of Financing Requested			**7,909,026**

PROJECTED CALENDAR:

Submission of project concept to AF Board for review	7 October 2011	✓
Approval of the Concept by the AF Board	22 December 2011	✓
Submission of project document to AF Board for review	21 August 2012	✓
Approval of the Full Programme Proposal by the AFB (Estimate)	January 2014	
Start of Project/Programme Implementation	April 2014	
Mid-term Review (if planned)	March 2017	
Project/Programme Closing	March 2018	
Terminal Evaluation	October 2017	

PART II: PROJECT / PROGRAMME JUSTIFICATION

[9] AF funding is requested to cover US$106,024 (=1.48% of total project costs; or 22% of the total project execution costs), with UNDP Myanmar contributing US$381,158. Total project execution costs: US$487,182. Please see Annex B for more details.

[10] 8.5% of total project costs; see detailed breakdown of services provided by MIE fees in Annex C

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

COMPONENT 1: Response to the climate-induced reduction of freshwater supply

The main Outcome of Component 1 is that in 280 villages in Myanmar's Dry Zone, the climate-induced reduction of freshwater supply is countered through increasing water capture, storage, filtering and retention capacity. These physical and ecosystem-based fresh water management measures will be put in place to cover all 280 villages while the specific selection of the measure(s) will be verified with a view to 1) enhance the strategic use of existing physical and natural assets such as forest resources and of available surface and sub-surface water; and 2) ensure ownership by community and sustainability of the adaptive investments. This contextualized approach will not only ensure that AF investments are tailored to the local context, but also provide platforms for community dialogue, consensus building and capacity development on climate-induced water scarcity issues. Compliance with new environmental and social safeguards that are applied by all UNDP-supported adaptation projects will ensure community consent for all investment activities.

Component 1 is comprised of the following Outputs:

Output 1.1. Water capture and storage capacities in 280 villages enhanced to ensure sufficient irrigation and drinking water supply during dry periods

This Output focuses on the improvement in on-farm and off-farm water collection, storage, filtering and retention capacities through water storage, and soil and water conservation measures. Ground water recharge will be enhanced by the development of small-scale water harvesting structures built in sub-tributaries of the Ayeyarwady. Depending on the specific locality, this will be supplemented by contour trenching, contour stone walls, construction of temporary and permanent check dams and gully plugging structures. Additionally, percolation ponds, silt detention tanks and irrigation tanks will be constructed to harvest freshwater and recharge surplus to the groundwater aquifer for use in agriculture (irrigation). Supplementary irrigation will be enabled by the development of small diversion structures off tributaries of the Ayeyarwady River and natural water sources, to improve crop production and rangeland productivity.

The installations proposed under this Output are simple, farmer-friendly structures which make use of locally available materials and are implemented by communities according to their needs. This ensures not only cost-effectiveness of the adaptation measures, but also community ownership and sustainability. The effectiveness and community acceptance of these measures have been verified in ICDP among other initiatives. The aim of these structures is to store fresh

water[11] and reduce accelerated runoff and erosion, slowing down surface water so it will penetrate the soil better and increase sub-surface storage. The utilization of treadle pump irrigation will enable efficient use of freshwater and support livelihood resilience. These structures and practices have been used in some areas of the Dry Zone on a demonstration scale, and have been found useful in connection with integrated water resource management systems. Water User Groups in Dry Zone normally take the leading role in maintenance and facilitate cost sharing among the beneficiaries for operation cost, including fuel, for long term access to water.

Installations established under this Output will include:

Percolation Ponds: Percolation ponds are multipurpose conservation structures which store water for livestock and recharge the groundwater. They are constructed by excavating a depression, forming a small reservoir or by constructing an embankment in a natural ravine or gully to form an impounded type of reservoir.

Check dams: Check dams are small-scale structures constructed with locally available materials to shift the direction of surface water flows. Brush wood dams, loose rock dams and woven wire dams are structures that may be used by the project, depending on the locality. The main function of check dams is to impede soil and water removal from a watershed.

Motorized pumping irrigation: Centrifugal pumps and diesel engines are used for motorized pumping schemes, with streams, rivers and shallow tube wells as potential water sources. Water is pumped to head canals and storage facilities for use in irrigation. The proposed project will make selective use of this facility (if treadle pumps do not provide the required pumping head) to optimize water use and water efficiency in especially dry areas that do not have access to natural surface or subsurface water flows. Specific locations will be determined based on the volume of water and pressure needed in a given locations, and only in those locations where manual treadle pumps do not provide sufficient water, will a motorized pump be installed. Furthermore, the use of the pump will be restricted to the dry season according to the agreement with the Village Water User Group.

Treadle pump irrigation: Treadle pumps are a human-powered alternative to motorized pumps, and also use rivers, streams, open hand dug wells and shallow tube wells as potential water sources. The project will provide treadle pumps to water user groups and communities to address water scarcity issues in vulnerable dry plots.

[11] Past initiatives that expanded water storage capacities in Myanmar have not reported increased incidents of vector borne diseases such as dengue and malaria. However, the installation process will accompany awareness raising for maintenance and the need for close monitoring of such incidents. There have been some successful examples of biological control, as opposed to chemical, in Southeast Asia including Myanmar. In these examples, a predatory species that feed on larvae of mosquitos were released to water containers with successful results. If needed, the project will draw on lessons from these examples (see for example, Sebastian, A. et al., 1990; Nam, V.S., et al., 1997)

Sedimentation and water filtration infrastructure: Soil Storage bunds are strong embankments constructed across "U" shape, medium size gullies to increase fertility of adjacent fields by trapping sediments at the up steam site of the bund. Soil Storage bunds are usually built in series along the gully. They consist of a side spillway, with excess water draining through a spill way and moving on to the next bund downstream. Soil Storage bunds are often constructed across the depression of cultivated fields, particularly when a large waterway flows across the field. The purpose is to reduce erosion, refill the depression with fertility-increasing sediments, and improve the quality of water.

With assistance from the project, Village Water User Groups will seek the possibility of collecting user fees for the operation and maintenance costs. To supplement this, along with Activity 3.2.6, they will be trained to integrate the O&M needs into targeted proposals (especially Township Development Plans, which UNDP will facilitate). The installation of these infrastructures will be accompanied by necessary awareness raising sessions for sustainable water harvesting and water savings.

The costing and assessment of estimated increased access to freshwater were undertaken during the project formulation stage by consulting water infrastructure experts and based on previous experience such as the UNDP-assisted ICDP project. A list provide below has been produced based on such assessments, experts opinions on the feasibility of implementing these measures, and in consultation with local communities.

Activities under Output 1.1 include:

Activity 1.1.1. In response to priorities identified by local institutions (Village Development Committees, Water Management Committees, CBOs), establish a coordination platform with public institutions (Dry Zone Greening Department (DZGD), Irrigation Dept., Dept. of Development Affairs, Planning Dept.) and development organizations (CBOs, NGOs) in each township (5 total) to design and co-finance a simple network of technically and environmentally appropriate and complementary water harvesting, storage, filtering and retention structures to conserve water for dry periods and hold erosion in check.

Activity 1.1.2. In consultation with Village Water User Groups, revise/develop a water management scheme (including a conflict resolution mechanism and collection of user fees).

Activity 1.1.3. Organize sessions and trainings targeting Village Water User Groups on relevant know-how and technological means to manage the system.

Activity 1.1.4. Organize awareness raising events targeting WUG and community members on climate risks, resilient water use, and participatory management of the water systems

Activity 1.1.5. In cooperation with CBOs, NGOs, community members and government partners, establish:

- 56 canals for water diversion;
- 70 small-scale pumping systems;
- 56 communal water tanks and pipes (5000 gallon per tank);
- 56 shallow tube wells;
- 9 deep tube wells;
- 10 fixing deep tube wells;
- 150 pound renovations;
- 1563 hectare of land covered with terraces and soil storage dams

Activity 1.1.6. Production of a technical report on the effectiveness, success and challenges in enhancing freshwater availability

A robust M&E framework established at the inception phase of the project will capture the use, effectiveness in terms of enhancing water access, and O&M of these investments throughout the life of the project.

Output 1.2. 4,200 hectares of micro-watersheds are protected and rehabilitated through Farmer-Managed Natural Regeneration (FMNR) to increase natural water retention and reduce erosion

Community-based Natural Resource Management (CBNRM) is one of the most important manifestations of true decentralization as it relates to communal control of natural resources. Community-based management of forests and other natural resources plays a crucial role in improving the livelihoods of the poor. The benefits of CBNRM range from job creation to substantial management rights and long-term revenue-generation. One critical CBNRM activity promoted under the proposed AF project is the development of Community Forestry[12]. In line with Community Forestry Instructions (CFI, 1995) degraded and remnant natural forests in Myanmar shall be conserved through community-based forestry practices. Many community forests have already been successfully established in the Dry Zone, and relevant technology and investment input for afforestation measures is readily transferable to Community Forest User Groups (CFUG) who are active in nursery establishment, forest management, pruning techniques, promotion of non-timber forest products (NTFP) and tree selection. Community

[12] Community Forestry (CF) initiatives took place in Myanmar after a series of forest policy reforms and decentralization arrangements during the 1990s. Community Forestry has been encouraged and implemented since MOECAF issued the Community Forestry Instructions (CFI) in 1995. The Forest Department has been instrumental in the introduction of CF in degraded areas with primary objectives of afforestation and meeting the local consumption of forest products. It has focused on management of forests by rural communities through protection of natural vegetation, establishment of forest nurseries and forest plantations so as to enable them to fulfill their own basic needs for firewood, farm implements and small timbers. The duration of land lease for the establishment of Community Forest is set initially for 30 years and it is extendable depending on the performance and desire of the user's group.

forest schemes, which incorporate methods such as enrichment planting, natural regeneration and artificial regeneration, can be applied to conserve remnant forest and give poorer and particularly landless households much-needed access to income earning opportunities while improving soil conservation as well as water conservation activities. Most people who will participate in the regeneration and conservation of forest under the proposed AF project are landless; among them, women will be taking a lead role in nursery management, site preparation, species selection and weeding. Specifically, under this Output, the AF resources will be used to facilitate rehabilitation, regeneration and conservation of approximately 2,160 hectares of existing vegetation cover and remnant forests while additional 680 hectares of land will be afforested/reforested. In total, 2,840 hectares of forests will be under a community management for 30 years.

Investments in rehabilitation, regeneration, and afforestation/reforestation of community forests will be supplemented by reforesting denuded community areas which are part of micro-watersheds in the Dry Zone. Communities in the Dry Zone are generally surrounded by vast amounts of agricultural lands with patches of forests of varying size. This is best described in the picture below where an aerial photograph of a typical village in the Dry Zone is shown. It is evident from this photograph that existing forest patches in the village periphery are extremely small, the village is surrounded by exposed farm lands, farm boundary trees are thin and sporadic, and roadside (to the east of the village) and communal pond boundaries (to the north of the village) are almost completely denuded. In these locations, improved farm boundary planting (promoted under Output 1.3) would provide corridors of vegetation for soil arrest and sub-surface water retention (apart from greater viability for agro-forestry) whereas afforestation in available communal areas (such as roadsides, schools and religious compounds), which are usually located in the outer boundaries of the village, would provide an additional buffer against erosion and localized floods.

Forestry activities supported by this project will be embedded in concrete local management plans to rehabilitate and protect micro-watersheds in the project areas. These watersheds are heavily degraded from the effects of drought, flooding, erosion and human encroachment. The watershed management plans developed under Output 1.2 will address the interconnected issues of water use and source protection; soil conservation and enrichment; agriculture and agro-forestry; and land use planning for different livelihood activities. Supplemented by the climate hazard, risk and vulnerability maps produced under Output 3.1, the local management plans will reflect potential climate change impacts on specific locations based on the level of denudation, historic inundation areas, types of existing vegetation, soil types and topography, as well as locations of communities and vulnerable groups.

Activities under Output 1.2 include:

Activity 1.2.1. In response to priorities identified by local villages, prioritize and select relevant tree species for regeneration and reforestation purposes in each village and train Communal Forest User Groups (CFUG), farmer groups, Village Development Committees, foresters, rangers and range officers or deputy staff officers in participatory forest management in drought-prone zones;

Activity 1.2.2. Facilitated by CFUG and Village Development Committees, finalize in-kind co-financing agreement with local communities participating in FMNR activities

Activity 1.2.3. In alignment with 1.1.4., organize workshops on climate risks and linkages of FMNR, erosion control, and natural water control

Activity 1.2.4. Along with Activity 3.1.3., measure the preconditions of the micro-watersheds and integrate the information in the GIS system

Activity 1.2.5. Enrichment planting, improvement felling, pruning, ditch digging, and root cutting carried out in 116 villages for regeneration of existing vegetation cover and conserve remnant natural forests (engaging the bulk of landless labourers in the target area)

Activity 1.2.6. Afforestation and reforestation activities conducted covering 680 hectares of land (which can be initially transferred to communities for 30 years with the approval of the Forest Department[13])

Activity 1.2.7. Afforestation in religious and school compounds, along dam boundaries, road sides and gaps in communal areas covering 1,360 hectares

Activity 1.2.8. Provide hands-on trainings to CFUG, farmer groups, village development committees, foresters, rangers and range officers on forest management

Activity 1.2.9. Facilitated by Forest Department and NGOs, and using outputs from Activity 3.1.1., formulate a community forestry management plan in line with CFI guidelines

Activity 1.2.10. Production of a technical report on the effectiveness, success and challenges of community forestry management plan

Output 1.3. Community-based agro-forestry plots are established on 5,100 hectares of private and communal lands to conserve soil and water

Agroforestry is a set of land use practices that involve the deliberate combination of woody perennials including trees, shrubs, palms and bamboos, with agricultural crops and/or animals on the same land management unit. Agroforestry is one of the basic principal biological methods of conservation and assists in maintenance of soil cover. It is designed to create barrier[14] and cover[15] approaches through supplementary and direct uses of trees and shrubs for soil and water conservation. The integration of tree and annual crops provides potential to improve soils through nutrient cycling and supplementing organic matter. The trees, by covering the soil, guard it from direct exposure to the sun and avoid loss of soil moisture in times of

[13] Discussions with the Forest Department during the project preparatory phase have confirmed the original assumption that it has agreed to grant lease permission to community with a demonstration and implementation of a sound management plan, with which the project will assist communities.
[14] The Barrier approach checks/reduces runoff and soil removal by means of contour-aligned barriers such as terraces, ditch-and-bank earth structures, grass strips, or hedgerows.
[15] The Cover approach checks/reduces rainfall impact and runoff through maintenance of a soil cover formed of living of dead plant material including herbaceous plants, crop residues, tree litter and prunings.

drought and during dry spells. This results in the improvement of soil structure and texture, and enhances the natural water retention capacity compared with coarsely and sparsely vegetated soils. In addition, risks of wind- and water-induced soil erosion are greatly reduced.

Agroforestry approaches are not new in the Dry Zone, but their overall application is characterized by a distinct lack of diversity and variety of species. The potential of agroforestry to increase drought risk resilience in the Dry Zone is far from achieved: Current practices incorporate farm boundary planting, alley cropping and wind breaks, but silvo-pastural practices are largely missing (which is one of the factors that lead to fodder shortages during dry periods). Home gardens are often poor in terms of their composition and diversity, and prone to failure during climatic extremes. Current agro-forestry practices are not systematically documented for the Dry Zone in Myanmar. Field visits conducted during the formulation phase to target areas provided the primary source of information on agro-forestry practices. Ongoing agroforestry practices observed indicated a lack of diversity in current practices, many of which are largely driven by income earning potential rather than with a view to arrest soil erosion, improve soil texture and productivity, and improve a habitat for soil organisms. Where farm level boundary planting is practiced, a few species of trees dominate such as *Acacia catechu*, palm trees, and plum trees. The selections of these tree species are largely driven by income earning potential from collecting fruits or selling poles and posts from the timber, rather than considerations for maintaining/improving soil moisture and texture. At the household level, commonly tamarind (*Tamarindus indica*) and legume (*Cassia siamea*) are grown in the backyard if the soil and water availability of the household permit, but more sophisticated intercropping measures such as alley cropping were found only on a limited scale. Along the boundaries of property, perennial fruit trees, firewood trees and shady trees (commonly *Albezzia lebbek* or *Leucaena leucocephala*) were observed. Wind break tree planting is also practiced on a small scale that included *azadirachta indica* and *leucaena leucocephalah*.

Under a regime where climate parameters are displaying high variations with frequent extremes, diversity in micro and regional environment is a key to ecosystem resilience (see for example Falke, et al. 2004, and Thompson, et al. 2009). Diversified agro-forestry systems, which include a wide variety of species and functionalities in the village context (ranging from more resilient home-gardens to agro-silvo-pastural plantations) are needed to improve soil texture and arrest soil erosion that is worsening and expected to worsen under unfolding climate conditions. AF resources will be used to establish community-based agro-forestry groups and provide training on the planning, implementation and management of effective, diversified agro-forestry systems. These groups, which will be formed with gender considerations fully taken into account, will lead on the design of a locally appropriate agro-forestry strategy (home gardens with a greater crop varieties; increased use of agro-silvicultural systems; extension of wind breaks to denuded gaps) in specific locations and devise a community-based system to manage and preserve the functions of these new plots.

Activities under Output 1.3 include:

Activity 1.3.1. Establish a village-based agro-forestry group in each target village

Activity 1.3.2. Formulate a user-friendly template for community-led inventory of ongoing agro-forestry (agro-silviculture; agro-silvipasture; silvopasture) practices

Activity 1.3.3. Update a community-led inventory of agro-forestry practices, agro-silvopastural systems and non-timber forest utilization and development in 280 villages and identify gaps in the ongoing practices, to be updated along with implementation progress including economic benefits from the intervention

Activity 1.3.4. Based on the results of the inventory, community priorities and expert opinions, consult with communities on a locally suitable agro-forestry approach

Activity 1.3.5. Provide training to agro-forestry groups, Village Development Committees, CFUGs and other CBOs on the planning, implementation and management of small-scale, diversified agroforestry systems and non-timber forest production techniques;

Activity 1.3.6. Provide a diversified suite of relevant crops, tree species and water-saving technologies (such as drip-irrigation) to community groups to establish agroforestry and non-timber plots on the basis of recognized and appropriate soil conservation techniques:

- 1,700 hectares of homestead gardening in 110 villages[16]
- 3,400 hectares of farm boundary planting in 100 villages

Activity 1.3.7. Undertake exchange visits of community members for information sharing

Activity 1.3.8. Production of a technical report on the effectiveness, success and challenges of climate-resilient agroforestry practices

[16] During the project formulation proposal, a detailed feasibility assessment in the target five townships about availability of lands for homestead gardening and farm boundary planting as well as the analysis of ongoing market prices for climate-resilient crop and tree varieties were undertaken. It was estimated, as a result, that for homestead gardening and farm boundary planting, the estimated cost per hectare was around $185 and $62 respectively. Hence within the budget presented in the concept proposal, it was concluded that the target areas under this component needed to be reduced from 7,650 hectares to 5,100 hectares (Activity 1.3.6.) while Activity 1.3.1. to 1.3.3. continue to target all 280 villages where the village tracts will relay training of trainers system to its constituent villages for 1.3.2 activity. Target population under Activity 1.3.6. corresponds to approximately 15,000 to 16,500 households.

Component 2: Climate-resilient crop and livestock production systems

The main Outcome of Component 2 is increased diversification and resilience of the most vulnerable rural livelihoods in Myanmar's Dry Zone from climate-induced shocks and stresses. Consistent with the community-based adaptation strategy of the project, concrete investment activities under Component 2 will be preceded by participatory community-based assessments, which are essential for community-based organizations and village stakeholders to verify and confirm the specific locations and site-specific design elements of crop and livestock adaptation measures in the village context. These assessment activities will not only ensure that AF investments are tailored to the local context, but also provide platforms for community dialogue, consensus building and capacity development on agricultural drought management issues. Compliant with new environmental and social safeguards that are applied by all UNDP-supported adaptation projects, consent will underpin all community-based activities under Component 2.

Component 2 comprises the following Outputs:

Output 2.1. Drought-resilient farming methods introduced to farmers to enhance the resilience of subsistence agriculture in the Dry Zone

This Output promotes climate-resilient agricultural methods in at least 5,600 hectares of drought-prone land. Some of these methods will include improvement of plant density by optimizing plant population and row spacing; drought-tolerant crop varieties (such as rice, pigeon pea, groundnut, sorghum and pearl millet); better weed control and crop husbandry to increase crop yields; surface mulching to reduce water evaporation, improved soil quality by means of maintaining the soil cover to protect the soil physically from sun, rain and wind, and to feed soil microorganisms; and integrated nutrient management for improving the physical, chemical and biological characteristics of the soil. Soil conditions in the Dry Zone is already in deteriorated state in general from recurring drought- and flood-induced erosions and are likely to be exacerbated under intensifying impacts of climate change unless these resilient agricultural methods are implemented effectively. Investments on enhancing water capture and availability under Outcome 1 will underpin the resilient farming methods in this Component.

The proposed project recognizes that crop selection by farmers is not only based on the expected yield of a particular crop variety, but also determined by available labor, individual experience, availability and prices of seeds, government policies and a host of environmental factors such as climatic and soil conditions and available surface flow. To enhance the access of Dry Zone farmers to a wider variety of drought-resilient crops, part of which is currently available only at the township-level agricultural research farms managed by the Myanmar Agricultural Services (MAS), a village-level agricultural research farm (i.e. community-level seed banks) will be established on existing plots in 140 villages. AF financing will promote locally preferred and suitable drought-resilient varieties. Following the model established by the MAS, the project will establish a system whereby farmers will purchase the seeds directly from the

owners of the village research farm[17]. At the same time, to further accelerate the dissemination of drought-resilient crops and practices, the AF resources will assist volunteer farmers from at least 50 villages to establish a demonstration plot. This will enable farmers to observe the actual practices and performance of several varieties before they purchase preferred seeds from the village research farms. From the example of other adaptation projects in the region (such as the LDCF-funded project **'**Promoting Climate-Resilient Water Management and Agricultural Practices in Rural Cambodia', which has shown the efficiency of this approach in making farmers aware of different crop varieties and their resilience benefits during dry periods), the demonstration effects on scalability are likely to be large compared with top-down approaches.

Throughout the project implementation period, knowledge dissemination/collection on effectiveness of improved seed varieties will be facilitated between crop research institutions in Myanmar (such as the Yezin Agriculture University, Myanmar Agricultural Services, the Central Agricultural Research Institute, and Department of Agricultural Research) and other countries in the region (Bangladesh, Cambodia, Lao PDR and Thailand).

The project preparation phase has assessed a number of improved and drought resilient crop varieties which are specific to Myanmar and expected to be disseminated by the project (see Annex H). These varieties will be initially transferred from the existing agricultural research farms at the township level. To ensure sustainability of village-level seed banks and to facilitate further replication and scale beyond the project target areas, the project will facilitate technical assistance from Myanmar Agriculture Services, University of Agriculture (Nay Pyi Taw) and State Agricultural Institute (Shwe Bo) to the community-managed seed banks; the project will also organize exchange visits involving project and non-project community members, staff from these institutions, agricultural extension officers, Township and District Administrations and NGOs active in the Dry Zone.

Activities under Output 2.1 include:

Activity 2.1.1. Organize training events on a range of climate-resilient farming methods targeting Dry Zone farmers and extension workers including drought-resilient crop varieties, optimization of plant population, weed control and crop husbandry techniques, and surface mulching;

Activity 2.1.2. Establish and transfer drought-resilient varieties from township agricultural research farms to village-level research farms in 140 villages.

Activity 2.1.3. Establish a participatory, demonstration plots in 50 villages and undertake field trials of drought resistant crops and drip irrigation techniques to enable local dissemination and transfer of adaptation know-how

[17] At the time of project formulation, the following is a few sample prices of seeds sold at MAS's township research farms: sesame = $18/hectare; groundnut = $38/hectare; pigeon pea = $4/hectare.

Activity 2.1.4. Organize exchange visits and farmers' field school involving project and non-project community members, staff from these institutions, agricultural extension officers, Township and District Administrations and NGOs

Activity 2.1.5. Produce at least one technical report capturing lessons learnt on the effectiveness of drought-resilient farming methods

Output 2.2. Resilient post-harvest processing and storage systems introduced to reduce climate-induced post-harvest losses (droughts and floods)

This Output focuses on the promotion of climate-resilient post-harvest crop processing and storage to reduce increasing harvest losses that Dry Zone farmers are likely to incur under a changing climate. To optimize harvest and post-harvest processing and storage techniques, each step in existing post-harvest systems needs to be analyzed with regards to climate-related impacts and resilience. During the harvesting and post harvesting time, extreme climate conditions (such as erratic rain) and inferior storage systems combined with anthropogenic effects such as labour shortages and lack of timely labour result in deterioration and collapse of harvested grain. For instance, in Dry Zone, normally after the harvesting of paddy, farmers dry their grains in the open field but when the erratic rain comes, they do not manage to collect, store and protect the grains from the rain. In traditional practices of post-harvest handling and storage, about 3% to 20% of yields are wasted. A properly considered, resilient post-harvest system needs to encompass the delivery of a crop from the time and place of harvest to the time and place of consumption, with minimum loss, maximum efficiency and maximum return for all aspects involved. Existing post-harvest systems include activities of harvesting, threshing, drying, storing, processing, product evaluation, packaging, marketing, use, and finally establishing/ gaining consumer preference. For climate change adaptation purposes, the focus will be on the improvement of steps from harvesting to processing. In this aspect, locally made rice threshers will be delivered to the relevant villages after forming farmers' groups to effectively manage the cost sharing and maintenance of the machines in the long run.

With regards to reducing climate-related risks in storage processes, the project will promote and establish structures to secure agricultural produce from the impacts of extreme climate events (such as flooding, erratic rains and drought). Secure storage is essential to maintain critical food reserves and achieve price stabilization at the local level during times of drought or natural disaster. In order to maintain grain quantity and quality, alternative storage technologies such as bag systems, bulk systems and bag-cum-bulk systems in secure locations are needed. Integrated pest management practices need to be integrated in all aspects of storage system design to reduce post-harvest losses from pest infestations.

Activities under Output 2.2 include:

Activity 2.2.1. Undertake a participatory assessment to quantify the effects of existing practices and identify loss patterns from current post-harvest practices

along the value chain of harvesting, threshing, drying, storing and processing;

Activity 2.2.2. Based on the findings from Activity 2.2.1, provide 140 locally made, community-managed rice threshers to 140 villages in areas where post-harvest loss are highest to increase communal food security and price stability in flood-prone areas;

Activity 2.2.3. Introduce improved community-managed crop handling and storage processes and facilities in 36 villages to avoid losses of produce during times of flooding and drought:

- Construct 36 elevated harvest storage facilities which reduce post-harvest losses from erratic rainfall and flooding
- Organize technical trainings targeting Agriculture Services officers, farmer groups/cooperatives, CBOs/NGOs on post-harvest handling techniques based on the results from Activity 2.2.1
- In line with Output 3.2, test and report effectiveness of the climate information dissemination network for reducing post-harvest losses

Activity 2.2.4 Production of a technical report on the effectiveness, success and challenges of climate-resilient post-harvest practices

Output 2.3. Climate-resilient livestock production systems introduced to 6,300 landless households to buffer the effects of flooding and drought on rural livelihoods

Climate-related shocks and economic stresses in rural households have been identified as the most important cause for a decrease in the numbers of livestock in Myanmar, followed by pest and disease problems. Other natural/environmental factors such as drought, and loss of common pool resources (CPRs) such as grazing lands and ponds, were also identified as important reasons for decline in numbers of livestock. On the other hand, it is also noted that the livestock sector is valued as one of the main drivers of agriculture as well as one of the sectors that have enormous potential for poverty reduction (FAO 2005, Holmann et al. 2005). It provides a major source of cash income, food (milk and meat), draught power, and transport. It is also an important reserve of financial/economic security in times of growing climate variability and uncertainty.

Constraints to livestock production in the Dry Zone include the scarcity of fodder and water in the dry season, the shortage of good-quality grazing land, the high price of cattle, and the high incidence of disease. 99.6% of the national sheep herd, 71% of the goats, and 40% of the cattle are located in the Dry Zone. Based on the community-level consultations with all village tract heads and District Administrators during the project formulation, and experiences from the UNDP ICDP project in Dry Zone, however, not more than 10% of the Dry Zone farmers own livestock at a commercial scale, and most of the farmers raise oxen and cow for the purpose of

cultivating their farmland. 25-30% of the population rear small scale livestock at their backyard just for subsistence (usually a few chickens or ducks). Goats, Sheep, Pigs and poultry are the species most widely held in the target areas. These are the preferred species because they are fast growing, quick to reproduce and easily disposed of. They are thus both a ready source of income and a cash reserve. They are particularly important among the landless and marginal farmers, who depend on these assets in times of financial difficulties to make a living.

In the target areas of the proposed project, the fattening pigs and the raising of native chickens may contribute as much as half of all household income in poor households. Diversified livestock production systems encompass locally adapted small-scale poultry, pig, cattle, goat and sheep. Pasture development by means of encouraging and implementing the protected livestock fodder banks with appropriate tree species and preservation of fodder with agriculture residues will be promoted under this project. To encourage livestock intensification with less destructive effect on vegetation cover, the project will promote and encourage the fencing of livestock, cut-and-carry (also known as zero-grazing) practices during the rainy seasons, as well as rotational grazing. In conjunction with Output 1.3, the project will promote the expansion of agro-silvo-pastural practices, based on community-based assessments. These practices will significantly increase the amount of high quality forage, and reduce the effects of trampling and over-grazing. One issue that will be watched in these systems is competing uses of woody biomass (for example, as fuel). If managed correctly and in a consultative and community-based manner, these systems can produce a stable supply of forage that has other benefits, including as fuel, but also in terms of increased below-ground carbon.

Goats and sheep are biologically more tolerant to dry environments, and in the project target areas, the native species of goat and sheep are, respectively, *Capra biraus* and *Ovis aries*. On the other hand, pigs are generally more prone to drier conditions but the native species of pigs currently available in the Dry Zone of Myanmar do not have drought-tolerant characteristics. Similarly, drought tolerant chickens do exist in Myanmar, but it is not widely grown by the Dry Zone farmers. Hence, AF financing will be for procurement and distribution of high productivity pigs with 62.5% drought-tolerant gene, drought-tolerant chickens, and wider dissemination of drought-tolerant goats and sheep. All of these species have already been tested by the University of Veterinary and Livestock Department in Myanmar. To complement this and to enhance more medium-term resilience, the AF resources will also be used to procure small number of high productivity goats and sheep species to enable the Livestock Department and University of Veterinary to test the viability of cross-breed between high productivity and drought tolerant genes of goat and sheep.

Beneficiary farmers and households under this output will be selected on the basis of greatest vulnerability, which translates into those with limited access to capital according to participatory wealth ranking and resource mapping. This will be supplemented by the field surveys administered during the project preparation phase with the combined secondary data available from Village and Township Administrators, Planning and Statistics Department, and Integrated Household Living Conditions Survey Assessment (IHLCA) data jointly conducted by UNDP, Myanmar Government, other UN agencies and World Bank. The field survey confirmed

available information that about 60% of the total population in Dry Zone is landless. Of the remaining 40%, more than half owns minimum land area of 0.4-0.8 hectares.

Activities under Output 2.3 include:

Activity 2.3.1. Organize a training of trainer events targeting Livestock Department officers in diversified livestock rearing, improved fodder preparation and storage, rangeland management, disease control methods, fodder bank and livestock shelter practices;

Activity 2.3.2. Organize at least 4 training events throughout the course of project in each village-tract aiming at a transfer of technical know-hows on climate-resilient livestock practices from Livestock Department officers to community members, CBOs and NGOs

Activity 2.3.3. Procure high productivity pigs with 62.5% drought tolerant gene; drought tolerant chicken; existing species of goats and sheep; and high-productivity goat/sheep species

Activity 2.3.4. Formulate a community agreement on benefit sharing from diversified and climate resilient livestock practice

Activity 2.3.5 Organize events that demonstrate participatory animal (cross) breeding to conserve essential buffer stocks during extreme events and maintain genetic diversity

Activity 2.3.6 Production of a technical report on the effectiveness, success and challenges of diversified livestock practices

Component 3: Improved climate risk information dissemination

The main Outcome of Component 3 is to increase the timeliness and quality of climate risk information accessed by Dry Zone farmers. Enhanced quality of climate risk information entails the effective use of short-term forecast information, medium-term seasonal forecasts, and longer-term climate scenario planning. Since the devastating effects of cyclone Nargis in 2008, the national mechanism to disseminate early warning information have changed considerably (See the baseline assessment in Section I for details). However, there are still significant shortcomings in the current information dissemination framework and farmers' capacity to interpret and respond to climate risk information and seasonal forecasts remains severely limited. This Component focuses on establishing and strengthening institutional capacity to disseminate climate risk information, both short-term and long-term, in an efficient and timely manner while at the same time, building the capacity of the farmers, and NGOs who support them, to interpret such information. Efficient and timely delivery of improved climate information, in turn, will have a positive cascading effect to the effectiveness of the other two Components as

it will trigger adaptive behavioral change for improved water conservation, agricultural and post-harvest practices. Outcome 3 will be achieved through the following Outputs:

Output 3.1. Climate hazard maps and risk scenarios are developed in each township to support community-based climate risk management and preparedness planning

This Output will ensure availability and communication of climate-related risk, vulnerability and hazard information to local organizations (Community-Based Disaster Management Committees (see Output 3.2), Village Development Committees, Water User Groups, farmer groups/cooperatives, and other CBOs), township-level institutions and organizations (DZGD, Forestry Dept., Agriculture Services Dept., Dept. of Livestock Breeding and Veterinary Services, Irrigation Dept., Settlement and Land Record Dept., Dept. of Development Affairs, Planning Dept., Dept. of Meteorology and Hydrology) and non-governmental organizations. The aim is to enable informed planning and investment decisions about appropriate risk reduction measures, and communicate which actions can be taken in advance of impending climate hazards to reduce human, material and livestock losses from slow and sudden onset of extreme events.

Given the unpredictability of extreme weather events and the intensity and frequency of changes between dry spells and intensive rainfall, the need for accurate risk and hazard maps is paramount in the Dry Zone to enable effective investment decisions in different risk reduction measures and to prevent catastrophic losses for the most vulnerable groups in affected communities. Such risk and hazard maps will be based on existing data from various sources in the country and regions[18] superimposed on high resolution special and temporal information. AF resources will enable the expansion and inclusion of climate change related information by primary data collected during the inception phase of the project on socioeconomic characteristics and natural ecosystems (or lack thereof) that could act as a buffer. A particular focus will be placed on drought, flooding, storm damage and erosion. The production process will involve Climate Risk Information sub-committees within the local government and CBDRM committees in villages that will be established under Output 3.2, CBOs/NGOs as well as government technical agencies with the view to enhance their awareness and technical capacity to update such tools on a periodic basis for development planning and investment decisions. Moreover, AF resources will be used to further update these maps at least twice in the course of the project so that the enhancement of natural ecosystem functions to mitigate climate risks (through Component 1 and 2) is visibly and explicitly presented. They will be digitized and transposed into a Geographic Information System (GIS) database for use in local development and disaster risk reduction planning (e.g. with support by the Myanmar Information and Management Unit, supported by UNDP).

[18] The project preparation phase has identified the following existing sources of hazard information that will feed into the comprehensive risk information system:

- Myanmar Management Information Unit (MIMU, UNDP)
- Disaster Risk Reduction (DRR) committee and working group for vulnerability assessment plan
- Department of Meteorology and Hydrology (DMH)
- Myanmar Drought Monitoring Centre
- Regional Multi-Hazard Early Warning system (RIMES)

Activities under Output 3.1 will include:

Activity 3.1.1. Synthesize available information on future climate in the Dry Zone (in collaboration with the Climate Risk Information sub-committee at the township level)

Activity 3.1.2. Organize a training of trainers event, inviting a regional expert on participatory vulnerability assessments, targeting local NGOs, DZGD and Department of Development Affairs

Activity 3.1.3 Carry out vulnerability assessments in township and rapid vulnerability assessments at each village tract

Activity 3.1.4. Using the product from Activity 3.1.3., generate climate hazard, risk and vulnerability maps for all townships targeted under the project taking into account locally-specific socio-environmental conditions such as the extent of poverty, FMNR/micro-watershed management, access to small-scale water infrastructure, adoption of agro-forestry, and agro-silvo-pastural practices;

Activity 3.1.5 Update the map at least twice during the course of the project taking into account the progress in Outcome 1 and 2

Activity 3.1.6. Organize town-hall meetings with township administrator, CRI sub-committees and other government departments, CBOs/NGOs, and community members, to discuss climate risk and hazard information and lessons learned from risk reduction measures into rural development planning and investment processes

Output 3.2. Local level information dissemination framework strengthened for climate and disaster risk management

This Output focuses on strengthening the nascent framework at the local level for disseminating climate and disaster risk information. After the devastating impact of Cyclone Nargis in 2008, the Government has established Disaster Preparedness Committees (DPC) at the division, district and township levels as relay points for disaster early warning. Under this Output, AF resources will be used to enhance this framework through activities aiming at strengthening the local level DPCs (especially township level) in communicating/producing information on both sudden and slow onset of climate-induced extreme events and developing reciprocal capacities at the village level, which is currently extremely low, to effectively use the information produced by and disseminated through DPCs.

Towards this end, this component will first aim at strengthening village-level capacity to respond to sudden onset of climate hazards which are likely to increasingly threaten human lives and

assets under a changing climate. Community-based disaster risk management (CBDRM) Committees comprising capable Dry Zone farmers will be established in at least 70 villages to this end. CBDRM Committees will be the village-level counterpart for the national-level DPC system that runs through the capital-division-district-township and thus they complete the last missing link that currently exists in the early warning dissemination chain. While CBDRM Committees will be primarily responsible for relaying early warning information on cyclones and other sudden onset of disasters to villagers and Farmer User Groups/Water User Groups will be the primary counterparts for the Climate Risk Information sub-committee (see below) to receive "slower" climate risk information such as impending drought, storms and floods, there will likely be necessary redundancy at the village level. The AF resources will be used to establish a communication protocol for village-level CBDRM Committees and township DPCs at the time of a disaster, assign specific responsibilities CBDRM Committee members in information dissemination and facilitating mock drills at the village level as well as the de-warning procedures.

Secondly, to strengthen the information dissemination framework specifically for "slower" climate risks, the AF resources will be used to establish a Climate Risk Information (CRI) sub-committee within DPC in all targeted townships under the Township Administrator's guidance to serve as climate risk information and technical knowledge hubs. An establishment of a sub-committee is needed because, first, DPCs are mandated to become active only during a large scale extreme event, such as cyclones, and are not designed to serve communities on a continuous basis; and second, presently in Myanmar, there is no local level institutions that disseminate climate information (such as on impending drought or floods) in such a way that is understandable to end users. The sub-committee will be represented by the same members as the DPC but will also invite select NGOs and representatives of CBDRM committees as they will play a critical role in filling the "last mile" of information dissemination. The CRI sub-committee, particularly the township meteorology and hydrology officers in DHM, agriculture officers, and NGO representatives, will receive extensive trainings facilitated by the AF project to enhance their capacity to produce tailored seasonal climate information. The effectiveness of these trainings will be measured by the production of tailored agro-meteorological bulletins (seasonal) and other information materials that assist Dry Zone farmers to make informed decisions about their livelihood behaviors. This group will also be part of the production of climate hazard maps envisaged under Output 3.1. These efforts will be supplemented by trainings targeting farmers so that their capacity to interpret climate information and adjust their agricultural and livestock rearing practices (e.g. planting and harvesting schedule, storage of fodder, etc envisaged in Component 2). Further, linkages between the CRI sub-committees and existing national Early Warning Systems such as the Drought Monitoring Centre, and over-regional Early Warning Systems, such as RIMES that is hosted by the Asian Disaster Preparedness Center (ADPC) in Bangkok, disaster risk related data will be analyzed and connections established where feasible to ensure sufficient lead time for the communication of new hazard warnings.

Activities under Output 3.2 will include:

Activity 3.2.1. Finalize operational procedures for the Climate Risk Information sub-committee in coordination with the Township Administrator's Office, DPC, Drought Monitoring Centre, member NGOs, and village-level CBDRM Committees.

Activity 3.2.2. Organize a national level training targeting DHM at the national, division, district and township level officers on collection, analysis and communication of climate risk information; organize regional training targeting DHM and NGOs in producing climate risk information tailored for agricultural use.

Activity 3.2.3 Formulate a TOR and communication protocol for CBDRM Committees in coordination with their respective Disaster Preparedness Committee at the township level and local NGOs, detailing the early warning information flow from DPC to CBDRM Committees

Activity 3.2.4. With support from local NGOs, form Community-based Disaster Risk Management Committees (CBDRM) in at least 70 villages

Activity 3.2.5. Organize community level trainings on interpreting publicly available weather forecasts broadcasted through TV and radio; seasonal forecasts, agro-meteorological bulletins and communal hazard maps from CRI sub-committee; early warning information from DPC and CBDRM Committee.

Activity 3.2.6. Establish linkages with national and regional information sources for the Climate Risk Information Sub-committees;

Activity 3.2.7. Carry out early warning mock drills to test information flow from the national DMH and National Disaster Preparedness Central Committee, to division/district/township DPCs, to CBDRM Committees, and finally to villagers and practice evacuation (Output 3.1 will identify community evacuation centres as part of hazard map preparation process).

B. Describe how the project/programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

The primary beneficiaries of the targeted intervention are 50,639 households in Myanmar's Dry Zone. As indicated in the description of the project location, it is estimated that 280 villages with a high percentage of landless households and marginal/small farmers will benefit directly from the proposed project. Within the targeted 50,639 rural households, approximately 85% are estimated to be impoverished, marginal farmers' or landless households who are prone to critical losses of livelihood assets from recurring droughts and crop failures. While impoverished and marginal farmers with land-use rights (approximately 25% of the total households in the target region, or 12,600 households) will benefit from the project through additional investments in natural and productive capital (such as improved water supply on drought-prone fields; access to diversified and improved crops for fields and home gardens; expanded agro-forestry services; diversified livestock rearing; arrested soil erosion and watershed protection), landless

people will benefit from diversified livestock assets, homestead gardens to expand micro-scale agroforestry practices, improved ecosystem services (such as greater availability of non-forest products and more reliable freshwater supply), as well as through greater opportunities for manual labour in water-, forestry- and agroforestry-related components of the project. An important element of the proposed project is to strengthen the participation and stakes of landless people in Community-based Organizations, especially Forest User Groups and Agroforestry Groups.

Economic benefits of the project can be broadly categorized into two types: reductions in potential losses of agricultural produce or assets (e.g. livestock or built structure) imposed by additional climate risks; and enhanced/diversified income opportunities especially for the landless and impoverished farmers.

Within the context of the proposed AF project, farmers in the Dry Zones have historically faced economic losses primarily in the form of crop losses due to climate anomaly during the cultivation or due to post-harvest losses, livestock losses (or its productivity) due to lack of water and fodder, and losses of crop, livestock and infrastructure by large scale disasters like Nargis. Presently, losses from these shocks are unexpected and extremely difficult to buffer for most vulnerable farmers due to multiple factors as described in the Underlying Causes section. A suit of interventions proposed in the project will equip them with a range of options that increase their resilience to and reduce potential losses from such shocks.

At the same time, the project will also expand income earning opportunities specifically targeting the landless which directly and indirectly contribute to building their resilience. This will be achieved through access to diversified livestock production system, which initially provides an additional income source to 6,300 households, representing about 12.4% of the landless households in the project target sites; and promotion of micro-scale agroforestry at the household level (also targeting approximately 6,300 landless households). With the replication of a previous good practice of a benefit sharing agreement, in which Livestock Management Committee will be responsible for distributing offspring from livestock to those who were not selected in the first distribution, the AF resources will also be used to formulate an agreement through which the access to such an income earning opportunity will be expanded beyond the original project targets. In addition, through the provision of manual labour in water-, forestry- and agroforestry-related components of the project, approximately 12,500 landless households are expected to receive much needed income earning opportunities.

Expected social benefits from the project are multiple and interrelated with economic and environmental benefits that will be brought about by the project. Most importantly, a dedicated Component focusing on increasing freshwater availability will put in place at least 1.4 discrete units of rainwater and surface water capture measures per village supported by ecosystem-based measures contributing to the increase of sub-surface rainwater capture. It is important to note that the Dry Zone farmers are already highly vulnerable to the current climate variability, let alone the future climate variability which are predicted to be larger. For example, per capita water consumption in the Dry Zone is currently only 50% of the WHO-suggested standard due to unavailability of freshwater resources. The combination of measures proposed under Outcome 1 will impact the entire population in the project target areas – 255,000 people in five townships. It is also important to note that natural disasters not only destroy economic assets but also impact social cohesions as the lack of economic viability accelerates outgoing migration trends in search for income earning opportunities. Climate risk information dissemination

network as well as heightened awareness that will be strengthened with the AF resources, will also increase the preparedness of vulnerable communities.

Type of Benefits	Baseline	After the project
Social Benefits	- Existing water resource management practices do not consider equality issues and buffer capacities for times of water stress	- Better social cohesion and community cooperation through climate-sensitive water resource management
	- Average water consumption per person of 10gals (0.05 $m^{3)}$/day and per cow is 15gals (0.06 m^3)/day (BAJ, 2004). The consumption per person is just 50% of the standard consumption (WHO, 2003).	- Health benefits through improved access to safe water sources and reduction of water-borne diseases
	- Prevalence of diarrhoeal diseases in times of water stress, due to overuse and pollution of limited water resources	
	- Tendency to focus on mono-cropping in times of drought	- Diversified crops and livestock production increase coping abilities after disaster events
	- Limited diversification of livestock, due to economic pressures and a lack of breeding stocks	
	- Limited awareness of climate change-related impacts, emerging risk patterns and appropriate no-regrets adaptation options	- Increased risk awareness and improved knowledge on climate change impacts enhances capabilities to undertake autonomous adaptation actions
	- Ongoing migration and encroachment on sensitive natural resources in search of animal fodder, water, fruit and fiber products	- Project interventions will improve food safety and security, providing additional household income from Cash for Work schemes
	- Reactive nature to hydro-meteorological hazards which increases the potential need for costly humanitarian relief and subsequent social inequality and strif	- Heightened awareness and capacity for disseminating and interpreting early warning information to mitigate the risks of such hazards
		- Abated economic and human losses from increasing and intensifying incidents of climate-induced disasters

Economic Benefits	- In the Dry Zone, there are 54 important dams with watershed areas of about two million hectares, of which 75% are already degraded and 50% are in critical condition (MOECAF, 2005). - Annual Average available ground water and surface water potential are less than 60 mm and 800 mm (Atlas 2005) - Limited knowledge and lack of financial capital to implement systematic agroforestry practices - Limited natural capital in times of drought - Tendency to focus on one crop only in times of drought - Limited diversification of livestock, due to economic pressures and a lack of breeding stocks - Insufficient improved technology and machines for effective post harvest and storage which results in 3% to 20% (MoAI, 2011) loss of grain and severe damage from short and high intensity rainfall	- Improved or more stable agricultural practices with diversified species (for households with access to land rights): Approximately 15,000 farmer households - Additional income earning opportunities through manual labour: Approximately 12,500 landless households - Access to diversified livestock practices: Approximately 6,300 landless households as the first direct beneficiaries - Enhanced homestead gardening production: Approximately 15,000 households of which 6,300 are estimated to be landless - Access to enhanced natural resources, especially forest resources - Reduced post-harvest losses
Environmental benefits	- Climate-related pressures are necessitating poor people to over-exploit natural resources which is leading to the degradation of vegetative cover, deforestation and forest degradation. This, in turn, keeps getting exacerbated by increasing erosion. - Soils in the Dry Zone are generally poor and shallow, and easily eroded by intense rains and strong winds. In the target areas, soil erosion is intensive and rapid as a result of heavy showers and low degree compaction. Surface runoff has been estimated to be 30% in the target areas. Removal of the natural savanna vegetation quickly leads to erosion, which is more intensive at the start of the monsoon rains on bare soils - The deterioration of natural resources such as soil erosion and deforestation has made agricultural production uncertain and unsustainable.	- Water conservation and reforestation will improve soil fertility, retain moisture, and restore ecosystem resilience and protective ecosystem services - Improved runoff management and infiltration of both rangelands and arable areas will reduce soil erosion and land degradation - Carbon sequestration will be increased through reforestation, watershed area conservation, and the establishment of agroforestry systems - Dependency of communities and livestock on fragile and remnant natural resources for fuel wood, construction and fodder will be reduced through

		diversification and community-based adaptation measures

Table 2: Key benefits of the proposed project

In line with the principle of community empowerment, conscious efforts have been made in the design of the proposed project to ensure that the landless (and to a lesser extent, impoverished farmer) households will derive direct benefits from the participation in the project activities. Several types of direct benefits are envisaged: opportunities for manual labour; diversified livestock assets; access to homestead gardening; membership of various community based organizations such as CFUG and Agroforestry Groups; and improved ecosystem services (including greater availability of NTFP and more secured freshwater).

In terms of economic benefits derived from manual labour opportunities, based on the similar experience from UNDP-assisted ICDP project, it is expected that the total of 12,449 landless people will be engaged as labourers for the following activities:

Activity	Work force	Male	Female
Output 1.1			
(i) Water diversion canal	575	276	299
(ii) Established small scale water pumping system	1668	801	867
iii) 5000 gallon tanks and pipe	593	285	308
iv) Established shallow tube well	461	221	240
v) Established deep tube well	383	184	199
vi) Fixing deep tube well	43	20	22
vii) Pond renovation	734	352	382
viii) Terraces and soil storage dams	2613	1254	1359
Output 1.2			
i) Regeneration of natural forests	2497	1198	1298
ii) Community Forest establishment	2145	1029	1115
x) Tree planting in public areas	739	355	384
Total	**12449**	**5976**	**6473**

Note: Each individual engaged in these activities will earn 2,000 Myanmar Kyat (2.35 USD as of 7 November 2012) per day from their labor contribution in water supply development scheme and soil-water conservation, micro-watershed conservation and reforestation activities. To ensure greater benefit sharing among communities, those landless households who will directly be benefited from such labour contributions will be selected from those that are not direct beneficiaries of the agro-forestry or diversified livestock activities. Identifications of households will be facilitated through project activities such as Activity 1.1.1 and 1.2.2.

As described earlier, Output 2.3 (diversified livestock practices) will work directly with **6,300 households** initially, with a potential of multiplying this number based on the benefit-sharing agreement signed among community members.

Activities that promote agroforestry practices will also target a large group of landless and impoverished households (60% and 25% of the total households in the target areas, respectively). It is assumed that approximately additional **6,300 landless households** would receive direct support in enhancing/establishing homestead garden.

This means that a total of nearly 25,000 households will be directly benefited from project activities through labour opportunities, enhanced livestock production, or homestead gardening. This corresponds to over 80% of the landless households in the target region.

In addition, they will also derive more indirect benefits through participation in community based organizations, most importantly, CFUG and Agroforestry Groups. While the exact number of the landless households who will be part of these groups cannot be determined at this stage, it is assumed that the representation of the landless will more or less follow the current distribution of the landless in the target area – approximately 60%.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

- *Cost effectiveness of decentralized, community-driven resilience vs. top-down relief planning:*

The cost effectiveness of the proposed project is closely linked to the approach of increasing local resilience through the empowerment of local and community-based institutions (including Village Development Committees, Water User Groups, Community Forest User Groups, CBDRM Committees, farmer groups and cooperatives). 'Bottom-up' community resilience, as opposed to top-down government planning, is a framework for understanding and managing complex socio-ecological systems such as the ones represented by the proposed target areas in Myanmar's Dry Zone. The local resilience approach emphasizes principles of flexibility rather than stability[19] and is based on the premise that resilient local systems are adaptable, flexible, and prepared for change and uncertainty. In contrast, non-resilient systems are prone to irreversible or catastrophic losses, and irreparable economic damage.

Managing for resilience at the local level realizes the practical opportunities provided by effectively managed ecosystems in supporting the environment and dependent human communities to absorb climatic and economic shocks, regenerate and reorganize so as to maintain key functions, economic prosperity, social well-being and political/social stability: By

[19] Plummer, R., Armitage, D. 2007. A resilience-based framework for evaluating adaptive co-management: Linking ecology, economics and society in a complex world. Ecological Economics 61, 62-74.

implementing this project in a community-driven and participatory manner, the impact of the project will contribute to greater abilities of local communities to 'bounce back' from climatic extremes. This, in turn, will reduce dependence on state interventions and humanitarian relief by the central government. Greater community resilience will contribute to greater equality between regions and thereby reduce potential for political/social conflict. In the immediate term, the resilience approach proposed by this project is supporting physiological acclimation by vulnerable ecosystems to climate change, while reducing the magnitude of humanitarian costs associated with rapid ecosystem degradation or collapse. In addition, it facilitates the necessary diversification of dependent communities to alternative food, livestock and income sources. Along these lines, the proposed resilience approach is providing much greater long-term economic benefits than emergency response, disaster relief or retrofitting of critical infrastructure.

In support of the proposed community-based and community-driven resilience approach, UNDP will build on its long-standing experience in facilitating the formation and empowerment of Community-based Organizations, such as farmer groups, self-reliance groups and forest user groups. Under the UNDP-supported Human Development Initiative (HDI) programme, there are approximately 3,400 community based organizations with 310,000 members. UNDP will build on this engagement and work with local organizations (both public and non-governmental) to increase awareness, provide training, and deliver targeted organizational and capacity development services to CBOs in the Dry Zone. In doing so, the project will promote equitable and inclusive climate risk reduction planning in the responsible CBOs, and enable these CBOs to maintain planning capabilities and management responsibilities after the project has ended. As the project successfully demonstrates increased resilience of smallholder farmers during forthcoming drought periods, the institutional structure of NGOs and CBOs on which the project is based will provide a strong multiplying factor. These organizations will have the capacity to replicate and upscale project experiences in other vulnerable districts of Myanmar. There is ample evidence of these multiplier effects, based on the experiences of the HDI in Myanmar which has empowered CBOs to interact much more effectively with government and development partners. This, in turn, has enabled them to sustain a number of community-based development strategies.

NGOs and CBOs will be systematically mobilized in governance bodies such as the Project Steering Committee (PSC), the Technical Advisory Group (TAG), the Environment Thematic Working Group (ETWG) and in a planned series of field visits and training events. In these fora, the partnering NGOs and CBOs will demonstrate and promote project experiences, lessons learned, and propose follow-up interventions in other areas. Through PSC and ETWG, project results and lessons learned will be disseminated to different tiers and levels of relevant government entities, as well as private sector and development partners.

An alternative to this community resilience & empowerment approach is a sectorally-driven, top-down approach where adaptation resources are allocated to line ministries and departments and a cookie-cutter adaptation planning is made at the central level. This approach is thought to be less desirable for two reasons from the stand point of cost-effectiveness. First is the

significantly limited outreach of line departments in rural Myanmar. As described elsewhere, the existing public service delivery for livelihood support through Department of Agriculture or Livestock penetrates only to the township level. Relying only on the government outreach for adaptation service delivery will inevitably miss out majority of rural residents who are most vulnerable to climate change. Second, a centrally (or sectorally) driven model is likely to have lower return on investments in the medium- to long-term as the design, locations, and local management structure almost always fail to reflect the needs of local community. The mismatch between the needs and government provision leads to loss of interests among community, lack of ownership, and eventual abandonment of the investments. Although this approach would still contribute to building technical capacity of department staff for, for example, climate resilient water infrastructure design, but due to their limited outreach (compared with NGOs and CBOs), the application and replication potential beyond the project target sites is likely to be significantly limited.

- *Cost-effectiveness of different technical options:*

During preparation of this proposal, a number of alternative options to achieve the same intended Outcome were assessed in terms of, not only costs, but also effectiveness and feasibility. Table blew presents the comparison of proposed interventions against alternatives that were considered.

Adaptation Objective	Proposed Measures	Comparison with Alternative(s)
Ensuring freshwater availability during the dry seasons	• Micro-scale water capture/ storage infrastructure • Micro-watershed protection and rehabilitation through FMNR • Community-based agroforestry practice **Programme Costs: $4,084,641** **Adaptation benefits accrued to:** **50,639 households**	**A large-scale spate irrigation structure on the Irrawaddy River and pump irrigation waters from the Irrawaddy** Abundance of water in the Irrawaddy River makes a large-scale spate irrigation theoretically possible. 1) prohibitive cost (multiple amount of the proposed AF project budget, according to expert opinion in the ETWG); 2) technology which is difficult to operate and maintain by local communities; 3) large losses of arable land for channel construction; and 4) high operational costs to run the diesel pumping station. **Rainwater harvesting at household level** Another alternative considered was to equip each household with a rainwater harvesting unit. While this would potentially augment water scarcity for drinking use and for home gardening, the typical capacity for storage (1-2.5m^3) is hardly sufficient to address the water needs for agriculture or livestock. **Micro-watershed management through a private**

		sector contracting An alternative to supplement freshwater availability through enhancing sub-surface water retention is to contract a private firm to undertake the watershed rehabilitation. It is estimated that the cost is around US$1,000/hectare whereas in the AF project, it is envisaged that the same results could be obtained at $540/hectare for community forest rehabilitation and establishment and $128/hectare for afforestation in communal areas within watersheds.
Climate resilient food and livestock production systems	• Drought-resilient farming methods • Resilient post-harvest systems • Diversified livestock production systems **Programme Costs: $2,316,760** **Adaptation benefits accrued to:** **18,900 households**	**Intensifying agricultural production through increased inputs, access to markets, contractual farming, and increasing values of agricultural produce** An alternative to transform the current agricultural production system in the Dry Zone into a less vulnerable system to climate change is to intensify investments in the sector and increase the unit value of revenue from the production. However, considering the current development status in Myanmar, it was concluded that potential investments required to achieve resilience through such an option is prohibitively high. Increased inputs, market linkages, contractual farming all require rather robust infrastructure such as market roads and high quality and uninterrupted electricity, which the Dry Zone currently does not have. **Off-farm migration** Temporary and long-term migration has been a traditional coping mechanism for Dry Zone farmers in times of difficulty. However, in line with the increasing incidents of urban poverty, increasing migration trends not only have a potential for social unrest, it does not address the causes of vulnerability in the Dry Zone. Thus, this option is expected to much larger potential needs for state (or donor) intervention for relief operations.
Improved dissemination of climate risk information	• Climate hazard maps and risk scenario developed • Local dissemination	No viable alternatives exist. However, given the highly nascent nature of the institutional and regulatory infrastructure with regards to climate risk information dissemination, it was concluded that the value for money would be highest if the activities focus on soft aspects, rather than

	network strengthened **Programme Costs: $782,000** **Adaptation benefits accrued to: 50,639 households**	equipping the community and institutions with hardware.

Apart from cost comparisons against alternatives, the past experience from ICDP reinforces positive economic returns on investments. For example, an Internal Rate of Return from soil conservation and on-farm water harvesting from the empirical experience in ICDP shows 16-19% (benefits are measured in terms of increased agricultural yields). Similarly, homestead gardening shows 17% IRR and limited samples of forest plantation show 13-25% IRR (benefits are measured in terms of increased fodder, fuelwood, seeds and NTFP).

- *Increasing cost effectiveness through community contributions:*

Cost-effectiveness of the proposed adaptive investments are enhanced even further through community contributions (which also have a positive side effect of stronger ownership and sustainability). In line with experiences from the UNDP-supported Human Development Initiative (HDI), the project preparation team undertook community consultations during 30th May – 2nd June and verified commitment from target communities that out of the total cost of establishing new forest plantations, approximately 30% of costs will be contributed by communities in terms of voluntary labor and in kind contributions in site selection, planting and patching, mulching, fire line construction, boundary demarcation, patrolling and weeding. In soil storage dam construction, community-driven projects need to provide only 50-80% of paid labor, while the owners of land use rights on which the facilities are built often contribute the rest in cash and labour. Similarly, drawing on experiences from the HDI and Integrated Community Development Project, FMNR activities under the proposed project can be costed at a total of US$ 740 per hectare. With contributions by communities expected to be around US$ 200 per hectare, this leaves costs of around US$ 540 per hectare to be covered by AF resources.

- *Cost-effectiveness in day-to-day project operations:*

Operational cost effectiveness of the proposed AF project is further enhanced through the following characteristics:

1) Throughout the project, AF resources will be aligned with the financing and delivery of project Outputs that have competitive procurement components to ensure best value for money;

2) During the project preparation phase, the project will make an active effort to mobilize co-financing from different sources, which is expected to diversify financial risks and increase financial flexibility.
3) A number of project activities will involve local communities and connect directly to local opportunities for the purchase of goods and services.

It is also important to note that significant co-benefits across project components are expected. Apart from the direct linkages between enhanced water retention capacity promoted under Outcome 1 and drought-resilient food and livestock production system under Outcome 2, climate information services such as hazard maps and tailored seasonal forecasts (Outcome 3) are expected to contribute to the effectiveness of adaptive behavioral changes promoted under Outcome 1 and 2. In turn, activities in enhancing forest coverage, watersheds, water infrastructure, post-harvest infrastructure, and agro-forestry practices will be visibly presented in periodically updated climate hazard maps (in the form of enhanced adaptive assets). Local community participation through engagement of CBOs and NGOs in the social asset mapping in the production process will act as an important hands-on awareness raising opportunity, which would otherwise have a risk of being a conceptual exercise. Improved climate risk information, such as seasonal forecasts, will amplify the impacts of improved access to drought-resilient seed varieties promoted in Outcome 2.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programmes of action, or other relevant instruments, where they exist.

In response to the developmental context highlighted above, economic growth and food security have been the central objectives of the Government of the Republic of the Union of Myanmar since 1988. The activities in the project have a strong correspondence with the Environmental Law (2012), Myanmar National Environmental Policy (MOECAF, 1994), Forest Policy (MOECAF, 1995), Community Forestry Instruction (MOECAF, 1995), Forest Law (MOECAF, 1992), National Sustainable Development Strategy – NSDS (NCEA, 2009), 30-Year National Forest Master Plan (MOECAF, 2001), Dry Zone Integrated Plan (MOECAF, 1999), Myanmar Agenda 21 (NCEA, 1997), the Myanmar Action Plan on Disaster Risk Reduction - MAPDRR (RRD, 2009), as well as with agricultural sector development programmes of the Government of the Republic of the Union of Myanmar. These highlight the commitment to ensuring food security, poverty reduction and environmental sustainability.

The proposed project is fully aligned with the implementation of national policies and programmes that will assist Myanmar to meet its obligations under the UNFCCC. Along these lines, it is based on findings from Myanmar's draft **Initial National Communication to the UNFCCC**, which recommends adaptation measures for the agriculture sector including the use of high-quality, heat stress-tolerant plant varieties suited to local climatic conditions; adjustment

of agricultural cropping systems to achieve greater diversification, multiple cropping, inter-cropping and mixed-cropping patterns; improved water management measures, such as water-saving, optimized fertilization, deep fertilization, flood prevention and control of soil erosion; and improvement of genetic strains of crops to adapt to climate change.

Similarly, the project addresses initial findings from the **National Adaptation Programme of Action (NAPA)** process, which is coordinated by a Task Force comprising 32 representatives from eight ministries (Ministry of Agriculture and Irrigation, Ministry of Environmental Conservation and Forestry, Ministry of Health, Ministry of Industry, Ministry of Energy, Ministry of Livestock and Fisheries, Ministry of Education and Ministry of Transport) and three NGOs. The five thematic areas identified by the NAPA Task Force are (1) agriculture and forestry, (2) biodiversity, (3) water resources, (4) energy, transport and industry and (5) public health. The thematic area of agriculture and forestry focuses on the need to climate-proof rural water management, safeguard agricultural output from flooding and drought, combat erosion, rehabilitate degraded lands and improve early warning systems. An overview of NAPA priorities which correspond to interventions proposed under this project is listed in Table 4.

Table 4: Draft NAPA priorities of Myanmar's NAPA (status May 2012), with relevant priorities this AF project corresponds to highlighted in yellow.

Sector/Theme	Priority Adaptation Project Title
FIRST PRIORITY LEVEL SECTORS: Agriculture, Early Warning Systems and Forest	
AGRICULTURE	**First priority:** Enhanced rice production through farm mechanization and breeding new rice varieties to ensure food security in areas most vulnerable to climate change.
	Second priority: Increased climate change resilience of rural and subsistence farmers in the Dry and Hilly Zones through legume crop diversification and climate-resilient varieties.
	Third priority: Increasing the climate change resilience of Dry Zone communities by diversifying and intensifying home-gardens through solar-power technology, high-income fruit crops and climate-smart agriculture approaches.
	Fourth priority: Reducing the vulnerability of livelihoods in agro-ecological zones to climate change through the transfer of a wide range of high-yielding and climate-resilient rice varieties.
EARLY WARNING SYSTEMS	**First priority:** Improving weather observation capacity through a mobile/deployable weather radar system for providing early warning systems against extreme weather events.
	Second priority: Developing a flood early warning system for reducing the vulnerability of local communities to climate change impacts.
	Third priority: Assessing the hydrological impact of climate change on river systems.
	Fourth priority: Developing a drought early warning system for reducing the vulnerability of local communities to climate change impacts.
FOREST	**First priority:** Building the resilience of degraded/sensitive forest areas to climate change impacts through reforestation.
	Second priority: Community-based reforestation for climate-resilient ecosystems and rural livelihoods in degraded watershed areas of the Central Dry Zone.
	Third priority: Community-based mangrove restoration for climate-resilient ecosystems and rural livelihoods in vulnerable and degraded coastal regions.
	Fourth priority: Enhancing the climate change resilience of rural livelihoods through community-based restoration at the Indawgyi and Lake watershed areas in the Northern Hilly Region.

SECOND PRIORITY LEVEL SECTORS: Public Health and Water Resources	
PUBLIC HEALTH	**First priority:** Adaptation to climate change through climate-resilient health facilities in the Rakhine State and Ayeyarwady Region.
	Second priority: Integrating climate change adaptation strategies into the prevention of heat- related disorders in agricultural and industrial workers.
	Third priority: Supporting Intensive Care Units (ICU) in hospitals to treat heat-related disorders.
	Fourth priority: Reducing the vulnerability of local communities to climate-induced water-related health hazards through the provision of safe water supplies and sanitary latrines.
WATER RESOURCES	**First priority:** Assessing the status of dams for providing sustainable water supplies and withstanding flood risks under future climate change.
	Second priority: Constructing small-scale water impoundments in Naypyidaw for flood control and increasing water supplies for local communities.
	Third priority: Protecting human life and property against climate extremes in the Ayeyarwady river system through channel improvement and adaptation structures.
	Fourth priority: Estimating regional rainfall-runoff relationships for supporting the development of flood early warning systems and ensuring sustainable water management.
THIRD PRIORITY LEVEL SECTOR: Coastal Zone	
COASTAL ZONE	**First priority:** Adaptation to climate change through Integrated Coastal Zone Management (ICZM).
	Second priority: Community-based mangrove reforestation for building climate-resilient ecosystems and rural livelihoods in degraded coastal areas in the Rakhine State.
	Third priority: Community based eco-friendly aquaculture systems (e.g. mudcrab, clam, shrimp and tilapia) for enhancing the climate change resilience of rural livelihoods and supporting the recovery of mangrove forest ecosystems.
	Fourth priority: Small-scale aquaculture and mangrove buffers demonstration sites for transferring adaptation technologies to Mon and Tanintharyi coastal communities.
FOURTH PRIORITY LEVEL SECTORS: Energy and Industry, and Biodiversity	
ENERGY AND INDUSTRY	**First priority:** Enhancing the resilience of water supplies in the face of climate change for rural communities through solar powered water purification and irrigation pumping systems.
	Second priority: Enhancing the resilience of sanitation in the Shan Region to climate change impacts through solar powered aerobic septic tanks.
	Third priority: Increasing climate change resilience of rural communities in the Sagaing, Mandalay and Ayeyarwady Regions by increasing livelihood opportunities through renewable solar electricity systems.
	Fourth priority: Increasing climate-resilience of harvested seed/grains through heated-air mechanical drying technologies.
BIODIVERSITY	**First priority:** Buffering marine habitats and sustaining fish populations under climate change conditions through community-based MPA management and ecosystem sensitive fishery practices at the Sister Group Islands of the Myeik Archipelago.
	Second priority: Mainstreaming ecosystem-based climate change adaptation for buffering rural communities against climate change impacts into policy, planning and relevant projects.
	Third priority: Buffering marine habitats and sustaining fish populations under climate change conditions through community-based MPA management and ecosystem sensitive fishery practices at Wetthay Chaing (bay) coastal area.
	Fourth priority: Buffering marine habitats and sustaining fish populations under climate change conditions through community-based MPA management and ecosystem sensitive fishery practices at the Thameehla Island, Ayeyarwady Region.

The objective of Myanmar **National Environment Policy** (MOECAF, 1994) is *"(…) the integration of environmental considerations into the development process to enhance the quality*

of life of all its citizens. (…) It is the responsibility of the State and every citizen to preserve its natural resources in the interests of present and future generations. Environmental protection should always be the primary objective in seeking development."

The **Forest Policy** (MOECAF, 1995) identifies six imperatives, namely protection of soil, water, wildlife, biodiversity and environment; sustainability of forest resources to ensure perpetual supply of both tangible and intangible benefits accrued from the forests for the present and future generations; basic needs of the people for fuel, shelter, food and recreation; efficiency to harness in the socio-environmentally friendly manner, the full economic potential of the forest resources; participation of the people in the conservation and utilization of the forests; and public awareness about the vital role of the forests in the well-being and socioeconomic development of the nation.

The **Forest Law** (MOECAF, 1992) highlights forest protection, environmental and biodiversity conservation, security of permanent forest estates and protected areas system; opportunities for the promotion of private sector involvement in reforestation and timber trade; and the importance of community participatory approaches in managing forest resources, particularly to satisfy the basic needs of the rural people.

Myanmar Agenda 21 (NCEA, 1997) identifies the following programme areas: 1. Accelerate sustainable development of forest resources, 2. Develop the forestry sector to meet basic needs, 3. Promote efficiency in the production of forestry goods and services, 4. Strengthen forestry policies, legislation and institutions, and 5. Enhance people's participation in forestry development and management.

In addition, the project is aligned with the **National Sustainable Development Strategy – NSDS** (NCEA, 2009) which aims to achieve sustainable management of natural resources, integrated economic development, and sustainable social development. The NSDS proposes a number of actions that would improve the resilience of people vulnerable to climate change including increasing water availability by harnessing seasonal water flows and improving storage capacity; improved water application techniques at the farm level; and reducing post-harvest losses, developing and disseminating more drought resistant, faster-maturing seed varieties, soil conservation measures (terracing, construction of check dams, planting/afforestation, and natural regeneration) to improve soil fertility and thereby crop production and productivity; protecting and restoring the rural environment; and reorienting agricultural extension and research to respond more effectively to farmers' priority needs and demands. The NSDS also proposes to check shifting cultivation by introducing agro-forestry, community forestry (MOECAF, 1995), Sloping Agricultural Land Technology (SALT) on cleared lands without shifting and clearing of natural forests any further.

The Government has designated agriculture as the main pillar of the economy and made efforts to achieve greater progress in the agricultural sector. Currently, MOAI is working on a set of strategies for agriculture developments such as;

- Ensuring food security with comparative advantage on food crops production
- Ensuring post-harvest processing facilities
- Support contract farming arrangement between farmers and the private sector
- Withdrawal of 10 percent export tax
- Strengthening agricultural research development and extension services
- Development of Seed Industry
- Adjustment of the Land Policy to be in line with market economy
- Introducing a pricing policy on export crops

In Myanmar, with an agro-based economy, the agricultural sector plays a dominant role in national human and economic development. Sustainable agriculture requires the integration of environmental considerations with agricultural policy analysis and planning. Along these lines, Myanmar Agenda 21 is proposing a number of dedicated objectives and activities, namely 1.Promote Sustainable Agriculture, Livestock and Fisheries Development; and 2. Enhance Food Security and Pre-warning Systems.

In order to achieve disaster resilience in Myanmar, the **Myanmar Action Plan on Disaster Risk Reduction (MAPDRR)** has been prepared in August 2009 with a consultative and partnership approach. The Goal of the MAPDRR is *'To make Myanmar safer and more resilient against natural hazards, thus protecting lives, livelihood and developmental gains'.*

It identifies a number of priority projects which need to be implemented to meet the Hyogo Framework for Action (HFA) and the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) commitments. In order to achieve these objectives, the MAPDRR aims at the following:

1. To build a more resilient and safer community through conceptualization, development and implementation of appropriate disaster risk reduction programmes and culture of safety;
2. To provide a framework for implementing Myanmar's DRR commitments at the global and regional levels under HFA and AADMER;
3. To provide a mechanism where the DRR initiatives of all Government ministries and departments, supported by United Nations organizations and other stakeholders, can be coordinated and monitored;
4. To provide a conducive environment for mainstreaming DRR into development plans, and programmes at the national, state, division, township, and village tract levels; and
5. To support mutually beneficial partnerships between the Myanmar Government and their development cooperation partners in DRR programmes.

Project design is compliant with priorities under Myanmar's **National Action Plan (NAP) under the UN Convention to Combat Desertification** (UNCCD), 2005. In article 7.8 and 7.9 of Myanmar's NAP, it is stated that Myanmar is committed to:

- “promote the greenery of the environment with full participation of the local people in order to achieve indirect benefit for their present and future generations”
- “improve the soil fertility of the degraded land by means of agroforestry and proper agricultural methods in order to increase the production of crops and consequently seasonal income”
- “to prevent land degradation and desertification through generating information to facilitate proper method of soil conservation and transfer the technologies to the farmers”

Regarding **Millennium Development Goal (MDG) targets**, the project corresponds to MDG 1 (‘End Poverty and Hunger’), and MDG 7 (‘Ensure Environmental Sustainability’). The project will help Myanmar to:

- Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day;
- Halve, between 1990 and 2015, the proportion of people who suffer from hunger;
- Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources;
- Reduce biodiversity loss and achieving a significant reduction in the rate of loss; and
- Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.

Regarding long-term institutionalization of project results, it is important to note that UNDP will facilitate lessons on successful adaptation measures from the project into township- and village-level planning processes. In this regard, it is also crucial to acknowledge that the development process at the sub-national level is rapidly changing in Myanmar. Beginning in 2012, the country began a process of formulating township- and district-level development plans, which marks a remarkable departure from the previous centrally-led development planning process. These plans will be formulated with assistance from the planning department at respective level and in coordination with development agencies and NGOs. In the process, it is envisaged that the Chief Minister from each Division/State consolidates lower-tier development plans and submits to the Parliament for approval. Using the UNDP-led Inle Lake Rehabilitation and Conservation Project as a platform, UNDP has been invited to monthly meetings with township administrators, along with other NGOs and development agencies, to initiate a dialogue for the township development planning. Reflecting this recent development, UNDP’s project formulation team for this project consulted Chief Ministers of the project target Division/States and they have expressed strong interests and commitments to feed lessons learned from this project into the future development planning process. While this is clearly a step towards a more participatory development planning process in Myanmar and improves the leverage non-governmental development institutions (such as NGOs and development agencies) have over planning process, the degree to which village communities will be assisted financially and technically by local administrations is still uncertain. Public investment shortfalls and policy implementation gaps that have characterized the development at the village level in Myanmar is likely to continue in the near future, and hence, many communities in the Dry Zone will likely continue to depend on autonomous ways to cope and adapt to the effects of climatic extremes while being

assisted by NGOs and CBOs. In line with this rationale, the primary target focus of the proposed project is at the administrative level of townships, utilizing networks of NGOs and CBOs to enhance the adaptive capacity of vulnerable farmers, and establishing partnerships with government institutions to ensure that AF investments can be interconnected with continued operation and maintenance support. A number of deliverables under Component 3 of this project, such as risk and hazard maps, will be developed in cooperation with national universities and research institutions, combining bottom-up information about hazard sensitivity with top-down spatial assessments of hazard exposure. The results of these assessments will be disseminated to different tiers of government via the Project Steering Committee (PSC), the Technical Advisory Group (TAG), the Environment Thematic Working Group (ETWG), and township-level coordination mechanisms that will be established under this project. A series of field visits will enable knowledge sharing with government entities at the regional and national scale.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

All project activities are in compliance with existing rules, regulations, standards and procedures endorsed by the relevant government ministries.The proposed reforestation, afforestation and conservation activities are aligned with technical standards provided by the forest law, forest policy, national forest master plan, and Dry Zone Greening Action Plan. Construction of any small-scale irrigation systems and check dams will be carried out according to technical guidelines of the Irrigation Department, and accompanied by technical supervision through certified engineers.

The project will be compliant with standards established by the manual on “Soil Conservation and Water Harvesting” in 2003, *“Review of Agroforestry Activities and Formulation of Strategies for the Dry, Chin and Delta Areas* (Khin, 2010), *Technical Manual for Environment Rehabilitation and Climate Change Mitigation* (Paw, 2010), which were produced by UNDP, Myanmar and adopted by the Government of Myanmar.

UN-Habitat has developed a manual on drought prevention for Myanmar with consultation of experts from government ministries, UN agencies, INGOs and NGOs. The proposed activities under this project are fully aligned with the recommendations from this manual.

Other technical standards employed by the project relate to procedures in developing and disseminating improved seed varieties, drought and disease tolerant and early maturing crops (provided by the Department of Agricultural Research (DAR) and the Seed Division of the Myanmar Agricultural Service of the Ministry of Agriculture and Irrigation). Adherence to the recently promulgated Seed Law (2011) will apply in project tasks related to the development of agricultural seed banks, cultivation and production of crops from pure seed, and community participation in seed production research.

The National Seed Committee has a designated responsibility to develop the agricultural sector by cultivating and producing new crops, using pure seeds. A Technical Seed Committee will scrutinize the introduction and production of new plant varieties. Furthermore, the proposed project will apply standards promulgated in Myanmar's Pesticide Law, which governs the use of pesticides and identifies principles of Integrated Pest Management (IPM) the project will adopt.

Due to the lack of formal requirement for environmental impact assessment in Myanmar, UNDP's Social and Environmental Screening process will be applied. As the project follows the principle of small-scale, community-based adaptation, it is assumed that the implementation schedule of the proposed activities will not be affected.

F. Describe if there is duplication of project / programme with other funding sources, if any.

In Myanmar, UNDP works under a special mandate from its Executive Board[20] which focuses exclusively on programmes with village- and grassroots level impact in the areas of training and education, health, food security, the environment, and HIV/AIDS. In response to this mandate, UNDP delivers its assistance through its Human Development Initiative (HDI). The HDI is a set of projects which is currently providing assistance to poor rural communities in 62 townships in 11 different regions of the country. The HDI focuses on assistance to meet the basic social and food security needs of communities, based on principles of collective and participatory decision-making. It also aims to develop the capacity of local NGOs and CBOs so that communities can plan and implement independent self-help activities. So far, some 3 million women, men and children in nearly 8,000 villages of targeted townships in Myanmar have benefited from the various phases of the HDI: HDI-1 (1994-96), HDI-E (1996-99), HDI-3 (1999-2002) and HDI 4 (2003 to 2011). The proposed project will build on the longstanding experience and partnerships of the HDI to address adaptation needs in those Dry Zone townships which are currently not covered by investments in resilient water supply, agriculture and communal forestry. This will ensure that the proposed AF project is addressing an evident investment gap in those townships that are hardest hit by the trends of declining water supply (Shwebo, Moneywa, Myin Chan, Nyaung Oo and Chauk).

The Integrated Community Development Project (ICDP), assisted by UNDP, has been implemented in the Dry Zone since 1994 with the aim to improve food security and reduce poverty in 7 targeted townships. Since 2003 to date, a total of USD 8,341,378 investments have been made in this project. The project focuses on livelihood support activities such as the promotion of small scale irrigation schemes, the provision of improved seeds, the provision of financial and technical assistance to landless people for animal husbandry, and the development of capacity in local organizations for various technical and business skills. The ICDP is implementing project activities in 7 townships of the Dry Zone, which at present do not overlap with the AF project. However, the lessons learned over the last two decades of the

[20] See the footnote 23 in Part III Section A for the current discussion on the UNDP project implementation modality in Myanmar.

ICDP implementation in terms of socio-economic status, institutional contexts, social mobilization strategies, etc. presents a wealth of knowledge that the proposed AF project will tap into. This synergetic collaboration has already started in the project formulation stage, during which advisors from ICDP project accompanied a number of community consultations and assessments and their inputs have been reflected in the final project document.

Some of the projects in the Dry Zone are aiming to improve the livelihoods of Dry Zone communities. FAO is supporting a project titled “Support to Special Rice Production in the Dry Zone, Mandalay Division”. The objective of the project is to improve the quality and quantity of rice production in an area affected by chronically limited rain. Project activities cover extension services and training sessions to improve the cultivation and harvesting of rice. Particular attention is given to the introduction of new methods for the selection of seeds in order to achieve a stable and long-lasting effect on their quality. In addition to the multiplication of high quality seeds and the distribution of improved traditional seeds and seeds of new experimental varieties, mechanical tools, and especially water pumps for irrigation, are provided. The project area covers Meikhtilar and Yamethin in Mandalay Division, and is thereby not creating any duplication with the proposed approach. That said, the project provides a very good point of departure for the transfer of know-how and training materials, especially related to agricultural production methods. FAO’s participation in the Technical Advisory Group of this project will ensure that such transfer can take place, so that duplication of efforts is avoided and cost-efficiency is increased.

At present, UN Habitat and Bridge Asia Japan (BAJ) are undertaking actions to increase water resources availability through pond renovation and deep tube well construction in some villages in the project target sites. Two International NGOs GRET and IDE have been implementing similar activities in several villages in Monywa Township in Sagaing Division and Myingyan Township in Mandalay Division, respectively. The Department of Development Affairs have also been constructing or fixing deep tube wells and installing pipelines in Chauk Township in Magway Division as part of the ten-year project for rural water supply. The village-level appraisal that was conducted in all targeted townships during the AF project preparation phase has provided more concrete and precise information about the existing and planned development support investments by partner institutions (see Annex I). This will enable this AF project to increase complementarity and avoid redundancy in its livelihood support activities. In this context, it is worth highlighting that the activities for water provision proposed under this AF project are based on the principle of diversification and redundancy in order to increase water security during dry periods. Rather than focusing singularly on the restoration of a community pond or on the construction of a tube well, the proposed project is employing a complementary suite of investment activities which combine the construction of shallow or deep tube wells with water diversion canals, treadle pumps, water storage tanks and drip irrigated home gardens to reduce water stress during dry periods.

A study for the ‘Sustainable Agricultural and Rural Development for Poverty Reduction Programme in the Central Dry Zone’ was supported by Japan International Cooperation Agency (JICA) from 2008 to 2010. The development study was initiated to formulate a policy for

reducing poverty in the Central Dry Zone. A project focusing on Rural Water Supply Technology in the Central Dry Zone was supported by JICA from 2007 to 2009 in Nyaung Oo Township. The objective of the project was to establish a reliable water supply system for and provide safe drinking water to local inhabitants through 20 new deep tube wells (200 to 300 meters in depth) as well as repairing 40 existing tube wells. In addition, the Afforestation Project in the Central Dry Zone has been implemented from 2003 to 2008 funded by JICA and led to the establishment of 1,619 ha of plantation in Nyaung Oo and Kyaukpadaung in the Mandalay Division. Due to the difference in target areas, this project does not duplicate with the proposed efforts.

At present, there is no other project which focuses on adaptation to climate change in the agricultural and forestry sector in Myanmar, and no initiative is focusing on an integrated, ecosystems-based approach to reduce the vulnerability of local farmers. The same is valid for the provision of end-to-end early warning services at the village level, which have been specified as an evident gap in HDI-related reviews. The HDI has provided baseline information about DRR-related gaps in rural communities, including the fact that despite two Warning Centers in Yangon and Nay Pyi Taw, no system is currently operational that would transfer hazard warning signals from the existing Early Warning Centers to rural villages. No local early warning and communication protocols are in place, and no low-cost mechanisms to communicate warning signals from village to village are available.

An inventory of ongoing development support initiatives in the targeted townships is attached in Annex I of this proposal. This inventory was constituted on the basis of extensive stakeholder consultations conducted during the project preparation phase (see Annex E).

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Through the implementation of the project, the project will apply the following knowledge and learning tools:

- Local media news items in local language;
- Public & school presentations;
- School field visits;
- Climate hazard maps (and the production process)
- Community evacuation mock drills
- Community briefs on integrated water management, communal forestry, agro-forestry, non-timber forest products, watershed management, conservation agriculture, drought-resilient crops, common maladaptive and climate-resilient post-harvest practices;
- Study visits between different community groups and townships especially under Outcome 2 in which pilot/demonstration community plots are established;
- Public media articles in journals, newspapers and newsletters;
- Awareness actions for private sector entities;

- Training workshops and short courses on Climate Change and sustainable land management for non-governmental community leaders and local government institutions
- Policy briefs for national decision makers; and
- Best practice guidance materials and tools.

Implementation of concrete adaptation actions on the ground will constitute the primary learning experience, which will feed into all awareness, training and knowledge management actions facilitated and conducted by the project. Close involvement of CBOs/NGOs, which also work in non-project target sites, will facilitate smooth replication of good practices during and after the project. Apart from consultative face to face meetings and interactive events, the project will prepare brochures, leaflets and posters on the effects of climate change on natural resources in the Dry Zone, and on the relationship between water management practices, agroforestry practices, agricultural cropping, post-harvest and storage practices and the resilience of the surrounding ecosystem. Existing awareness materials from other projects (most notably FAO-supported ones) will be adopted and tailored to the target groups in the project location.

It is important to note that the project recognizes that the establishment of M&E systems for relevant outputs/activities is of paramount importance for effective knowledge management and sharing. Based on UNDP's previous experience from community-based adaptation projects in other countries, presentation of concrete/tangible benefits (in terms of, for example, increased volume of water, increased cash income, reduced harvest losses) in a way that is easy to understand to community members is often one of the most effective means for upscale and replication. Also it should be noted that past experience from UNDP-assisted adaptation projects clearly demonstrate that investing in a robust and systematic M&E framework at the beginning of the project has a significant efficiency and effectiveness gain in the knowledge management within the project. This gain is especially highlighted when compared with commonly-practiced customs of engaging external consultants for the purpose of knowledge synthesis in a short duration of time. For this reason, a full-time M&E Officer will establish detailed monitoring and tracking tools in the inception phase of the project implementation. With these tools, throughout execution of the project, lessons learned will be captured, codified and discussed among stakeholders. This M&E framework will enable a production of technical report from each of the technical Outputs, which will be collated as "best practice guidance materials and tools". Periodic project briefs, annual progress reports, midterm evaluation and final evaluation results will be circulated widely for review.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

This proposed project was developed in consultation with the Environment Thematic Working Group (ETWG)[21], which is currently chaired by UNDP Myanmar and comprises government

[21] The ETWG was formed by UN agencies, local and international NGOs. It provides a multi-stakeholder forum for 1) networking and sharing of information on environment (climate change, land degradation, bio-diversity) natural resources and renewable energy issues in Myanmar; 2) knowledge sharing on specific technical issues in the environment field, as well as the way in which environmental issues relate

departments, NGOs, academic institutions, media, donor represents, UN agencies, and representatives from the private sector. A number of consultations with the primary stakeholders of the project in target areas (farmer and livestock groups) have taken place over the course of the project preparation phase to fine-tune project Outputs and Activities and finalize a cohesive implementation strategy in the target sites.

The National Environment Conservation Committee (NECC), formerly known as the National Commission for Environmental Affairs (NCEA), plays a key role in addressing environment-related concerns in Myanmar, with the Secretary serving as Myanmar's Focal Point to the UNFCCC. The Commission comprises 19 members from various line Ministries and is chaired by the Minister of Environmental Conservation and Forestry. MOECAF, assisted and facilitated by UNDP, has consulted with a number of stakeholders in identifying the targeted areas of the proposed project, and created awareness among stakeholders. MOECAF/UNDP has facilitated a participative process to formulate the proposed AF project with ETWG members and director of the NECC.

The MOECAF comprises the Dry Zone Greening Department (DZGD), the Forest Department (FD), and the Planning and Statistics Department (PSD). Among them, the DZGD is a key stakeholder at the township and village level, while the PSD and the FD provide technical backstopping and assistance on policy matters. The concept formulation mission held a number of discussions with the MOECAF, including the Director Generals of the PSD, the FD and the DZGD. These discussions have helped the project formulation team to identify the target areas for the proposed project, based on reviews of climate trends and loss data from climate-related events. A number of follow up discussions were held during the proposal formulation phase with the MOECAF (including the Union Minister for Environmental Conservation and Forestry), Chief Ministers and Ministers in Magway, Sagaing and Mandalay, NCEA and other line agencies, particularly the Ministry of Agriculture and Irrigation (Myanmar Agriculture Services, Department of Agriculture Research, Department of Water Resources and Utilization, Department of Agriculture Planning); the Ministry of Fishery and Veterinary (Livestock Breeding and Veterinary Department, University of Veterinary Science); the Ministry of Transport; the Department of Meteorology and Hydrology (Drought Monitoring Centre) and the Ministry of National Planning and Economic Development (Planning Department). A multi-stakeholder concept formulation meeting was held in June 2011, which has confirmed that the proposed adaptation options address existing investment gaps and provide the best possible approach to achieve transformational impact on climate risk reduction in Myanmar's Dry Zone.

At the local level, the project formulation team visited the proposed townships and solicited views and ideas from local administrators, non-governmental extension workers, heads of local NGOs, and community members including farmers' groups, livestock groups, landless, women and youth groups.

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to other sector policies, programmes and activities; 3) policy advice on environmental issues, sustainable use and management of natural resources, renewable energy for rural areas, recycling and reuse of resources, and public-private partnerships; 4) discussion of issues related to multi-lateral environmental agreements such as the Framework Convention on Climate Change and the Kyoto protocol.

Regarding local-level stakeholder involvement, it is important to emphasize that the entire project strategy is rooted in principles of community ownership, which would not be achievable without the promotion of participatory and gender-sensitive approaches at different levels of project implementation. The delivery of project Outputs is preceded by community-based assessments, which determine the site-specific location, design specifications and management modalities for AF-funded measures. Community-based Organizations, such as farmer groups, Water User Groups and Forest User Groups, play a critical role in this AF project and will serve as platforms to foster community dialogue, institutional and capacity development throughout project implementation. All participatory approaches that are advocated and facilitated by the project will promote equal participation of women and men.

At the level of project governance, both the Project Steering Committee (PSC) and the Technical Advisory Group (TAG) will have women representation. The TAG will ensure consistent representation from Farmer Groups and NGOs, and provide gender-related lessons from the UNDP-supported HDI program. The HDI has successfully enhanced participation of women in agro-forestry and livestock raising activities, and empowered them to participate in CBO decision making processes. One of the strategies to achieve this was to undertake advocacy actions with participating CBOs, but also to establish new CBOs with equal participation of women and men. At the current point in time, some leaders of Self Reliance Groups (SRGs) that have been established in the Dry Zone under the HDI are women. The proposed project will ensure that these women can actively participate in the TAG.

Annex E details the list of stakeholders consulted.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Component 1: Respond to the climate-induced reduction of freshwater supply

Baseline situation:

The Dry Zone in central Myanmar, which covers about 10% of the country's total area and close to a third of the country's population, is one of the most food insecure areas in the country. Water shortages in connection with irregular and scarce rainfall constitute a regular threat to rural livelihoods. Watershed areas in the Dry Zone are managed by the FD and the DZGD. Although policies and laws have been issued to conserve and manage watershed areas, results have not been achieved due to inadequate budget and outreach to follow through with policy implementation in remote communities. Active participation and empowerment of community groups in the target townships is needed to advance community-based adaptation and ensure management of scarce water resources in a changing climate.

The Government of Myanmar has implemented various rural water supply projects, one of which is "A ten Year Project for Rural Water Supply by Development Committees of Sagaing,

Magway and Mandalay Divisions (from 2000 - 2001 to 2009 - 2010)". The Department of Development Affairs (DDA) under the Ministry of Progress of Border Areas and National Races and Development Affairs, is currently implementing these projects. Four village tracts in Chauk Township under the proposed AF project have received investments through this DDA initiative (see ANNEX I).

Adaptation alternative:

After the project, farmer, livestock, forest and water user groups in 280 vulnerable villages of the Dry Zone will have the capacity to manage the climate-induced reduction of freshwater supply with decentralized, community-based measures which increase water capture, storage, filtration and water retention. After the project has ended, these communities will have access to sufficient quantities of water for household and agricultural uses during dry periods, and benefit from rehabilitated micro-watersheds which increase natural water retention and reduce surface runoff and erosion. Community-based agro-forestry plots will help communities conserve soil and water, increase genetic diversity and protect crops from climate hazards. This package of measures will enable various community based organizations to partake in project activities increasing the breadth of community ownership, reduce dependency on external planning interventions and ensure that adaptation measures are implemented in tune with local priorities and capacities. The installations proposed under Component 1 include simple, farmer-friendly structures (percolation ponds, check dams, locally adapted agro-forestry and watershed rehabilitation plots), which make use of locally available materials and follow community-based design and priorities. These structures will store additional fresh water in aquifers and watershed ecosystems, and reduce surface evaporation in a warming climate. The installation of water infrastructure and forest management activities, and more importantly enhanced access to non-timber forest resources, will also promote economic resilience of landless or marginal farmers whose livelihoods are otherwise predominantly dependent on casual labor on someone else's rain-fed farmland.

Component 2: Climate-resilient agricultural and livestock production systems established and promoted

Baseline situation:

In terms of food security in the target areas, a number of risk factors need to be closely monitored. WFP has highlighted the key risk factors for the 2011 growing season as follows:

(1) Potential dry spells can affect agricultural production;
(2) Increasing food prices can put pressure on vulnerable groups relying heavily on food markets; and
(3) Seasonal water scarcity during the dry season can pose a serious health risk.

The baseline situation in Myanmar's Dry Zone is characterized by a climate-induced pressure on natural resources, which in turn leads to unsustainable agricultural practices and

environmental degradation. The effects of dry spells, drought and erosion in the Dry Zone push many poor farmers into ecologically sensitive areas, where they apply unsustainable agricultural practices to survive and make at least short-term economic gains. This, in turn, undermines long-term ecosystem resilience and adaptive capacity. With regards to livestock management, insufficient fodder for cattle and other animals during drought periods is resulting in the deterioration of livestock health. The death of livestock is commonly beyond the capacity of poor rural farmers to buffer, which drives the poorest community groups to relocate or sell their remaining livelihood assets at a very low price. Typically, the fodder from millet is collected during the monsoon/harvesting seasons (August-September) and it needs to be preserved until the dry season in February-April. However, suboptimal preservation techniques and insufficient preservation infrastructure lead to a significant loss of the fodder before the dry season. The Livestock Department provides trainings on fodder preservation techniques to some farmers, but limited public budget dictates suboptimal outreach and impacts (usually only at the township centres).

In principle, the Seed Division within the Myanmar Agricultural Services is responsible for seed production and seed quality control, and the Agriculture Extension Division within MAS is responsible for multiplication. Each township under this project has a research farm (seed bank) operated by MAS, where some drought-resilient crop varieties are grown and sold to farmers. However, similar to the challenge faced by the Livestock Department, the outreach is severely limited as they are usually located only at the township capital (Each township is a cluster of 40-70 villages). Moreover, even if farmers have physical access to a seed bank, advance notice of 2-3 months is needed which almost precludes the possibility of adjusting planting variety based on seasonal forecasts. Private investments in improved varieties of crops and livestock to increase yields and buffer periods of drought is too limited due to the lack of financial capital and limited access to credit (with interest rates on the informal market as high as 20%). Access to robust and efficient post harvesting processes and storage methods is generally out of reach for Dry Zone farmers. Waste in harvest processing and loss of grain during periods of drought and flooding are hardly being managed. Improved fodder processing is not widely practiced.

Adaptation alternative:

After the project, the most vulnerable farmers in the Dry Zone will have access to additional adaptation options which will diversify their livelihood assets and increase long-term resilience from climate-induced shocks and stresses. Community groups and local NGOs will be empowered through participatory breeding of resilient crop and fodder varieties, access to the tools and know-how for conservation agriculture, efficient post-harvest processing and storage techniques to ensure safe handling and storage of agricultural produce during extreme climate events (droughts, floods, rains), and diversification of livestock production to buffer the effects of flooding and drought. These measures will be implemented on the basis of participatory assessments and community-based experimentation, ensuring that they correspond with communal priorities and capacities. The impact of the improved access to drought-resilient seed varieties through establishment of village-based seed banks and demonstration plots is likely to be reinforced with available climate risk information that is promoted under Outcome 3, which

aims at producing simple, understandable agricultural bulletins informing farmers early/late arrival of monsoons and assisting informed decisions of crop selections. The landless or marginal farmers with land access to 0.4-0.8 hectares of land will benefit from diversified livestock assets that are less prone to a wholesale loss of family assets. Agroforestry practices that will be promoted under Component 1 and enhanced livestock management practice promoted under this Component will have amplifying positive impacts on the economic resilience of these most vulnerable populations in Myanmar to the impacts of climate change.

Component 3: Improve climate risk information dissemination

Baseline situation:

At present, the Department of Meteorology and Hydrology (DMH) in Myanmar provides various services pertaining to climate information to different industries and sectors, including hydrological, meteorological and seismological services to assist shipping and inland water transport, the aviation industry and the agricultural sector. DMH provides hazard information, forecasting and early warning bulletins to national authorities, government agencies and the media. Information currently being disseminated includes daily and monthly weather forecasts, cyclone and strong wind warnings, flood warnings, rainfall warnings; and earthquake news. According to the Myanmar Action Plan on Disaster Risk Reduction (MAPDRR), a comprehensive Early Warning system is envisaged by the government to alert the population under threat of an imminent disaster in sufficient lead time to undertake protective actions. Such a system requires the following components to work together: (1) Hazard monitoring and detection; (2) Issuance of warning signals; (3) Multi-level dissemination of risk and warning signals; and (4) Preparedness at the local level to interpret warning signals and take timely and appropriate actions. In this chain, the effective and efficient dissemination of hazard information of the local level is especially critical, and a common weakness in many early warning systems. If this part fails, innumerable human and material losses can follow.

The formulation of MAPDRR and an enhanced early warning system that is envisaged in it is a direct response to the failure of Myanmar's national early warning chain in 2008 during cyclone Nargis. In the pre-Nargis period, the National Disaster Preparedness Central Committee, established in 2005, chaired by Prime Minister, was the only institution that was mandated to disseminate risk information to the public. Despite the receipt of early warning signals from the Indian Meteorological Department, the Joint Typhoon Warning Center, and ADPC in the days leading up to the arrival of Cyclone Nargis, the Committee was unable to relay the information effectively to the public, except through the regular TV/radio broadcast of which local communities have little access or understanding. After the cyclone, the dissemination network for early warning was strengthened by the establishment of division-, district- and township-level Disaster Preparedness Committees. In principle, the aim was to increase the efficacy of early information down to the community level. In addition, the government has provided hand-phones and radios to some village tracts and establishing community radio network. However, the coverage is far from sufficient and in the foreseeable future, TV and radio will likely to be the dominant mode of communications for many villages. And yet, the capacity within villages to

interpret early warning or weather information disseminated through TV/radio remains severely limited.

Devastating impacts of Nargis was an impetus for advancing the national and regional early warning infrastructure for sudden onset of disasters, despite some obvious shortcomings that still need to be overcome. However, when assessing the level of climate information dissemination system in general including slow onset of natural calamities, such as drought forecasts which assist vulnerable farmers in mitigating potential loss of livelihoods, the capacity is non-existent in both supply side in terms of quality and timeliness of the information and recipient side in terms of interpreting climate information and adjusting responsive actions (such as sowing/harvesting behaviour).

Community based organizations are currently not engaged effectively in communicating and disseminating climate risk and early warning signals to village communities. Although DMH has two Early Warning Centers in Yangon and Nay Pyi Taw, no multi-hazard, end-to-end Early Warning dissemination system is operational that would transfer official warning signals from the existing Early Warning Centers to the village level. No local early warning and communication protocols are in place, and no low-cost mechanisms to communicate warning signals from village to village are available. Moreover, the focus is exclusively on sudden onset of disasters, most notably cyclones, and no climate risk information for farmers is currently provided except for the announcement of some climate parameters, which farmers have little understanding of. For an effective climate risk and hazard warning system in Myanmar, community based organizations and processes need to be developed to enable systematic connection with higher-level early warning hubs and continued assistance to community members.

Adaptation alternative

Component 3 of the proposed project envisages enhancing the timeliness and quality of climate risk information through establishing and strengthening organizational framework. First, Community-Based Disaster Risk Management (CBDRM) Committees will be established in at least 70 villages on a pilot scale as the village-level counterpart for the Disaster Preparedness Committee (DPC). CBDRM Committees will serve as the lowest-tier multiplier of early warning information transmitted through the Township-level DPC. Members will be trained to receive and interpret information from DPC and communicate with other villagers based on pre-assigned responsibilities. Designation of responsibilities in the “last mile” of climate and early warning communication network is envisaged to reduce the vulnerability of Dry Zone farmers significantly. As a second measure to enhance the effective dissemination and use of climate risk information, a Climate Risk Information (CRI) Sub-Committee at the township level as a subordinate body of the Township-level Disaster Preparedness Committee (DPC) will be established. The CRI sub-committee will act as a platform on which government agencies and CBOs/NGOs can efficiently and effectively share climate risk information that are seasonal in nature while they work with their village counterparts of farmer’s groups and Water User Groups. In particular, the capacity of township-level DHM and other technical line agencies, along with CBOs/NGO representatives, will be enhanced to produce tailored climate risk

information in such a manner that is understandable to Dry Zone farmers and facilitates adaptive behavioral change. Engagement of local CBOs/NGOs in the CRI sub-committee is critical as they have more extensive grass-roots network. On the other hand, technical capacity within CBOs/NGOs will be augmented by technical line departments. Thus, the CRIC will serve as information hubs for the communication of seasonal flood, drought and storm-related risk.

These activities will be supplemented by a series of awareness raising and training events targeting farmers themselves so that they are better able to interpret emerging climate risk information whether it is from CBDRM or CRI sub-committee. The participatory establishment and analysis of climate risk and hazard maps, and the process of updating them along with the project progress, will not only enable villages in the target townships to undertake decentralized preparedness and risk mitigation planning, but also act as an effective visual aid for understanding the links between vulnerability reduction measures undertaken in Component 1 and 2 and sources of threats for these communities. As it is discussed above, CBOs/NGOs and development agencies, including UNDP, are now involved in regular meetings with the Township Administrations (General Administrative Department) to discuss and contribute to the formulation of the very first Township-level development plans. Climate risk and hazard maps, and the process of the participatory analysis of climate risks, will feed into the local development process that is taking shape since 2012.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme

Considerations for sustainability of project results have been integral to the design of the proposed AF Project. First and foremost, the principle of local empowerment and strong emphasis placed on community-based organizations in the implementation of the project will ensure participation and ownership by local communities, and sustainability of adaptive investments that will be promoted within the proposed AF project. The design of the project also emphasizes the *process* of determining the investments, as much as it does on the product of the investments. For example, the inventory of agro-forestry practice (under Output 1.3) is not merely a one-off exercise to take a snapshot of the status quo, but repetition of such an exercise through the course of the project implementation will provide an important dialogue and learning platform on which the impacts of adaptive investments are showcased, acknowledged, and the future course of actions discussed among community members. Such an approach is consistently visible across all Project Components such as the identification process for determining the specific locations and locally suitable designs of water infrastructure (Output 1.1), on-farm demonstrations of resilient seed varieties (Output 2.1), and participatory production of climate hazard maps (Output 3.1).

During the project formulation phase, representatives from the project target sites were consulted to verify and validate their commitment and willingness to provide in-kind co-finance, in the form of labour and locally available materials, for the water-, forestry-, and agroforestry-related investments. Contributions of in-kind co-finance are likely to increase the ownership, and hence, sustainability of the investments as well. At the same time, built infrastructures financed

with the AF resources (mainly under Output 1.1) follow simple, farmer-friendly design to ensure the ease of maintenance by community themselves, learning lessons from the UNDP-assisted ICDP project.

Lastly, as described in Part II/Section D, lessons learned from the implementation of this project will directly feed into the local development dialogue platform, as validated by the strong interests expressed by Chief Ministers of the project target Division/States during the project formulation stage. This dialogue platform was established in 2012 and is expected to set a stage where locally generated lessons will formally have an outlet to inform locally-appropriate development and climate change adaptation measures. Output 3.1 of this AF project has an activity to support and facilitate this dialogue to institutionalize project results.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Arrangements for project/programme implementation

In Myanmar, UNDP works under a special mandate from the UNDP Executive Board which focuses exclusively on programmes with village- and grassroots level impact. The entire UNDP programme is directly executed (DEX) by the UNDP Country Office to ensure technical and financial accountability for the funds entrusted by multilateral and international donors. Although the recent political and democratic transition of Myanmar provides new opportunities for UNDP to scale up partnerships with public institutions in Myanmar, the modality of Direct Execution remains the most effective option to ensure delivery of AF resources to vulnerable farmers in Dry Zone villages[22].

Reflecting the longstanding work and experience of UNDP in working directly with grassroots communities, and considering the past success that UNDP's direct execution modality has had in advancing community-based development and disaster risk reduction in vulnerable areas, the Government of Myanmar has explicitly endorsed this AF project to be executed by UNDP directly, with a focus on delivery through local-level institutions (NGOs, CBOs).[23]

UNDP's role in this project is two-fold:

- As MIE for the Adaptation Fund (for which an MIE fee of 8.5% is provided), UNDP has supported the Government of Myanmar to appraise urgent adaptation needs in the Dry Zone, scope out an AF concept, develop a full AF proposal (based on extensive consultations in the project areas), mobilize project stakeholders, develop township-level coordination mechanisms and partnerships, and mobilize resources from the AF for urgently needed adaptation actions. During the project implementation phase, UNDP's MIE role will include independent project oversight and implementation support through Specialized Technical Support Services and Quality Assurance provided by UNDP Asia-Pacific Regional Center (Bangkok) and UNDP Headquarters (New York). The details of services and cost positions covered by the MIE fee are listed in Annex C of this proposal.

[22] The new UNDP Country Programme in Myanmar will be tabled at the January session of the Executive Board in 2013 and change in implementation arrangement for the Country Programme will likely be discussed. It should be noted, however, even with an Executive Board decision on an alternative implementation arrangement, the operationalization of such a new arrangement will require approximately two years during which a national execution (NEX) manual is prepared and capacity assessments and HACT (Harmonized Approach to Cash Transfers) assessments. In the event that the proposed AF project will alter its implementation arrangement in the course of the project life, all changes will be reported to the Adaptation Secretariat. Also note that the Project Execution costs are generally higher under the DEX modality, it is unlikely that a transfer of implementation modality from DEX to NEX will have negative financial implications.

[23] For further information and a record of this endorsement, please see the government support letter dated 29 September 2011 which is attached to this project proposal and LoE

- At the request of the Government of Myanmar, UNDP will serve as Executing Entity for this project. In this capacity, UNDP will be responsible for the execution of the proposed AF project in collaboration with local NGOs and CBOs, which requires the administration and delivery of financial inputs as detailed in Annexes A and B of this proposal. Any inputs related to Project Execution (which covers the costs of project management staff for the duration of the project; costs for project inception, Steering Committee and township-level coordination meetings; costs for field offices in 5 townships; costs of independent external evaluations; and costs for monitoring/evaluation-related travel of project staff to the field sites) have been costed and apportioned between AF and UNDP. The proportion requested from the AF to support project management costs has been reduced to 4.9% of the overall budget.

In the context of lessons learnt from already completed projects, such as the Integrated Community Development and Community Development in Remote Townships Programme, UNDP Myanmar has demonstrated technical, managerial and administrative capacity to serve as Executing entity for the Government of Myanmar.

At the national level, the Project will be supported by a **Project Steering Committee (PSC).** The PSC will be formed to oversee and keep abreast of project progress and facilitate the implementation of the project in partnership with co-financing institutions. Direct implementation of the project and decisions regarding the allocation of resources and assistance under the project will be taken by UNDP as the executing agency under the overall direction of the PSC, in consultation and partnership with the Government of Myanmar. The PSC will be chaired by UNDP and include Director Generals from the Ministry of Environmental Conservation and Forestry (MOECAF), Director Generals from Water Resources Utilization Department and Department of Meteorology and Hydrology, and the Chair of the Environment Thematic Working Group. For details, please see Annex D.

The **Project Team (PT)** will consist of the following core staff:

- 1 National Project Manager
- 1 Monitoring and Evaluation Officer (responsible for tracking of results indicators)
- 1 Financial and Administrative Assistant;
- 1 Data Assistant;
- 5 Sector Specialists (agriculture, water engineer, livestock, forestry, soil conservation and water harvesting) based in townships.

National Project Manager, M&E officer, finance and data assistance will be stationed at Yangon. Five sector specialists will be stationed in township-based project offices to facilitate smooth local implementation and backstopping of the project. One project targeted township called Shwebo is geographically quite close to Monywa Township, and the other two Townships named Chauk and Myingyan are close to Nyaung Oo. As a result, the AF project subjects to open two UNDP offices at Nyaung Oo and Monywa due to cost effectiveness where these two townships are located at the center of rest of townships and strategically also important in terms of administrative structure and transportation. Three technical specialists - forestry and

environment, water resources engineering and soil-water conservation – will be positioned in Nyaung Oo Township while two technical specialists – agriculture and livestock - are to be assigned in Monywa Township.

By means of co-financing, UNDP Myanmar will cover the recurrent administrative and operational costs to run field-based project offices (see Annex B and co-financing letter). Local farmer groups, community-based organizations and NGOs will lead participatory processes at the community level and support field implementation through direct involvement in planning and labor-related tasks.

To assist the PT on technical questions, a **Technical Advisory Group (TAG)** will be formed to provide guidance and advice on technical questions related to water management, agriculture,

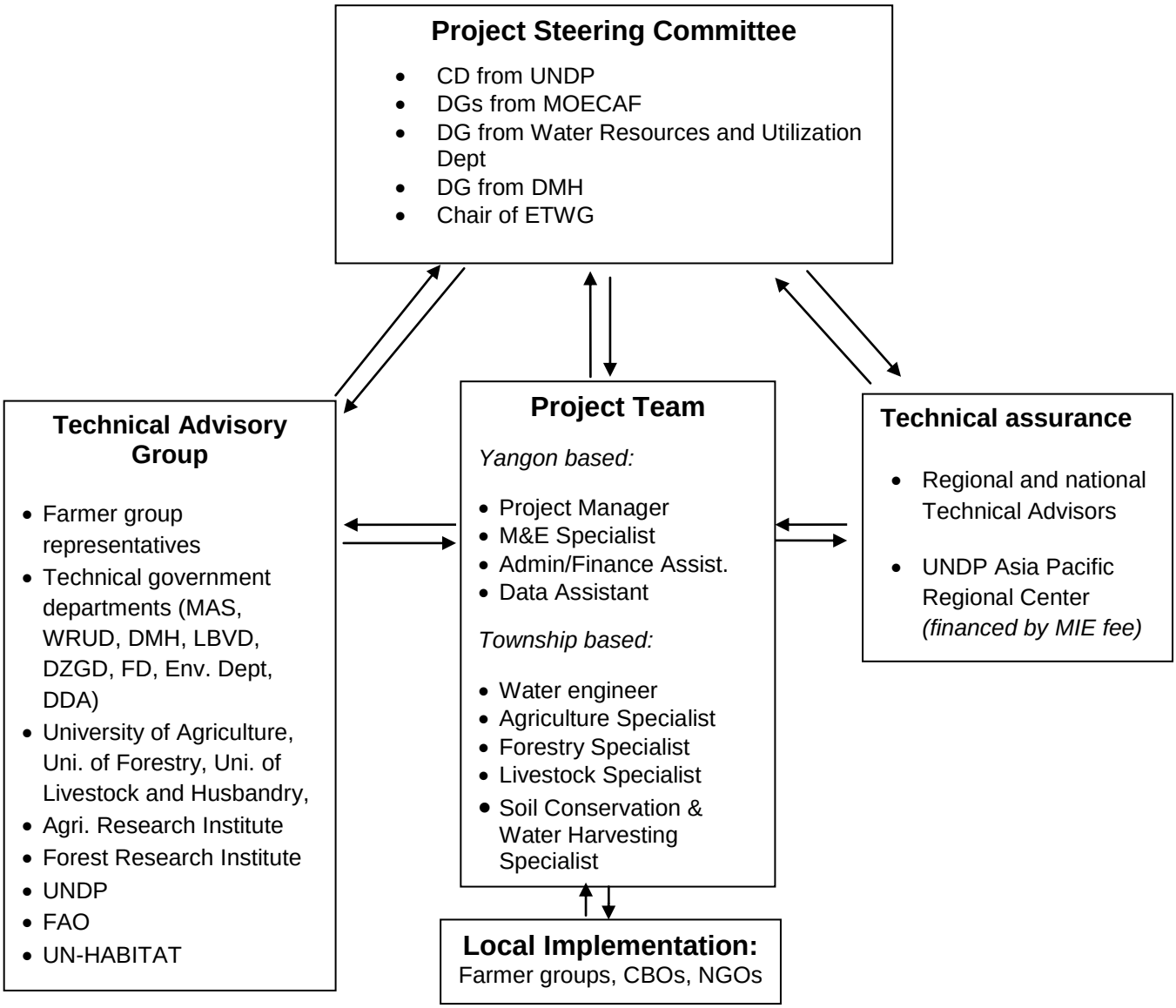

Fig.3: Organigram of the proposed project

forestry, food security and risk information/communication. The main objective of the TAG is to identify technical strengths and weaknesses of the project, take stock of available and required technical know-how under different project Components, and provide technical backstopping and quality control throughout the project period. The TAG will include representatives from local farmer organizations and NGOs, technical staff from Government Departments (such as the Department of Meteorology and Hydrology, the Ministry of Agriculture and Irrigation, the Dry Zone Greening Department (DZGD), the Forest Department (FD), the Livestock Breeding and Veterinary Department), UNDP, and other UN agencies such as FAO. FAO's involvement in this TAG is especially important, as this will enable transfer of experience and know-how from other townships in which FAO is involved in projects with an agricultural development focus.

NGOs/CSOs will play a critical role in the proposed AF project as a service provider, community organizer, and repository of knowledge and lessons learned from the project. Their contributions towards sustainable human development in Myanmar and collaborative working relationship with government agencies and UNDP, have been demonstrated, inter alia, in the ICDP and the Inle Lake Rehabilitation project. Stakeholder consultations at national, regional and local-levels during the project preparation phase identified potential NGOs and CSOs which are thought to have sufficient capacity to carry out some of the project activities. However, the selection of and a formal agreement with these entities will be made during the inception phase of the project as per UNDP rules and regulations, based on an open call for proposal, screening and assessment. Table below shows a list of potential NGOs/CSOs with their capacity and areas of expertise:

No	Name	Capacity and areas of expertise	Project Townships
1	BAJ	It is technically strong and is a leading NGO in the areas of water development issues and availability activities	Operational in target townships
2	Partner	It is technically strong and carry out activities in water availability development issues, and livelihood activities	Currently operational in Chauk but they can expand their operations into other Dry Zone areas
4	GRET	They specialize in water availability, agricultural extension, livestock provision and to some extent of hoemstead garden, agroforestry	Monywa
5	IDE	It is technically strong in water development issue	Nyaung Oo
6	ADRA	They work on small scale water development issue, reforestation, integrated agricultural farming, and livestock provision activities, agroforestry	They are operational in most targeted Dry Zone townships as per the constitutions and organizational charts
8	ECODEV	Strong at policy advocacy, awareness training and capacity building the farmers, well experienced in dry zone regions	Capable to cooperate for targeted Townships

9	ECCDI	Technically strong at reforestation, community forestry, natural forest conservation and regeneration	Capable to cooperate for targeted Townships
10	Royal Tree Services	Technically strong at reforestation activities	Nyaung Oo & Chauk
11	Soil-Water Conservancy Group	Technically strong and well experienced at soil and water conservation activities	Capable to cooperate for targeted Townships
12	PC Livestock Group	Technically competent at livestock sector especially for chicken	Capable to cooperate for targeted Townships
13	Shwe Tha Naung (CSO)	Strong techniques and extensive work on agricultural farming in dry zone area	Capable to cooperate for targeted Townships

B. Describe the measures for financial and project/ programme risk management.

A number of potential risks have been revisited, considered and analyzed in the full proposal formulation period. The following risks as well as associated risk management strategy of this AF project have been prepared.

No	Risk	Classification	Impact/ Probability 1: Low 5: High	Mitigation Measure
1	Non-climate drivers undermine adaptation efforts under this project	Institutional	Impact: 4 Probability: 1	The project will promote an integrated view of vulnerability in which the mitigation of climate-related drivers of vulnerability can be coupled with economic benefits. This integrated, ecosystem-based view of resilience, which is based on community-based participatory planning, will be able to hold non-climatic drivers such as over-grazing, deforestation and unsustainable agricultural practices in check.
2	Extreme weather events during the project lifetime undermine confidence of local communities in adaptation measures promoted by the project	Environmental	Impact: 3 Probability: 3	The project will integrate designated Outputs which focus on disaster risk and early warning communication, which will enable basic preparedness planning. As indicated in the Implementation Schedule in section D, activities in Component 3 will be implemented in earlier phase of the project implementation so that the impact of potential extreme weather can be minimized while the effectiveness of activities can be demonstrated.
3	Adaptation		Impact: 3	Local level implementation through farmer

	measures increase inequity in communities	Environmental Social	Probability: 2	groups, CBOs and NGOs will ensure that adaptation measures are demonstrated on the basis of participative processes which are gender-sensitive and enable participation of, and expression of views from, vulnerable and marginalized groups. Furthermore, during the inception phase of the project, M&E Officer will formulate a detailed beneficiary selection criteria and have it endorsed by relevant stakeholders to reduce the potential risks of mistargeting.
4	Technical capacity of township and village stakeholders restricts broad community engagement	Institutional	Impact: 3 Probability: 2	The project is adopting a capacity development approach which is based on participatory assessments. These assessments will build awareness, support ownership and enable the analysis of autonomous adaptation approaches. Based on these assessments, community groups will be supported in piloting local adaptation measures, which enhance capacity in a practical 'learning by doing' manner.
5	Political and social instability and lack of government engagement	Institutional/ Political	Impact:3 Probability:1	While potential political instability is ultimately outside the control of the project, the Dry Zone has been relatively insulated from the past civil unrest. The principle of community empowerment, the economic, social and environmental benefits that the project is likely to deliver, will have a positive impact on removing a seed of potential civil unrest. Project preparation phase had extensive consultations with government officials including Region Chief Ministers in the project target sites as well as high level officials at the capital. These consultations reconfirmed their original commitment for and interest in successful implementation of the project. Lastly, UNDP has been regarded as a trusted government partner even during the times of internal conflicts and their aftermath. UNDP's active role in project execution will contribute greatly to ensure continued commitment from and engagement of government agencies.

Table 5: Project risks

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan

The project will be monitored through the following M& E activities. The M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework in Part III, Section D of this project document is aligned with the UNDP M&E frameworks.

Project start: A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.
The Inception Workshop will address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project; Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team; Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
b) Based on the project results framework set out in Part III, Section D of this project document, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
e) Plan and schedule PB meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

Following the Inception Workshop, an **Inception Report** will be prepared as a key reference document. The Inception Report will serve as an Annex to the signed project document and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly: Project progress will be monitored through the UNDP Enhanced Results Based Management (ERBM) Platform. Based on the initial risk analysis submitted, a risk log will be regularly updated in ATLAS. Risks become critical when the impact and probability are high (more than 50%). Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot. Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually: Annual Project Performance Report (PPR) is an extensive key report which is prepared to monitor progress made since project start and in particular for the previous reporting period (on a rolling basis). UNDP will assess the quality of PPR through an external consultant, who reviews all PPRs prepared by UNDP-supported adaptation projects for completeness, comprehensiveness, analytical rigor and lessons learned.

The PPR includes, but is not limited to, reporting on the following: (a) Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative); (b) Project outputs delivered per project outcome (annual); (c) Lesson learned/good practice; (d) AWP and other expenditure reports; (e) Risk and adaptive management; (f) ATLAS QPR; (g) Portfolio level indicators are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits: UNDP CO and the UNDP APRC will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Members of the Project Steering Committee and Technical Advisory Group will join these visits as required. A Field Visit Report/BTOR will be prepared by UNDP for circulation no less than one month after the visit to the project team and PSC members.

Mid-term of project cycle: The project will undergo an independent Mid-Term Review at the mid-point of project implementation. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation, and provide an independent review of UNDP's role as an Executing Entity for this project. The Mid-term Review will highlight issues requiring decisions and actions and present initial lessons learned about project design, implementation and management to the PSC. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term Review will be prepared by the UNDP CO in partnership with the Government and based on guidance by APRC. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

End of Project: An independent Terminal Evaluation will take place three months prior to the final PSC meeting. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. It will also include an independent review of project implementation arrangements and their efficacy. The Terms of Reference for this evaluation will be prepared by the UNDP CO in partnership with the Government and based on guidance from the APRC.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (Objectives, Outcomes, Outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing: Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Audit: Project will be audited in accordance with UNDP Financial Regulations and Rules and applicable audit policies.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ Project Team ▪ UNDP CO	Indicative cost: $10,000	Within 2 months of project start
Measurement of Means of Verification of project results.	▪ UNDP CO/Project Manager will oversee the hiring of specific institutions and delegate responsibilities to relevant team members. ▪ Project Team, especially M&E Specialist	To be finalized in Inception Phase	Start, mid and end of project and annually when required.
Measurement of Means of Verification for Project Progress	▪ Oversight by Project Manager ▪ Project Team, especially M&E Specialist	To be determined as part of the Annual Work Plan	Annually prior to APR/PIR and definition of annual work plans
Annual Project Performance Report (PPR)	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Review	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC ▪ Independent external evaluators	Indicative cost: $20,000	At the mid-point of project implementation.
Terminal Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC ▪ Independent external evaluators	Indicative cost: $20,000	At least three months before the end of project implementation
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost $15,000	Yearly

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Visits to field sites[24]	▪ UNDP CO ▪ UNDP APRC (as appropriate) ▪ Government representatives	To be determined as part of the Annual Work Plan	Yearly for UNDP CO, as required by UNDP APRC
TOTAL indicative COST Excluding project staff time & UNDP staff / travel expenses		US$ 65,000	

Table 6. M & E Plan of the Project

D. Include a results framework for the project proposal, including milestones, targets and indicators.

The following table shows the detailed Results Framework, including project Outcomes, Outputs and measurable and verifiable Indicators.

[24] Monitoring visits of UNDP CO and APRC staff are covered by the MIE fee (see Annex A); monitoring visits of project staff are budgeted in the Project Execution Budget (see Annex B)

Project Strategy	Indicator	Baseline	Target at end of Project	Sources of Verification	Assumptions
Objective: To reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security.	% of households in target site implementing climate change adaptation livelihood measures introduced by the project	Current agricultural and livestock rearing practices among subsistence farmers are based on historical climatic conditions and trends and are unsuited to increased drought conditions that are becoming increasingly frequent in the Dry Zone in Myanmar	By the end of the project, at least 75% of impoverished farming households[25] or the landless, equivalent to approximately 32,400 households, benefit from and implement climate-resilient agriculture or livestock practice	Project evaluation and technical reports Field surveys	The communal agreement made between livestock management committee and community members about distribution of livestock offsprings is strictly followed Climate-resilient farming practices introduced by the project demonstrate large enough difference compared to non-climate-resilient practices
	% of Dry Zone farmers using climate risk information to adjust their livelihood behavior	Currently climate risk information on sudden onset of disasters is delivered only to those houses with TV/radio and yet the level of interpretation and response is low. The outreach and understanding of	At least 50% of all households in target location (based on random sampling), equivalent to 25,000 households, report that they have changed their livelihood behaviour based on climate risk information produced by the project	Periodic field surveys Quarterly and annual project reports	Seasonal climate risk information such as bulletins is produced and disseminated in a timely manner for farmers to adjust their behaviour
	% of Dry Zone farmers with access to early warning information on sudden onset of disasters	information on slow onset of disasters are even lower.	At least 90% of all households in target location, equivalent to 45,600, receive early warning in a timely manner.	Assessments during periodic mock drills Quarterly and annual project reports	Climate risks are properly captured and disseminated to township DHM and Disaster Preparedness Committees from the national authorities

[25] Impoverished households are defined as those with land-use rights but own less than 0.8 hectares.

OUTCOME 1. Continuous freshwater availability is ensured during the dry seasons in 280 villages in the Dry Zone	Number of Dry Zone farmers reporting increased freshwater availability during dry periods	74% of households in project targeted townships area currently face shortages of fresh water supply for domestic and agricultural use	At least 80% of households facing water shortages in 280 villages in the five project targeted townships report increased freshwater availability during dry periods	Project evaluation and technical reports Field surveys Project evaluation and technical reports	Governmental department, mainly, Department of Development Affair (DDA) will cooperate with local NGOs to perform water resources availability Higher-than-usual dry season rainfall during the implementation period do not distort perceptions of the farmers
Output 1.1.: Water capture and storage capacities in 280 villages enhanced to ensure sufficient fresh water supply during dry periods	Additional community-based freshwater supply and storage infrastructure put in place in drought-prone villages	0 additional freshwater supply and/or storage infrastructure in drought-prone villages to account for climate change-induced increases in drought	56 canals for water diversion constructed 70 small scale water pumping systems installed 70 communal water tanks (5000 gallon) incl. pipes installed 56 shallow tube wells constructed 150 communal ponds rehabilitated 9 deep tube wells 10 deep tube well to be fixed 1563-ha of land covered with terraces and soil storage dams	Project evaluation and technical reports Field surveys Quarterly and annual project reports	Government Ministers, line departmental staffs, local authorities (administrators) will continue to support in terms of in kind contribution and human resources expertises in water resources availability The project teams, local NGOs and line departments will mobilize women and female-headed households for income generation and soil-water conservancy measures activities.

Output 1.2.: 4,200 hectares of micro-watersheds are protected and rehabilitated through Farmer- Managed Natural Regeneration (FMNR) to increase natural water retention and reduce erosion	Hectares of watershed area protected through community-based afforestation, reforestation and regeneration practices	50 ha of natural forest conservation and community based reforestation practices in the critical watershed area in the project area	2,160 ha of natural forest conservation 680 ha of forest plantation on community-managed land 1,360 ha of tree planting activities on public land	Field survey and inventory Project evaluation and technical reports	Main responsible department, Forest Department will cooperate for community forestry establishment
Output 1.3.: Community-based agro-forestry plots are established on 5,100 hectares of private and communal lands to conserve soil and water	Hectares of land covered by systematic new agroforestry plantations	160 ha of traditonal agro-forestry home garden and 430 ha of farm boundary plantations currently exist in 280 villages in five targeted townships	1,700 ha of homestead gardening/agro-forestry plots established in 110 villages 3,400 ha of farm boundary plantations in 100 villages	Field assessment survey Quarterly and Annual reports Project evaluation and technical report	The village communities' willing to support to carry out the agro-forestry related activities at thier private and communal homestead garden continues throughout the course of the project
OUTCOME 2. Climate-resilient agricultural and livestock practices enhanced in Myanmar's Dry Zone	Number of climate-resilient agricultural/livestock practices demonstrated to support adaptation of vulnerable farmers	Agricultural and livestock practices and extension services in the Dry Zone do not take into account climate change risks.	By the end of the project, at least 5 discrete agricultural adaptation practices are demonstrated including resilient varieties, on-farm water management techniques, soil management practices, planting techniques, post-harvest processing, and diversified livestock rearing practices.	Field survey asessment Quarterly and Annual reports Project evaluation and technical reports	Myanmar Agrciultural Services (MAS) and Livestock Department continue their commitment to support agrciulture or livestock support activities and technical team and Local NGOs will collaborate with MAS/LD to carry out the tasks

Output 2.1. Drought-resilient farming methods introduced to farmers to enhance the resilience of subsistence agriculture in the Dry Zone	Number of Dry Zone farmers exposed to and involved in climate resilient farming techniques Accessibility to drought-resilient seed varieties Number of project and non-project community members participating in exchange visits and demonstration plots	In project target villages, farmers have not been exposed to climate-resilient farming techniques Only five seed banks are available in the target sites (one per each township) Currently there is no initiatives in the Dry Zone promoting cross exchange of practical knowledge on climate resilient farming techniques	By the end of the project, at least 12,600 households, extension workers and CSO/NGO members in the target villages are trained on climate-resilient farming methods At least 140 village-level research farm is operational At least 20% of community participants in exchange visits and farmers field demonstrations are from non-project target villages	Project evaluation and technical reports Field surveys Quarterly and annual project reports Participation lists during filed demonstrations	Improved varieties perform convincing productivity for farmers to adopt new varieties Volunteer farmers whose lands will be set up as a research farm continue their commitment that they indicated during the consultations
Output 2.2. Resilient post-harvest processing and storage systems introduced to reduce climate-induced post-harvest losses (droughts and floods)	Number of farmers who report reduced harvest losses due to improved post-harvest processing and storage	No farmers apply improved post-harvest processing techniques	80% of target households report reduced post-harvest losses through the use of improved processing and storage technology	Project evaluation and technical report Field Survey Quarterly and Annual Report	Continued support from MAS and Myanmar Agrciultural Machinery Development Association in the use of post harvest machines in cooperation with local NGOs
Output 2.3. Diversified livestock production systems are introduced in 6,300 households to buffer the effects of drought on rural livelihoods	Number of vulnerable households with increased diversity of livestock	Majority of impoverished farmers (either landless or those with less than 0.8 hectares of land) in the Dry Zone have zero or small number of livestock (the exact number will be updated during the inception phase of the project)	By the end of the project, at least 6300 vulnerable households have increased the diversity of livestock assets	Field survey Project evaluation and technical report	Local community enable to adopt cut and carry new system and receive training

OUTCOME 3. Timeliness and quality of climate risk information disseminated to Dry Zone farmers enhanced through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-term climate scenario planning	% of Dry Zone farmers using climate risk information to adjust their livelihood behavior % of Dry Zone farmers with access to early warning information on sudden onset of disasters	Currently climate risk information on sudden onset of disasters is delivered only to those houses with TV/radio and yet the level of interpretation and response is low. The outreach and understanding of information on slow onset of disasters are even lower.	At least 50% of all households in target location (based on random sampling), equivalent to 25,000 households, report that they have changed their livelihood behaviour based on climate risk information produced by the project At least 90% of all households in target location, equivalent to 45,600, receive early warning in a timely manner.	Periodic field surveys Quarterly and annual project reports Assessments during periodic mock drills Quarterly and annual project reports	Seasonal climate risk information such as bulletins is produced and disseminated in a timely manner for farmers to adjust their behaviour Climate risks are properly captured and disseminated to township DHM and Disaster Preparedness Committees from the national authorities
Output 3.1. Climate hazard maps and risk scenarios are developed in each township to support community-based climate risk management and preparedness planning	Number of climate risk communication products in active use by township authorities, NGOs and CBOs to improve planning decisions and prioritize investment actions	No climate risk communication products in active use by township authorities, NGOs and CBOs to improve planning decisions and prioritize investment actions	Climate hazard maps and risk scenarios are available in each township Climate hazard maps updated at least twice during the project lifecycle	Field survey in availability and application of hazard maps,use of instruments Local communities report on disaster risk preparedness plan Quarterly and Annual Evaluation Reoirt Porject evaluation and technical report	NGOs along with Government bodies such as DMH, Myanmar Agricultural Services (MAS) and Ministry of Environmental Conservation and Forestry (MOECAF) cooperate on long term climate risk management planning

Output 3.2. Local level climate and disaster risk management framework strengthened for timely and effective communication of climate risk and early warning information	Number of local institutions that issue regular warning and forecasting communications to community-based organisations and vulnerable farmers The number of climate related information materials produced to assist Dry Zone farmers to adjust their livelihood behavior	0. Currently no such information is available except weekly/monthly weather forecasts broadcasted over TV/radio	70 community based disaster risk management (CBDRM) committee are formed to relay climate early warning information from the Township DPC 5 Climate Risk Information sub-committee established within the Township Disaster Preparedness Committee At least six agro-meteorological bulletins; two early warning and disaster response bulletins/posters; four guidance notes on resilient agricultural/livestock practices produced	TORs and other official documents noting the establishment of CBDRM Committees and CRI Sub-Committees Quarterly and Annual Evaluation Reoirt Porject evaluation and technical report Quarterly and Anual Report	Continuous commitment from the government is present throughout the life of the project

◆ = milestone

◆ = gender disaggregated milestone

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	Programme Execution																
	Inception Workshop																
1.1	Water capture and storage capacities in 280 villages enhanced to ensure sufficient irrigation and potable water supply during dry periods																
	1.1.1. Establish a coordination platform with public institutions and development organizations (CBOs, NGOs) in each township to design and co-finance a simple network of technically and environmentally appropriate and complementary water harvesting, storage, filtering and retention structures to conserve water for dry periods and hold erosion in check																
	Identify specific locations in target villages for the following adaptation interventions: Canals for water diversion; small-scale pumping systems; communal water tanks; tube wells; pound reservoirs; and soil storage dams.		◆														
	1.1.2. In consultation with Village Water User Groups, revise/develop a water management scheme (including a conflict resolution mechanism and collection of user fees)																
	1.1.3. Organize technical trainings targeting Village Water User Groups on the maintenance and management of the water systems as well as periodic monitoring of effectiveness and usage for M&E																
	1.1.4. Organize awareness raising events targeting WUG and community members on climate risks, resilient water use, and participatory management of the water systems																
	Village-level management scheme formulated which includes the roles and responsibilities of VWUG and distribution agreement across (vulnerable) households		◆	◆													
	At least 50% of women's participation is encouraged to the workshops and participation monitored	◆	◆				◆	◆	◆						◆		
	1.1.5. In collaboration with Village Development Committees and VWUG, identify sources of local materials and local labour for construction of the water systems																
	1.1.6. Construction of the water systems according to the priorities and agreement under																
	Contribution of labour from women and/or landless impoverished households is facilitated			◆	◆	◆	◆	◆	◆								
	Production of a report on the success and challenges of micro-scale water infrastructure														◆		
1.2	4,200 hectares of micro-watersheds are protected and rehabilitated through Farmer- Managed Natural Regeneration (FMNR) to increase natural water retention and reduce erosion																
	1.2.1. Verification of target locations (pre-identified during the preparation phase) and selection of relevant tree species for conservation/regeneration/afforestation/reforestation in consultation with CFUG, farmer groups, Village Development Committees, foresters, etc.																
	Finalize village-wise intervention type and size based on the level of denudation, on-going surface runoff, and topography.		◆														

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	1.2.2. Facilitated by CFUG and Village Development Committees, finalize in-kind co-financing agreement with local communities participating in FMNR activities	■	■														
	1.2.3. In alignment with 1.1.4., organize workshops on climate risks and linkages of FMNR, erosion control, and natural water control	■	■				■	■	■						■		
	At least 50% of women's participation is encouraged to the workshops and participation monitored	◆	◆				◆	◆	◆						◆		
	1.2.4. Along with Activity 3.1.3., measure the preconditions of the micro-watersheds and integrate the information in the GIS system			■	■	■											
	1.2.4. Soil storage dams and check dams constructed; enrichment planting, improvement felling, pruning, ditch digging, and root cutting carried out in 116 villages for regeneration of existing vegetation cover and conserve remnant natural forests (engaging the bulk of landless labourers in the target area)			■	■	■	■	■	■	■	■						
	1.2.5. Afforestation and reforestation activities conducted covering 680 hectares of land			■	■	■	■	■	■	■	■						
	1.2.6. Tree planting in religious and school compounds, along dam boundaries, road sides and gaps in communal areas covering 1,360 hectares			■	■	■	■	■	■	■	■						
	1.2.7. Provide hands-on trainings to CFUG, farmer groups, village development committees, foresters, rangers and range officers on forest management (initially in alignment with the implementation schedule for 1.2.5 to 1.2.6.)			■	■	■	■	■	■	■	■			■	■		
	1.2.8. Facilitated by Forest Department and NGOs, and using outputs from Activity 3.1.1., formulate a community forestry management plan in line with CFI guidelines						■	■	■								
	Roles and responsibilities of women are clearly identified in the community management plans						◆	◆	◆								
	1.2.9. Undertake monitoring and training on adherence to the community forestry management plan					■				■				■			
	Production of a report on the success and challenges of community forestry management plan														◆		
	Initial 30-year land lease permission sought and granted for successfully managed community forests														◆	◆	
1.3	Community-based agro-forestry plots are established on 5,100 hectares of private and communal lands to conserve soil and water																
	1.3.1. Establish a small village-based agro-forestry group in each target village	■															
	Initial call for participation will target primarily women; at minimum, 50% of the member should be women	◆															
	1.3.2. Formulate a user-friendly template for community-led inventory of ongoing agro-forestry (agro-silviculture; agro-silvipasture; silvopasture) practices	■															
	1.3.3. Undertake a community-led inventory of agro-forestry practices, agro-silvopastural systems and non-timber forest utilization and development in 280 villages to be updated along with implementation progress, including economic benefits from the intervention	■	■	■					■				■				■

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	Information collected on ongoing practices will be gender-disaggregated		◆	◆													
	1.3.4. Based on the results of the inventory, community priorities and expert opinions, consult with communities on a locally suitable agro-forestry approach				■												
	1.3.5. Implement locally suitable agro-forestry techniques					■	■	■	■	■							
	1,700 hectare of homestead gardening in 110 villages established									◆							
	3,400 hectare of farm boundary planting in 100 villages established									◆							
	1.3.6. Provide trainings to agro-forestry groups, Village Development Committees, CFUGs and other CBOs on planning, implementation and management of small-scale, diversified agro-forestry systems and non-timber forest production techniques					■				■				■			
	1.3.7. Undertake exchange visits of community members for information sharing							■				■				■	
	Participants of the monitoring visits encourage women's participation							◆				◆				◆	
	Production of a report on the success and challenges of community forestry management plan														◆		
2.1	Drought-resilient farming methods introduced to farmers to enhance the resilience of subsistent agriculture in the Dry Zone																
	2.1.1. Organize training events on a range of climate-resilient farming methods targeting Dry Zone farmers and extension workers including drought-resilient crop varieties, optimization of plant population, weed control and crop husbandry techniques, and surface mulching		■	■	■					■	■	■					
	Organize a technical workshop to consolidate existing domestic and international knowledge on drought resilient crop varieties and seed banks inviting technical agencies such as Myanmar Agriculture Services, Univ. of Agriculture, Dept. of Agricultural Research		◆														
	2.1.2. Establish and transfer drought-resilient varieties from township agricultural research farms to village-level research farms in 140 villages			■	■	■	■	■									
	2.1.3. Establish a participatory, demonstration plots in 50 villages and undertake field trials of drought resistant crops and drip irrigation techniques to enable local dissemination and transfer of adaptation know-how			■	■	■	■	■									
	2.1.4. Organize exchange visits and farmer's field school involving project and non-project community members, staff from these institutions, agricultural extension officers, Township and District Administrations and NGOs					■				■				■			
	2.1.5. Produce at least one technical report capturing lessons learnt on the effectiveness of drought-resilient farming methods													■	■	■	
2.2	Resilient post-harvest processing and storage systems introduced to reduce climate-induced post-harvest losses (drought and floods)																

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	2.2.1. Undertake a participatory assessment to quantify the effects of existing practices and identify loss patterns from current post-harvest practices along the value chain of harvesting, threshing, drying, storing and processing																
	2.2.2. Based on the findings from Activity 2.2.1, provide 140 locally made, community-managed rice threshers to 140 villages in areas where post-harvest loss are highest to increase communal food security and price stability in flood-prone areas																
	Quantitative assessment of current post-harvest process undertaken and reported				◆	◆											
	Production of an assessment report						◆										
	2.2.3. Identify sources of locally-made rice threshers																
	Formulate a cost-sharing and maintenance plan in each village for the use of the thresher			◆													
	2.2.4. Construct 36 elevated harvest storage facilities which reduce post-harvest losses from erratic rainfall and flooding																
	2.2.5. Organize technical trainings targeting Agriculture Services officers, farmer groups/cooperatives, CBOs/NGOs on post-harvest handling techniques based on the results from Activity 2.2.1																
	Women's participation is encouraged and gender-disaggregated participation record will be produced							◆					◆				
	Production of an assessment report on the effectiveness of 2.2.4 and 2.2.5														◆		
2.3	Diversified livestock production systems introduced in 6,300 households to buffer the effects of drought on rural livelihoods																
	2.3.1. Organize training of trainers events targeting Livestock Department officers in diversified livestock rearing, improved fodder preparation and storage, rangeland management, disease control methods, fodder bank and livestock shelter practices																
	2.3.2. Organize at least 4 training events throughout the course of project in each village-tract aiming at a transfer of technical know-hows on climate-resilient livestock practices from Livestock Department officers to community members, CBOs and NGOs																
	At least 50% of the participants of the trainings should be women. Gender-disaggregated participant list will be produced.			◆				◆				◆				◆	
	2.3.3. Procure high productivity pigs with 62.5% drought tolerant gene; drought tolerant chicken; existing species of goats and sheep; and high-productivity goat/sheep species																
	2.3.4. Formulate a community agreement on benefit sharing from diversified and climate resilient livestock practice																
	2.3.5. Organize events that demonstrate participatory animal (cross) breeding to conserve essential buffer stocks during extreme events and maintain genetic diversity																
	Production of an assessment report on the effectiveness of diversified livestock production systems														◆		

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
3.1	Climate hazard maps and risk scenarios are developed in each township to support community-based climate risk management and preparedness planning																
	3.1.1. Synthesize available information on future climate in the Dry Zone (in collaboration with the CRI sub-committees)																
	3.1.2. Organize a training of trainers event, inviting a regional expert on participatory vulnerability assessments, targeting local NGOs, CBDRM and CRI members, DZGD and Department of Development Affairs																
	3.1.3. Carry out vulnerability assessments in township and rapid vulnerability assessments at each village tract																
	Vulnerability assessment will look at gender-differentiated vulnerabilities to climate risks			◆	◆	◆											
	3.1.4. Using the product from Activity 3.1.3., generate climate hazard, risk and vulnerability maps for all townships targeted under the project taking into account locally-specific socio-environmental conditions such as the extent of poverty, FMNR/micro-watershed management, access to small-scale water infrastructure, adoption of agro-forestry, and agro-silvo-pastural practices																
	3.1.5. Update the map at least twice during the course of the project taking into account the progress in Outcome 1 and 2																
	3.1.6. Organize town-hall meetings with township administrator, CRI sub-committees and other government departments, CBOs/NGOs, and community members, to discuss climate risk and hazard information and lessons learned from risk reduction measures into rural development planning and investment processes																
3.2	Local level climate and disaster risk management framework strengthened for timely and effective communication of climate risk and early warning information																
	3.2.1. Finalize operational procedures for the Climate Risk Information sub-committee in coordination with the Township Administrator's Office, DPC, Drought Monitoring Centre, member NGOs, and village-level CBDRM Committees																
	3.2.2. Organize a national level training targeting DHM at the national, division, district and township level officers on collection, analysis and communication of climate risk information; organize regional training targeting DHM and NGOs in producing climate risk information tailored for agricultural use																
	Seasonal agricultural bulletins produced					◆		◆		◆		◆		◆		◆	
	3.2.3. Formulate a TOR and communication protocol for CBDRM Committees in coordination with their respective Disaster Preparedness Committee at the township level and local NGOs, detailing the early warning information flow from DMH/Drought Monitoring Centre to CBDRM Committees through DPC																
	3.2.4. With support from local NGOs, form Community-based Disaster Risk Management Committees (CBDRM) in at least 70 villages																

		Year I				Year II				Year III				Year IV			
	Output / Activity	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
	CBDRM Committee will have women representatives and they will be assigned specific roles and responsibilities			◆	◆												
	3.2.5. Organize community level trainings on interpreting publicly available weather forecasts broadcasted through TV and radio; seasonal forecasts, agro-meteorological bulletins and communal hazard maps from CRI sub-committee; early warning information from DPC and CBDRM Committee																
	3.2.6. Establish linkages with national and regional information sources for the Climate Risk Information Sub-committees																
	3.2.7. Carry out early warning mock drills to test information flow from the national DMH and National Disaster Preparedness Central Committee, to division/district/township DPCs, to CBDRM Committees, and finally to villagers and practice evacuation (Output 3.1 will identify community evacuation centres as part of hazard map preparation process).																
	Programme Execution																
	PMU established and operational																
	Project staff recruited																
	Equipment procured, office established																
	PMU operational and managing programme implementation																
	Project Monitoring and Evaluation																
	Establishment of M&E systems including additional baseline data collection (where needed)																
	Inception report																
	Quarterly reports																
	Annual technical monitoring report																
	Meetings of National Project Steering Committee																
	Meetings of Technical Working Group																
	Meeting of National Environment Coordinating Committee																
	Mid-Term Evaluation																
	Final Project Evaluation																
	Project Terminal Report																
	Audits																

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[26]

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

H.E. U Win Tun, Minister of Forestry and Chairman of National Environment Conservation Committee, Ministry of Environmental Conservation and Forestry, Building 28, Nay Pyi Taw Republic of the Union of Myanmar. Ph: +9567405009; Email: env.myan@mptmail.net.mm	Date*:* *25 July 2012*

[14] Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans, and subject to the approval by the Adaptation Fund Board, I understand that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
 *Yannick Glemarec* Executive Coordinator UNDP/GEF	
Date: November 7, 2012	Tel. and email:undpef@undp.org
Project Contact Person: Yusuke Taishi (Green-LECRDS)	
Tel. And Email: +66-819493997; yusuke.taishi@undp.org	

LIST OF ANNEXES

ANNEX A: Project Budget and Disbursement Schedule

Award ID:	**tbd**	**Project ID:**	**tbd**
Award Title:			
Business Unit:			
Project Title:	Addressing Climate Change Risks On Water Resources And Food Security In The Dry Zone Of Myanmar		
PIMS no.	**4703**		
Implementing Partner:	**Ministry of Environment Conservation and Forestry (MoECAF)**		

Project Outcome/Atlas Activity	Responsible Party/ Impl. Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	Budget Note
OUTCOME 1: **Continuous freshwater availability is ensured during the dry seasons in 280 villages in the Dry Zone**	**UNDP**	**62040**	**AF**	72100	Contractual Services	521,722	623,017	724,314	217,832	2,086,885	A
				72300	Materials and Goods	432,173	518,608	605,043	172,869	1,728,693	B
				71600	Travel	62,497	72,696	82,895	31,899	249,987	C
				72800	IT Equipment	11,447	7,630	0	0	19,076	D
					Total Outcome 1	**1,027,839**	**1,221,951**	**1,412,252**	**422,600**	**4,084,642**	
OUTCOME 2. **Climate-resilient agricultural and livestock practices enhanced in Myanmar's Dry Zone**	**UNDP**	**62040**	**AF**	72100	Contractual Services	61,740	84,990	96,615	50,115	293,460	E
				72300	Materials and Goods	479,873	671,822	479,874	287,925	1,919,494	F
				71600	Travel	25,953	31,732	25,951	20,170	103,806	G
					Total Outcome 2	**567,566**	**788,544**	**602,440**	**358,210**	**2,316,760**	

OUTCOME 3. **Timeliness and quality of climate risk information dissemination to Dry Zone farmers enhanced through use of short-term seasonal forecasts, and longer-term climate scenario planning**	**UNDP**	**62040**	**AF**	72100	Contractual Services	12,350	14,820	17,290	4,940	49,400	H
				72300	Materials and Goods	460,180	204,660	0	0	664,840	I
				71600	Travel	16,940	18,428	19,916	12,476	67,760	J
					Total Outcome 3	**489,470**	**237,908**	**37,206**	**17,416**	**782,000**	
Project Execution Costs	**UNDP**	**62040**	**AF**	72100	Contractual Services	13,800	33,800	13,800	33,800	95,200	K
				71600	Travel	3,000	2,500	2,000	3,323	10,823	M
					Project Execution costs	16,800	36,300	15,800	37,123	**106,023**	
PROJECT TOTAL COST						**2,101,675**	**2,284,703**	**2,067,698**	**835,349**	**7,289,425**	

Contribution from the UNDP for programme cost in USD:

Human Resources	Year 1	Year 2	Year 3	Year 4	Total
M&E Yangon (SC-8 Yangon)	15,240	15,240	15,240	15,240	60,960
Forestry specialist (SC-8)	15,240	15,240	15,240	15,240	60,960
Soil Conservation and Water Harvesting specialist (SC-8)	15,240	15,240	15,240	15,240	60,960
Livestock specialist (SC-8)	15,240	15,240	15,240	15,240	60,960
Total					243,840

Budget Note

Project Item	Description of Cost Position	Subcontractor type/IT/Material/Travel/Miscellaneous
A	Contractual Services under Component 1	Contractual Services to Water Engineering Based NGOs; Contractual Services to Soil and Water Conservation NGOs; Contractual Services to Reforestation performed NGOs; Contractual Services to Agroforestry Based NGO
		Contractual service for a full time water engineer (stationed in Nyaung Oo Township) @ $15,240/year
B	Materials and Goods under Component 1	Materials for water Resources infrastructure (Output 1.1). Indicative costing is: $3,100 per water diversion canal; $2,400 per small scale pumping system; $2,800 per 5,000-galon water tank and pipes; $1,450 per shallow tube well; $40,000 per deep tube well; $1,500 for fixing one tube well; $1,150 for pond renovation; and average of $296/hectare of terraces and storage dams. Materials for micro-watershed rehabilitation and natural regeneration of forests (Output 1.2): $540/hectare of community forest establishment; $128/hectare of public tree planting. Materials for agroforestry (Output 1.3): $185/hectare of homestead garden; $62/hectare of farm boundary planting
		Printing of knowledge materials - $2,000
C	Travel under Component 1	Local NGOs travel to filed sites from Yangon (including local DSA and transportation)
D	IT Equipment under Component 1	15 computers, 6 printers and 6 copiers by subcontractors
E	Contractual Services under Component 2	Contractual service for Agriculture and Livestock based NGO; Contractual service for a full time agriculture specialist (stationed in Monywa Township) @ $15,240/year
F	Materials and Goods under Component 2	Improved seeds, fodders, and compost making materials for 5100 ha calculated at: $128/hectare for improved seed provision; $50/hectare for improved fodder variety; $44/hectare for compost and neem oil
		140 rice threshers to ensure food security and prevent from post harvest losses; Based on experts opinion from Agriculture and Industry Department, it is estimated that each thresher will cost approximately $3,000.
		Provision of diverse livestock to 6300 vulnerable households. Average cost per animal (goat, sheep, pig, and chicken) is $117.
		Printing of knowledge materials - $2,000

G	Travel under Component 2	Local NGOs travel to field sites from Yangon and duty stationed at respective townships
H	Contractual Services under Component 3	Contractual service for weather related handled NGO
I	Materials and Goods under Component 3	1 hazard map, 5 set of test and drilled materials for EWS
J	Travel under Component 3	Local NGOs travel from Yangon to field sites at respective townships
K	Contractual Services under Project Execution Cost	1 Project Manager, 2 Finance and Admin assistance, 2 drivers (Contractual Service) by AF; $20,000 for one international and one national evaluators in year 2 and 4 is earmarked for mid-term evaluation and terminal evaluation, respectively.
M	Travel	Financial support for domestic travel and international (as necessary) to conduct project M&E
N	Miscellaneous	Mandatory course for PMU staff

Disbursement schedule

	Upon Agreement signature	Upon signing of agreement for year 1 activities	Year 2	Year 3	Year 4	Total
Scheduled Date	January 2014	April 2014	April 2015	April 2016	April 2017	
Project Funds		**2,101,675**	**2,284,703**	**2,067,698**	**835,349**	7,289,425
Implementing Entity Fee	247,840	107,185	116,520	105,453	42,603	619,601
Total	**247,840**	**2,208,860**	**2,401,223**	**2,173,151**	**877,952**	**7,909,026**
	Tranche I		Tranche II	Tranche III	Tranche IV	

ANNEX B:

Breakdown and Apportionment of Project Execution Costs:

Recognizing UNDP's modus operandi in Myanmar and the positive track record of UNDP in delivering community-based projects in partnership with NGOs and CBOs, the Government of Myanmar has requested UNDP to implement the proposed AF project under the same institutional arrangements as previous community development projects in the Dry Zone. The accompanying letter of support by the Ministry of Environmental Conservation and Forestry (see Annex J) serves to explain and confirm this modus operandi, which is very specific to the development situation in Myanmar and not currently applicable to any other AF projects UNDP is engaged in.

With regards to measures mitigating any conflict of interest between UNDP's dual role as Multilateral Implementing Entity (safeguarding technical and financial accountability for AF resources) as well as Executing Entity (serving to execute this project at the request of the Government of Myanmar), it is important to note that this project will be implemented following the same stringent procedures as GEF-funded projects which are directly executed by a UN agency. UNDP's financial and accounting procedures segregate and demarcate the use of project execution costs at country level (which are used to deliver project Outputs and Outcomes) from the use of Implementing Agency fees (which are used to cover General Management Support Services and Specialized Technical Support Services that have been incurred across different organizational tiers of the organization, including UNDP's Asia-Pacific Regional Center and the UNDP/GEF Business Unit in New York).

In line with UNDP/GEF policy and procedures, and as reflected by different budget codes in UNDP's internal accounting system (Atlas), project funds and agency fees are therefore strictly separated and transferred to different business units in UNDP. It is not possible to use AF funds from the project budget for services that are covered by the MIE fee paid by the AF. While MIE fees (detailed in Annex C) are covering the costs of services that have enabled the development of this AF proposal and the continued technical and financial quality assurance of AF funds, project execution costs are required to manage AF-funded inputs to achieve the corresponding Outputs as per project document.

In the process of preparing this project document, decision B.17/6 by the Adaptation Fund Board has been discussed in detail with project partners as well as the Government of Myanmar. To comply with this decision, the project execution budget requested for from the Adaptation Fund was reduced to 1.48% of the total project/programme budget while increasing the allocation of UNDP's cash co-financing for project execution purposes.

A corresponding breakdown of project execution costs, which aims to reduce the AF contribution and apportions project execution costs across different funding sources, is provided in the table below.

Cost item	Year 1	Year 2	Year 3	Year 4	AF	UNDP	Total (US$)
Human Resources							
National Project Manager (NO-D)	27,600	27,600	27,600	27,600	55,200	55,200	110,400
Finance and Admin Assistant + Data Assistant (SC-5)	13,800	13,800	13,800	13,800	0	55,200	55,200
Two drivers (SC-2)	7,171	7,171	7,171	7,171	0	28,684	28,684
Mandatory courses	700	700	700	700	0	2,800	2,800
					55,200	**141,884**	**197,084**
Operation costs							
Local travel	16,500	16,500	16,500	16,500	0	66,000	66,000
Office supplies	3,000	3,000	3,000	3,000	0	12,000	12,000
Equipment and furniture	42,635	12,250	12,645	12,250	0	79,780	79,780
					0	**157,780**	**157,780**
M&E							
M&E related travel expenses	8,000	8,000	8,000	8,000	10,824	21,177	32,001
External evaluations (mid term and terminal)	0	20,000	0	20,000	40,000	0	40,000
Inception and PSC meetings	10,000	1,486	1,486	1,486	0	14,458	14,458
Audit costs	3,750	3,750	3,750	3,750	0	15,000	15,000
Communication	7,714	7,715	7,715	7,715	0	30,859	30,859
					50,824	**81,494**	**132,318**
Grand total					**106,024**	**381,158**	**487,182**

ANNEX C:

Multilateral Implementing Agency (MIE) Fees for Support to Adaptation Fund Project:

ADDRESSING CLIMATE CHANGE RISKS ON WATER RESOURCES AND FOOD SECURITY IN THE DRY ZONE OF MYANMAR

The implementing entity fee will be utilized by UNDP to cover its indirect costs in the provision of general management support and specialized technical support services. The table below provides a breakdown of the estimated costs of providing these services.

Category	Services[27] Provided by UNDP[28]	Estimated Cost of Providing Services[29]
Identification, Sourcing and Screening of Ideas	Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF). Engage in upstream policy dialogue related to a potential application to the AF. Verify soundness & potential eligibility of identified ideas for AF.	$ 30,980 (5%)
Feasibility Assessment / Due Diligence Review	Provide up-front guidance on converting general idea into a feasible project/programme. Source technical expertise in line with the scope of the project/programme. Verify technical reports and project conceptualization. Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against AF requirements. Determination of execution modality and local capacity assessment of the national executing entity. Assist in identifying technical partners. Validate partner technical abilities. Obtain clearances from AF.	$ 92,940 (15%)
Development & Preparation	Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project/programme. Source technical expertise in line with the scope of the project/programme needs.	$123,920 (20%)
	Verify technical reports and project conceptualization. Verify technical soundness, quality of preparation, and match with AF expectations.	

[27] This is an indicative list only. Actual services provided may vary and may include additional services not listed here. The level and volume of services provided varies according to need.
[28] Services are delivered through UNDP's global architecture and 3 tier quality control, oversight and technical support system: local country offices; regional technical staff; and headquarters specialists.
[29] The breakdown of estimated costs is indicative only.

Category	Services[27] Provided by UNDP[28]	Estimated Cost of Providing Services[29]
	Negotiate and obtain clearances by AF. Respond to information requests, arrange revisions etc.	
Implementation	Technical support in preparing TORs and verifying expertise for technical positions. Provide technical and operational guidance project teams. Verification of technical validity / match with AF expectations of inception report. Provide technical information as needed to facilitate implementation of the project activities. Provide advisory services as required. Provide technical support, participation as necessary during project activities. Provide troubleshooting support if needed. Provide support and oversight missions as necessary. Provide technical monitoring, progress monitoring, validation and quality assurance throughout. Allocate and monitor Annual Spending Limits based on agreed work plans. Receipt, allocation and reporting to the AFB of financial resources. Oversight and monitoring of AF funds. Return unspent funds to AF.	$ 278,821 (45%)
Evaluation and Reporting	Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting. Participate in briefing / debriefing. Verify technical validity / match with AF expectations of all evaluation and other reports Undertake technical analysis, validate results, compile lessons. Disseminate technical findings	$ 92,940 (15%)
Total		**US$ 619,601**

ANNEX D: Terms of Reference for key project staff and institutions

Terms of Reference for Project Steering Committee (PSC)

The Project Steering Committee will be formed to keep abreast of project progress and facilitate the implementation of the project, while direct implementation of the project and decisions regarding the allocation of resources and assistance under the project will be taken by UNDP as the implementing agency, in partnership with Government entities. The Project Steering Committee will:

- Facilitate the implementation of the project to achieve progress on time, on scope and on budget
- Review progress reports submitted by the Project Team and advice the project team to be able to run the project smoothly
- Liaise and coordinate between Union and Regional level government to be able to implement the project activities efficiently and effectively

Project Steering Committee Members:

- Country Director, UNDP
- Director-General, Planning and Statistics, Ministry of Environmental Conservation and Forestry
- Director-General, Dry Zone Greening Department, Ministry of Environmental Conservation and Forestry
- Director-General, Forest Department, Ministry of Environmental Conservation and Forestry
- Director-General, Environmental Department, Ministry of Environmental Conservation and Forestry
- Director-General, Water Resources and Utilization Department, Ministry of Agriculture and Irrigation
- Director-General, Department of Meteorology and Hydrology, Ministry of Transport
- National Project Manager, UNDP Myanmar
- Chair of the Environmental Thematic Working Group, Myanmar

Project Steering Committee Meetings:

The Steering Committee will meet quarterly throughout the lifetime of the project and may meet more often as required. A calendar of meetings will be developed at the project inception workshop.

Secretariat function:

UNDP will provide secretariat services for the Project Steering Committee by coordinating meetings, producing documentation and meeting minutes, managing correspondence, information management/dissemination and related tasks.

Documents will be made available to Steering Committee members at least one week (five working days) prior to the meeting. Minutes of the meetings will be prepared by UNDP. Members of the Steering Committee will share information with non-member stakeholders.

Draft Terms of Reference for Project Technical Advisory Group (TAG)

The Technical Advisory Group (TAG) will be formed to provide technical assistance and advice on technical issues to the Project Team (PT) and Project Steering Committee (PSC). The Technical Advisory Group will:

- Analyze technical gaps in the project and propose technical specifications to address them;
- Propose strategies to update and adjust technical elements of the project;
- Provide assistance and advice to the Project Team (PT) to correctly assess the technical feasibility of specific project activities and courses of action
- Provide quality assurance for technical documents and studies produced by the project

Project Technical Advisory Group Members:

- Representatives from Ministry of Environmental Conservation and Forestry
- Representatives from Ministry of Agriculture and Irrigation
- Representative from Ministry of Livestock Breeding and Husbandry
- Representative from Department of Meteorology and Hydrology, Ministry of Transport
- Donor Representatives
- Project Manager and Technical specialists, UNDP Myanmar
- Representatives from Farmer Groups and NGOs
- Representatives from Universities and Research Institutes
- Assistant Resident Representative, UNDP Myanmar
- Representatives from FAO and other UN agencies

Technical Advisory Group Meetings:

The Technical Advisory Group will meet quarterly throughout the lifetime of the project and may meet more often as required. A calendar of meetings will be developed at the project inception workshop.

Secretariat function:

UNDP will provide secretariat services for the Project Technical Advisory Group. This entails coordination of meetings, documentation of deliberations and meeting minutes, management of Group correspondence, information management/dissemination and related tasks. Preparatory documents will be made available to Technical Advisory Group members at least one week (five working days) prior to the meeting. Minutes of the meetings will be prepared by UNDP. Members of the Technical Advisory Group will share information with non-member stakeholders.

Terms of Reference for National Project Manager

Functional Title	National Project Manager
Post Level	NO-D level
Duty Station	Yangon with frequent visit to field sites
Duration of Assignment	**Till December 2013**, with possibility of extension

Under the overall guidance of the Senior Deputy Resident Representative and Assistant Resident Representative (Environment), and in close consultation with the UNDP Asia Pacific Regional Centre (APRC) and Technical Advisory Group, the National Project Manager will:

i. Prepare a strategic framework and operational guidelines and procedures including technical terms of Partnership and Partnership Cooperation Agreements for project interventions;
ii. Liaise and coordinate project activities with partners including NGOs and other UNDP projects working in the same or related sectors, and with relevant line departments to complement and support related initiatives in addressing watershed management and other priority concerns;
iii. Assist in assessing immediate and future training and extension needs related to watershed management, environmental conservation and socio economic development for communities, and measures to address these needs, including organising on the job training, seminars and workshops;
iv. Provide technical guidance and training to project staff in areas related to watershed management, food security with an emphasis on conservation and rehabilitation of dry land, and on planning, implementation and monitoring of field activities;
v. Prepare Terms of Reference for the recruitment of project staff, consultants and collaborating NGOs;
vi. Prepare work plans, monthly and quarterly reports, budget forecasts and revisions with monitoring and evaluation officer;
vii. Establish/Put in place a monitoring and evaluation system for optimum management of project activities that will be based on and/or compatible with the UNDP programme-wise M&E system and with Atlas requirements;
viii. Monitor and ensure cost-effective use of project resources meeting the achievement of objectives;
ix. Take overall responsibility for day to day project supervision and management; and
x. Represent in the Project Steering Committee.

Qualifications and experience

The incumbent should have a postgraduate degree in an Environment related field of expertise, including agriculture, forestry, or natural resources management and related field, with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives.

In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point) and proven ability to lead a large team and to plan and organize work productively with the team.
Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Water Engineering Specialist

Functional Title	Water Engineering Specialist
Post Level	SC-8
Duty Station	Nyaung Oo Township with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the Technical Advisors, M&E Unit and Technical Advisory Group, the water engineering specialist will:

i. In close collaboration with the implementing partners, facilitate in Participatory Planning Exercises in selected villages, the preparation of technical Terms of Partnership for agreed upon interventions, contribute technical assistance on planning issues related to the water resources availability, design, and management plans;
ii. Assess the current water resources availability status of project areas in Dry Zone area, monitor the progress and prepare analytical and critical reports including proposals for improvements in operation and the scope of programmes;
iii. Produce technical guidelines and support implementing partners on the formation of CBOs (i.e.Forest User Groups) that will ensure effective implementation of community based water resources scheme and water resources mapping programmes and build the capacity of local NGOs and CBOs in water resources management scheme
iv. Conduct policy dialogue with governments that may be deemed necessary to create the enabling environment for improved delivery of water supply services;
v. Liaise with technical departments and research institutions, studying ways of introducing applied research results and disseminate the results in the project area;
vi. Assist the implementing partners in the establishment of community based irrigation system and demonstrations in the project townships and the design of technical packages for implementation and provide technical guidance to soil conservation and water harvesting;
vii. Collect, compile and analyze data from each of the project technical areas and support the project management in presenting recommendations to the Project manager/Steering Committee for improvements in implementation;
viii. Liaise with project implementing unit and undertake visits to monitor project outputs and benefits, provide technical assistance in order to ensure that progress is made in the achievement of project objectives;
ix. Contribute to preparation of monitoring tools and evaluation design/plan for the participatory water resource scheme to design a network of environmentally, locally and technically relevant measures for programmes. Including supporting the analysis of monitoring information to assess process and progress against objectives, support learning and the identification of areas for modification and opportunities for further developments;
x. Provide overall assessment report of the available and potential water resources s status of project area in the first three months of the project period;
xi. Prepare monthly and quarterly monitoring reports and an-end of assignment report;
xii. Analyze township reports in terms of problems and actions needed and submit consolidated progress report to the National Project Manager;
xiii. Undertake any other assignment given by the Project Manager.

Qualifications and experience

The incumbent should have a Bachelor degree in social science, economics, environment and development studies and related field of expertise with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives and environment concerned. Master degree for above subject is desirable but not mandatory. In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point). Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Soil Conservation and Water Harvesting Specialist

Functional Title	Soil Conservation and Water Harvesting Specialist
Post Level	SC-8
Duty Station	Nyaung Oo Township with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the Technical Advisors and Technical Advisory Group, the Soil Conservation and Water Harvesting specialist will:

i. In close collaboration with the implementing partners, take the lead in Participatory Planning Exercises in selected villages, the preparation of technical Terms of Partnership for agreed upon interventions, provide guidance on planning issues related to the development of soil conservation and water harvesting and take overall responsibility for the preparation of community based subwatershed management plans in the township;
ii. Develop sector policy and strategy in consultation with National Project Manager and Technical Advisors;
iii. Liaise with technical departments and research institutions, studying ways of introducing applied research results and disseminate the results in the project area;
iv. Assist the implementing partners in the establishment of small scale irrigation and demonstrations in the project townships and the design of technical packages for implementation and provide technical guidance to soil conservation and water harvesting;
v. Conduct technical trainings, prepare technical manuals in selected subject areas and disseminate information, education, communication materials (IEC) to target beneficiaries, NGOs and CBOs;
vi. Take responsibility for the preparation of annual and quarterly work plans and budgets together with contributions from CBOs and NGOs;
vii. Prepare monthly and quarterly monitoring reports and an-end of assignment report;
viii. Facilitate the timely and sequential provision of required technical inputs in support of Township Plans;
ix. Analyze township reports in terms of problems and actions needed and submit consolidated progress report to the National Project Manager.
x. Ensure a high standard of quality control is applied to the related activities;
xi. Undertake other duties as assigned by the National Project Manager.

Qualifications and experience

The incumbent should have a Bachelor Degree in an Environment related field of expertise, including agriculture, forestry, or natural resources management, environmental engineering, or water management with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives. Master degree for above subject is desirable but not mandatory. In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point).
Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Monitoring and Evaluation Officer

Functional Title	Monitoring and Evaluation Officer
Post Level	SC-8
Duty Station	Yangon with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the UNDP M&E Unit, the Monitoring and Evaluation (M&E) Officer will:

i. Develop effective M&E system to be able to use implementing partners and project;
ii. Test and develop M&E tools, approaches and databases as part of the programme M&E system;
iii. Ensuring that M&E data are readily available, to the National Project Manager, technical specialists, the country office and to other stakeholders;
iv. Ensuring adequate feedback to/from beneficiaries on data and analyses;
v. Maintain work plans, reports and budgets of the micro project proposals;
vi. Prepare and share monthly and quarterly and annual monitoring report to Project Manager (PM) and concern stakeholders;
vii. Advise implementing partners on their own internal M&E systems;
viii. Provide technical assistance to implementing partners to ensure participation in the project M&E process and an adequate flow of information and data;
ix. Routinely monitoring the project progress, activity results and outcomes, and adjustments
x. reflecting changing circumstances;
xi. Routinely visiting project sites for the purposes of progress and performance monitoring. Attending relevant technical meetings and maintaining contacts with all stakeholders, whether in Yangon or in the field;
xii. Promoting information sharing on all aspects related to his/her field of activity among stakeholders;
xiii. Providing support to the project manager to enhance project delivery; and other duties as assigned by the National Project Manager.

Qualifications and experience

The incumbent should have a Bachelor degree in an Environment related field of expertise, including social science, statistics and related field of expertise with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives. Master Degree for above subject is desirable but not mandatory. In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point). Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Livestock and veterinary specialist

Functional Title	Livestock Specialist
Post Level	SC-8
Duty Station	Monywa Township with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the Technical Advisors and Technical Advisory Group, the Fishery and Livestock Specialist will:

i. In close collaboration with the implementing partners, take the lead in Participatory Planning Exercises in selected villages, the preparation of technical Terms of Partnership for agreed upon interventions, provide guidance on planning issues related to the development of fishery and livestock and take overall responsibility for the preparation of community based fishery and livestock plans in the township;
ii. Develop sector policy and strategy in consultation with National Project Manager and Technical Advisors;
iii. Liaise with technical departments and research institutions, studying ways of introducing applied research results and disseminate the results in the project area;
iv. Assist the implementing partners in the establishment of livestock and fishery activities and demonstrations in the project townships and the design of technical packages for implementation;
v. Provide technical guidance to implementing partners particularly in fodder management, promoting improved animal husbandry and health, aquaculture, designing integrated technological packages, designing and implementing on-farm experimentation and livestock and fishery extension;
vi. Conduct technical trainings, prepare technical manuals in selected subject areas and disseminate information, education, communication materials (IEC) to target beneficiaries, NGOs and CBOs;
vii. Take responsibility for the preparation of annual and quarterly work plans and budgets together with contributions from CBOs and NGOs;
viii. Prepare monthly and quarterly monitoring reports and an-end of assignment report;
ix. Review the availability and potential of national technical service providers that might be subcontracted to provide technical/ training inputs;
x. Facilitate the timely and sequential provision of required technical inputs in support of Township Plans;
xi. Analyze township reports in terms of problems and actions needed and submit consolidated progress report to the National Project Manager;
xii. Ensure a high standard of quality control is applied to the related activities; and
xiii. Undertake any other assignment given by the Project Manager.

Qualifications and experience

The incumbent should have a Bachelor Degree in either fishery or livestock and related field of expertise, including fishery, zoology or veterinary, with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives. Master Degree for above subject is desirable but not mandatory. In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point).
Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Environment and Forestry Specialist

Functional Title	Environment and Forestry Specialist
Post Level	SC-8
Duty Station	Nyaung Oo Township with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the Technical Advisors and Technical Advisory Group, the Environment and Forestry Specialist will:

i. In close collaboration with the implementing partners, take the lead in Participatory Planning Exercises in selected villages, the preparation of technical Terms of Partnership for agreed upon interventions, provide guidance on planning issues related to the development of environment and forestry and take overall responsibility for the preparation of community based sub watershed management plans in the township;
ii. Develop sector policy and strategy in consultation with National Project Manager and Technical Advisors;
iii. Provide technical guidance to implementing partners and fully comprehend the sector policy guideline and Terms of Partnership for all technical subject areas;
iv. Liaise with technical departments and research institutions, studying ways of introducing applied research results and disseminate the results in the project area;
v. Assist the implementing partners in the establishment of natural resources activities and demonstrations in the project townships and the design of technical packages for implementation and provide technical guidance on biodiversity conservation, decentralized nursery, community forest plantation, natural forest management, agro-forestry, energy efficiency and forestry extension;
vi. Provide technical guidance and facilitate the implementing partners in the field of promoting environmental sanitation and community ecotourism;
vii. Conduct technical trainings, prepare technical manuals in selected subject areas and disseminate information, education, communication materials (IEC) to target beneficiaries, NGOs and CBOs;
viii. Take responsibility for the preparation of annual and quarterly work plans and budgets together with contributions from CBOs and NGOs;
ix. Prepare monthly and quarterly monitoring reports and an-end of assignment report;
x. Review the availability and potential of national technical service providers that might be subcontracted to provide technical/ training inputs;
xi. Facilitate the timely and sequential provision of required technical inputs in support of Township Plans;
xii. Analyze township reports in terms of problems and actions needed and submit consolidated progress report to the National Project Manager;
xiii. Ensure a high standard of quality control is applied to the related activities; and
xiv. Undertake any other assignment given by the Project Manager.

Qualifications and experience

The incumbent should have a Bachelor Degree in an Environment related field of expertise, including agriculture, forestry, or natural resources management, with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives. Master Degree for above subject is desirable but mandatory. In addition, the incumbent should have excellent

command of MS Office suite applications (Word, Excel, Access, and Power Point). Excellent oral and written command of English and Myanmar language is required.

Terms of Reference for Agricultural Specialist

Functional Title	Agriculturist
Post Level	SC-8
Duty Station	Monywa Township with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall guidance of the National Project Manager and in close consultation with the Technical Advisors and Technical Advisory Group, the Agriculturist will:

i. In close collaboration with the implementing partners, take the lead in Participatory Planning Exercises in selected villages, the preparation of technical Terms of Partnership for agreed upon interventions, provide guidance on planning issues related to the development of agriculture and take overall responsibility for the preparation of community based sub-watershed management plans in the township;
ii. Develop sector policy and strategy in consultation with National Project Manager and Technical Advisors;
iii. Liaise with technical departments and research institutions, studying ways of introducing applied research results and disseminate the results in the project area;
iv. Provide technical guidance to implementing partners in all project townships in subjects relating to the specialists technical skills and competence for livelihood support activities;
v. Assist the implementing partners in the establishment of sustainable agriculture practices and demonstrations in the project townships and the design of technical packages for implementation and provide technical guidance to livelihood support particularly in the field of;
   - environmental friendly income generation,
   - small scale irrigation and composed making,
   - environmental friendly agriculture practices(i.e., Sloping Agricultural Land Technology),
   - organic farming and Integrated Pest Management (IPM),
   - agro-forestry
vi. Conduct technical trainings, prepare technical manuals in selected subject areas and disseminate information, education, communication materials (IEC) to target beneficiaries, NGOs and CBOs;
vii. Take responsibility for the preparation of annual and quarterly work plans and budgets together with contributions from CBOs and NGOs;
viii. Prepare monthly and quarterly monitoring reports and an-end of assignment report;
ix. Review the availability and potential of national technical service providers that might be subcontracted to provide technical/ training inputs;
x. Facilitate the timely and sequential provision of required technical inputs in support of Township Plans;
xi. Analyze township reports in terms of problems and actions needed and submit consolidated progress report to the National Project Manager;
xii. Ensure a high standard of quality control is applied to the related activities; and
xiii. Undertake any other assignment given by the Project Manager.

Qualifications and experience

The incumbent should have Bachelor's degree in an Environment related field of expertise, including agriculture or natural resources management, with at least 5 to 7 years of experience in the sector, including in rural/community development initiatives. Master's degree for above subject is desirable but not mandatory. In addition, the incumbent should have excellent command of MS Office suite applications (Word, Excel, Access, and Power Point). Excellent oral and written command of English and Myanmar language is required.

Term of Reference for Project Assistant

Functional Title	Project Assistant
Post Level	SC-5
Duty Station	Yangon with regular visits to all project areas and villages
Duration of Assignment	Till December 2013, with possibility of extension

Under the overall supervision by the National Project Manager, the Project Assistant provides financial and administration support services ensuring high quality, accuracy and consistency of work. The Project Assistant works in close collaboration with the DEX Service Team, programme and project staff of other HDI projects in the CO as required exchanging information and supporting programme delivery.

The Project Assistant will be responsible for the following tasks.

1. Support to the management of the Dry Zone Conservation and Rehabilitation project;
   i. Maintain proper control over various financial records such as commitments and expenditures against budgeted amounts; initiate actions related to the following: general financial information, and travel payments, and procurement transactions;
   ii. Undertake in the preparation of budget, accounting, financial reports, statistical reports and other reports as required;
   iii. Prepare cash forecast for project and operations in monthly basic, and budget revisions;
   iv. Extract and input data from various sources in financial or accounting systems;
   v. Provide assistance to all staff services such as travel, expense claims, document retrieval, etc;
   vi. Assess project budgets and advice projects on budget status and suggest implementing partners to utilize budgets based on approved budget lines;
   vii. Advice projects on the status of project agreements and compliance to donor requirements, and reporting.

2. Administrative support to the project:
   i. Liaise and follow-up with relevant counterpart departments on administrative and programme matters;
   ii. Prepare correspondence to/from field in English-local language, relevant departments, implementing partners, UNDP Units, and UN agencies;
   iii. Produce correspondence and other documents including reproduction by copiers;
   iv. Receive and direct visitors; receive and direct incoming calls and visiting staff; receive and deliver telephone messages for staff on missions;
   v. Maintain incoming and outgoing correspondence register and track circulation of letters and memos; maintain up to date chronological files and office files in a systematic manner;
   vi. Assist in monitoring the use of office equipment, furniture, machinery and other inventory and ensure timely service and repairs, in coordination with DEX Service Team;
   vii. Provide administrative support to organization of conferences, workshops, retreats and other events;
   viii. Prepare routine correspondence, faxes, memoranda and reports in accordance with CO guidelines;
   ix. Document project and technical meeting, keep record of attendance, keep minutes of meetings, and keep tract and follow up submission of relevant reports;

x. Extract, input, copy, and file data from various sources;
xi. Check documents, field reports and plans for completeness, inform and follow up missing sections/attachments when necessary;
xii. When necessary assist projects on data base access/entry, PMIS, monitoring and reporting;
xiii. Maintain files in the project office/hardcopy and electronic filing of all supporting documentation, project documents;
xiv. Coordinate with DEX Team for procurement of logistics needs;
xv. Ensuring availability logistics for Yangon-based staff travel, meetings, and trainings;
xvi. Ensure field staff follows the procedures for travel and Security clearances;
xvii. Assist in proper control of supporting documents for payments and financial reports for DEX projects;
xviii. Any other duties assigned by the National Project Manager.

Qualifications and experience:

The incumbent should have a Bachelor's degree with at least 3 to 5 years of financial/administrative/secretarial experiences with development projects. Degree in Business Administration, Accounting or Finance is preferable but not mandatory. Experience with international organization is an asset. Experience in the use of Microsoft Office package (MS Word, Excel, etc.) is essential. The candidate will be able to communicate in English and Myanmar, both written and spoken and pro-activeness and ability to work as a team and under pressure an asset.

ANNEX E:

Consultative Meetings held during the project preparation phase

After the approval of the concept by the AF Board in December 2011, a series of consultation meeting with communities, government agencies, UN agencies, the private sector, and other development agencies took place in preparation for the full project proposal. This was led by a team of five specialists from UNDP (including specialists in Environment and Forestry, Agriculture, Livestock breeding and veterinary, and socio-economy) supported by government agencies at the national and township level, most notably MoECAF. The meetings were used, first and foremost, to present the proposed adaptation interventions to communities (over and above the initial consultations during the concept formulation stage) to seek their views, concerns, and buy-ins. In this regard, the team met with the representatives from all village-tracts in the target townships as well as a number of selected village representatives. In these meetings, community members were grouped into men, women and elderly to seek different perspectives and focus group discussions were undertaken. Secondly, as a result of these consultations, project target villages and households were refined further based on primary data collected from all 1,200 villages in five targeted townships through questionnaires as well as secondary information available. From 1,200 villages, final 280 villages that will be targeted under this project were identified based on water availability for domestic and agricultural use, livestock ownership, agro-forestry practice, and other socio-economic characteristics.

A series of meetings also took place with government agencies at the national, division, district and township level to verify technical standards of proposed adaptation intervention, baseline information, and finalize financial and in-kind contributions from these agencies (See Annex J for government financial contributions that were finalized during these consultations). It is also important to note that the formulation team consulted with Township Administrators and Division/Region Chief Ministers with regards to the potential integration of project lessons learned into respective township development planning.

The meetings that took place during the project formulation phase are presented in tabeles below.

18-21 March 2012: Nyuang Oo and Monywa Townships		
Nr	Stakeholders	Remark
1	Farmers and livestock groups in target townships	Nyaung Oo and Monywa Township
2	District and Township Administrators	Ministry of Home Affair
2	Dry Zone Greening Department (DZGD)	Ministry of Environmental Conservation and Forestry (MoECAF)
3	Forest Department (FD)	
4	Livestock Breeding and Veterinary Department	Ministry of Livestock and Fisheries
5	University of Veterinary Science	
6	Department of Meteorology and Hydrology (DMH)	Ministry of Transport (MoT)
7	Drought Monitoring Centre	
8	Planning Department	Ministry of National Planning and Economic Development (MNPED)
9	Department of Development Affair	Ministry of Boarder Area Development

10	Land Settlement and Record Department	Ministry of Agriculture and Irrigation (MoAI)
11	Myanmar Agriculture Service	
12	Irrigation Department	
13	Department of Agricultural Industry	
	Agricultural Research	
14	Cultural Department	Ministry of Culture
15	ADRA	Local NGO
16 17 18 19	World Vision Pact Myanmar GRET IDE	International NGOs
20	Royal Tree Services	Private Company
21	CP livestock Companies	
22 23 24	WFP UNDP UN-HABITAT	UN agencies

14-19 May 2012: Magway, Mandalay, and Sagaing Divisions; Nyaung Oo and Monywa Townships; Village communities		
Nr	Stakeholders	Remark
1	Magway Division/Region Chief Minister	During the period of 14th and 18th May
2	Mandalay Division/Region Chief Minister	Technical Advisor from APRC
3	Sagaing Divison/Region Chief Minister	Participated in this period
4	Mining and Forestry Minister	Magyaw Division
5	Mining and Forestry Minister	Mandalay Division
6	Mining and Forestry Minister	Sagaing Division
7	Agricultural Minister	Sagaing Division
8	Agricultural Minister	Mandalay Division
9	Farmers and livestock groups in target townships	Nyaung Oo and Monywa Township
10	District and Township Administrators	Ministry of Home Affair
11	Dry Zone Greening Department (DZGD)	Ministry of Environmental Conservation and Forestry (MoECAF)
12	Forest Department (FD)	
13	Livestock Breeding and Veterinary Department	Ministry of Livestock and Fisheries
14	University of Veterinary Science	
15	Department of Meteorology and Hydrology (DMH)	Ministry of Transport (MoT)
16	Drought Monitoring Centre	
17	Planning Department	Ministry of National Planning and Economic Development (MNPED)
18	Department of Development Affair	Ministry of Boarder Area Development
19	Land Settlement and Record Department	Ministry of Agriculture and Irrigation (MoAI)
20	Myanmar Agriculture Service	
21	Irrigation Department	
22	Department of Agricultural Industry	
	Agricultural Research	
23	Cultural Department	Ministry of Culture

24	ADRA	Local NGO
25 26 27	World Vision Pact Myanmar IDE	International NGOs
28	Royal Tree Services	Private Company
29	CP livestock Companies	
30	Shwe Tha Naung Paddy and Cereal crops Company	
31 32 33	WFP UNDP UN-HABITAT	UN agencies

Participant List of National Level Consultation meeting on "Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar" Ministry of Environmental Conservation and Forestry and UNDP jointly held the meeting at 18th May, 2012 is presented below.

1. Representatives from ministries

Sr.	Ministries	Department
1	Ministry of Environmental Conservation and Forestry (MoECAF)	Minister
		Planning and Statistics Department
		Forest Department
		Dry Zone Greening Department
		Forest Research Institute
2	Ministry of Agriculture and Irrigation	Department of Agriculture Research
		Irrigation Department
		Settlement and Land Record Department
		Myanmar Agriculture Services
		Water resources Utilization Dept.
		University of Agriculture
3	Ministry of Livestock and Fishery	Livestock Breeding and Veterinary Department
		University of Veterinary Science
4	Ministry of Transport	Department of Meteorology and Hydrology
5	Ministry of Boarder Area Development	Department of Development Affairs
6	Ministry of National Planning and Economic Development	Planning Department
7	Ministry of Science and Technology	Science and Technology research section
8	Ministry of Commerce	Myanmar Agricultural produce Trade

2. Representatives from donors and technical cooperation agencies

Sr.	Agencies
1	Australian Government Overseas Aid Program - AusAID
2	Swiss International Development Agency- SIDA
3	Department for International Development - DFID
4	Norwegian Government
5	Japan International Cooperation Agencies (JICA)
6	Regional Community Forestry Training Centre For Asia and Pacific (RECOFTC)

3. Representatives from Technical Expert, Practitioners, and Development Actors

Sr.	Organizations
1	Renewable Energy Association Myanmar (REAM)
2	Social Vision Services (SVS)
3	Swan Yee Development Foundation
4	Capacity Building Initiative (CBI)
5	Community Development Association (CDA)
6	Ecology and Economic Development Company Limited- ECODEV
7	Ecosystem Conservation and Community Development Initiative (ECCDI)
8	Ever Green Group (EGG)
9	Farm Business Development Technical Group
10	Forest Resource Environment Development and Conservation Association (FREDA)
11	Golden Plain Agri-Business Consultants Group
12	Mangrove Environmental Rehabilitation Network (MERN)
13	Mangrove Service Network (MSN)
14	Metta Development Foundation
15	Mingalar Myanmar
16	Myanmar Egress
17	Myanmar Agro Action
18	Myanmar Engineering Society
19	Myanmar Environment Institute
20	Myanmar Green Network
21	Myanmar NGO Network
22	Network Activities Group (NAG)
23	Pioneer Post Harvest Development Group
24	Water, Research and Training Centre (WRTC Myanmar)
25	SHALOM (NYEIN) Foundation
26	Thaddar
27	Water, Research and Training Centre –WRTC
28	Solidarities
29	Spectrum
30	Biodiversity and Nature Conservation Association (BANCA)
31	Wildlife Conservation Society (WCS)
32	World Concern
33	Action Aids
34	Care Myanmar
35	Save the Children
36	Istituto Oikos
37	Oxfam
38	HelpAge
39	International Development Enterprise (IDE)
40	AVSI Foundation
41	PACTMyanmar

4. Representatives from UN agencies

Sr.	Agencies
1	UNDP
2	FAO
3	UNICEF
4	UNWFP
5	UNHABITAT

5. Representatives from private sectors

Sr.	Agencies
1	CP Livestock Company
2	Myanmar Awba Agriculture Company
3	Royal Tree Services
4	Magway pulses Merchant Association
5	Shwebo Paddy Merchant Association
6	Monywa Merchant Association
7	Shwe Hta Naung company (Magway)

6. Representatives from media

Sr.	Media
1	MRTV 4
2	Yadanar Bon Newspaper

7. Representatives from cottage industries and local peoples from Dry Zone

Sr.	Categories	
1	Cottage Industries	A1- stove factory makers (Chaung U, Kokogwa Village-Taung Twin Gyi and Min Hla)
		Representatives from other cottage industries
		Representatives from CSOs

8. Representatives from honourable guests

Sr.	Name
1	U Soe Myint (Retired DG) company
2	U Than Daing (Retired Manager), Ministry of Livestock and Fishery
3	U Hoke San (Retired Manager), Water Resource Utilization, Ministry of Agriculture and Irrigation
4	U Nay Win Paw (Technical Specialist), Soil Conservation and Water Harvesting

ANNEX F:

Resources used in the preparation of this AF proposal

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ANNEX G:

List of Abbreviations

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
AF	Adaptation Fund
APR/PIRs	Annual Project Review/Project Implementation Reports
APRC	Asia Pacific Regional Center
ASEAN	The Association of Southeast Asian Nations
ATLAS	Automatically Tuned Linear Algebra Software
AWP	Annual Work Plan
BANCA	Biodiversity and Natural Conservation Association
CA	Conservation Agriculture
CBD	Convention on Biological Diversity
CBDRM	Community-based Disaster Risk Management
CBNRM	Community-based Natural Resource Management
CBOs	Community Based Organizations
CD	Country Director
CFUG	Community Forest User Groups
CPRs	Common Pool Resources
DAR	Department of Agricultural Research
DDA	Department of Development Affairs
DEX	Direct Execution
DMH	Department of Meteorology and Hydrology
DRR	Disaster Risk Reduction
DRR-WG	Disaster Risk Reduction Working Group
DZGD	Dry Zone Greening Department
ERBM	Enhanced Results Based Management
ERC	Evaluation Resource Center
ETWG	Environment Thematic Working Group
FAO	Food and Agriculture Organization of the United Nations
FD	Forest Department
FMNR	Farmer- Managed Natural Regeneration
FREDA	Forest Resource Environment Development and Conservation Association
FSWG	Food Security Working Group
HFA	Hyogo Framework for Action
IDE	International Development Enterprise
IHLCA	Integrated Household Living Conditions Assessment
INGO	International Non-governmental Organization
IPM	Integrated Pest Management
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction
MAS	Myanmar Agriculture Service
MBNS	Myanmar Bird and Nature Society
MDGs	Millennium Development Goals

MERN	Mangrove Environmental Rehabilitation Network
MNPED	Ministry of National Planning and Economic Development
MoAI	Ministry of Agriculture and Irrigation
MOECAF	Ministry of Environmental Conservation and Forestry
MoT	Ministry of Transport
NAPA	National Adaptation Programme of Action
NGO	Non-governmental Organization
NSDS	National Sustainable Development Strategy
NTFP	Non-Timber Forest Products
PSC	Project Steering Committee
PONREPP	Post Nargis Recovery Preparedness Plan
PPR	Project Progress Reports
PSD	Planning and Statistics Department
REAM	Renewable Energy Association Myanmar
RIMES	Regional Multi-Hazard Early Warning system
SALT	Sloping Agricultural Land Technology
SVS	Social Vision Services
TAG	Technical Advisory Group
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNDP APRC	Asia-Pacific Regional Centre of United Nations Development Programme
UNDP CO	United Nations Development Programme Country Office
UNDP RCU	UNDP Regional Co-ordination Unit
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-HABITAT	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
WCS	Wildlife Conservation Society
WFP	World Food Programme
WHO	World Health Organization
WRTC	Water, Research and Training Centre
YAU	Yezin Agriculture University

ANNEX H:

List of Potential Species to be used in Agro-forestry plantations and homestead gardens in the Dry Zone

Common Name	Scientific Name
1. Banana	*Musa Spiantum*
2. Buu	*Lagenaria siceraria*
3. Chin Paung	*Hibiscus sabdariffa*
4. Gwe Dauk	*Dregea volubilis*
5. Hnin Nu New	*Amarantus gargeticus*
7. Guava	*Psidium guajava*
8. Egg Plant	*Solanum melongena*
9. Chili	*Capsicum annum*
10. Coconut	*Cocos nucifera L*
11. Coriander	*Corianderum sativum*
12. Sue Poke	*Acacia intsia*
13. Mango	*Mangifera indica L.*
14. Papaya	*Carica papaya*
15. Ocimum	*Ocimum americanum*
16. Lime	*Citrus aurantifolia (Christm.)*

List of tree species commonly grown in Dry Zone Area with potential to be planted and improved for soil water conservation, fodder, firewood and fruits and for other multi-purpose uses

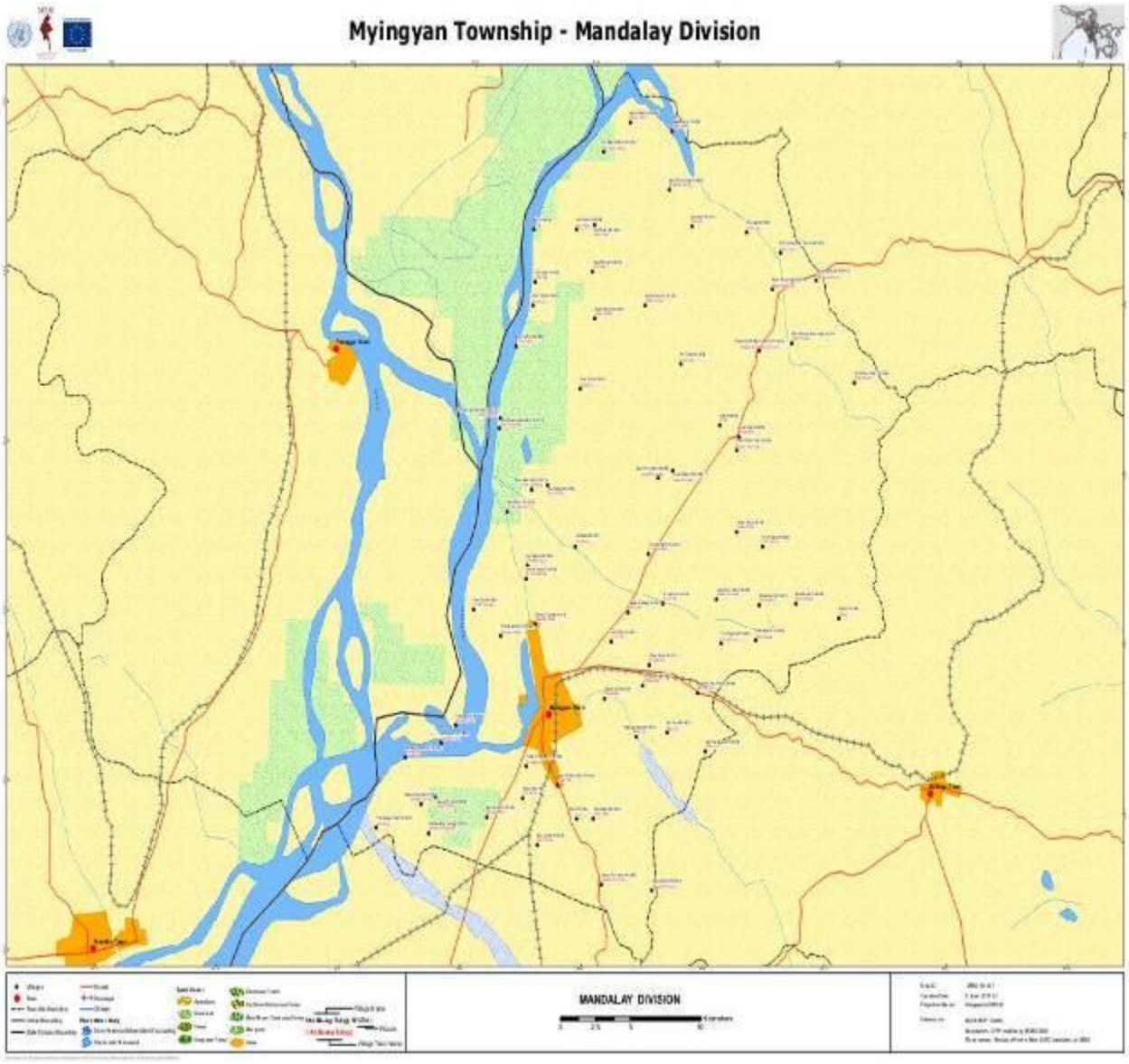
	Common Name	Scientific Name
1	Bambwe	*Careya arborea*
2	Banda	*Terminalia catappa*
3	Banyan	*Ficus benghalensis*
4	Bawdi-nyaung	*Ficus religiosa*
5	Bawzagaing	*Leucaena leucocephala*
6	Bein-nwe	*Hiptage benghalensis*
7	Burmese lacquer tree	*Melanorrhoea usitata*
8	Dahat	*Tectona halmatoniana*
9	Dan	*Lawsonia alba*
10	Gandasein	*Prosopis juliflora*
11	Hnaw	*Adina cordifolia*
12	Ingyin	*Shorea siamensis*
13	Kadat	*Crataeva roxburgi*
14	Khayay	*Manilkara hexandra*
15	Kinpon chin	*Acacia concinna*
16	Kokko	*Albezzia lebbek*

17	Kyaung-sha	*Oroxylum indicum*
18	Letpan	*Bombax ceiba*
19	Magyi	*Tamarindus indica*
20	Mezali	*Cassia siamea*
21	Nabe	*Lannea coromandelica*
22	Nan-lon-kyaing	*Acacia farnesiana*
23	Ngu	*Cassia fistula*
24	Ngu-sat	*Cassia javanica*
25	Nibase	*Morinda tinctoria*
26	Okshit	*Aegle marmelos*
27	Padauk	*Pterocarpus macrocarpus*
28	Panga	*Terminalia chebula*
29	Pan-tama	*Melia azedarach*
30	Pauk	*Butea frondosa*
31	Paukpan-byu	*Sesbania grandiflora*
32	Peinne	*Artocarpus heterophyllus*
33	Pyauk-seik	*Holoptelea integrifolia*
34	Pyin	*Xylia xylocarpa*
35	Pyinma	*Lagerstroemia speciosa*
36	Sandalwood	*Santalum album*
37	Sha	*Acacia catechu*
38	Subyu	*Acacia nilotica*
39	Swe-daw	*Bauhinia acuminata*
40	Tama	*Azadirachta indica*
41	Tanaung	*Acacia leucophloea*
42	Te	*Diospyros burmanica*
43	Thabut-gyi	*Miliusa velutina*
44	Than	*Terminalia oliveri*
45	Thanakha	*Hesperethusa crenulata*
46	Thanat	*Cordia dichotoma*
47	Thit-cho	*Sideroxylon burmanicum*
48	Thit-palwe	*Balanites aegyptiaca*
49	Thit-pyu	*Albizia procera*
50	Yeyo	*Morinda angustifolia*
51	Yinma	*Chukrasia tabularis*
52	Zani	*Hiptage candicans*
53	Zaung-gyan	*Osyris wightiana*
54	Zee	*Zizyphus jujube*
55	Zibyu	*Emblica officinalis*

List of Potential Drought Resistant and Locally Adapted Agricultural Crop Species for Farming in the Dry Zone Region

Common Name	Scientific Name
1. Sesame	*Sesamum indicum*
2. Red gram	*Cajanus cajan*
3. Horse gram	*Dolichos biflorus*
4. Soybean	Glycine max
5. Black gram	*Phaseolus mungo*
6. Peas	*Pisum sativum*
7. Cow Peas	*Vigna catjung*
8. Pigeon Pea	*Cajanus Cajan*
9. Ground nut	Arachis *hypogaea*
10. Maize	*Zea mays*
11. Cotton	*Gossypium hirsutum L*
12. Onion	*Allium cepa*
13. Rice	*Oryza sativa Linnaeus*

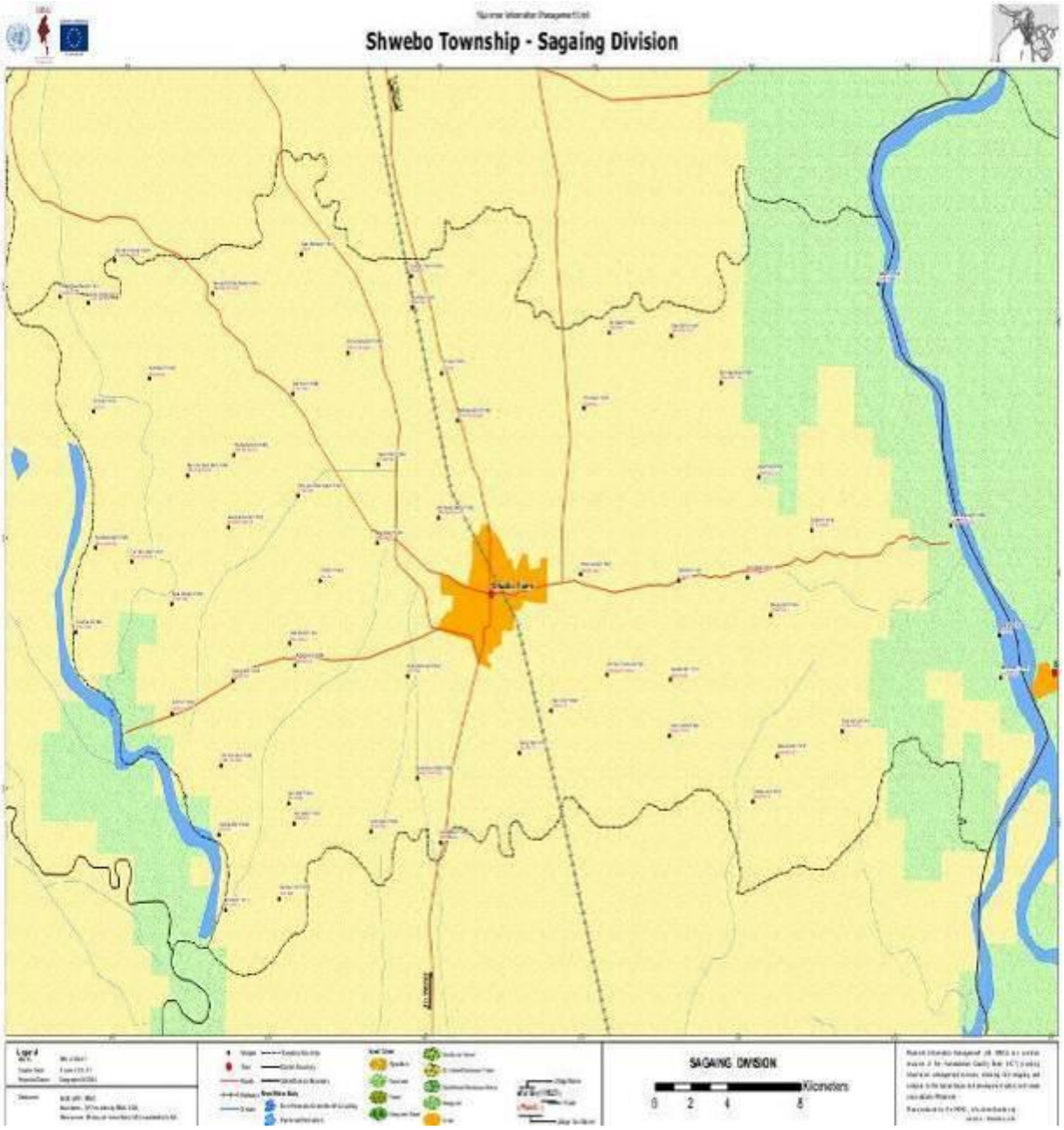
ANNEX I:



Source MIMU, Village tracts in Myingyan Township

Water Resource availability intervention by different Organizations in Myingyan Township

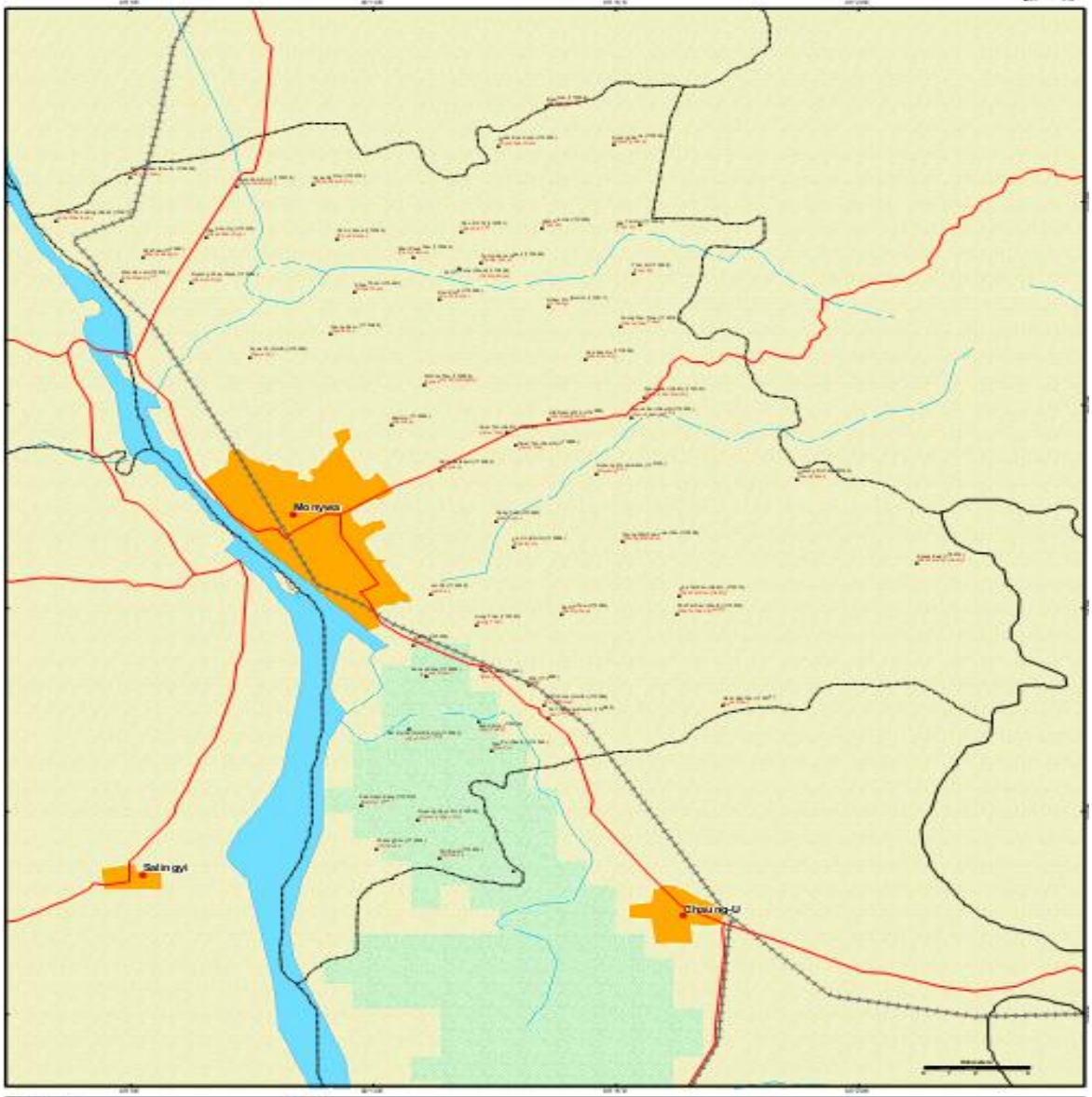
No	Village Tract	Village	Activity	Institution(s)	Remark
1	Hta Naung Kone	Hta Naung Kone	Pond Construction	IDE	completed
2	Hta Naung Kone	Kyauk Phyu Kan	Pond Construction	IDE	completed
3	Aye Ywar	Aye Ywar	Water availability	Habitat	Planned
4	Ein Ma	Ein Ma	Water availability	Habitat	Planned
5	Koke Ke	Ka Tat Pin	Water availability	Habitat	Planned
6	Lay Tan	Lay Tan	Water availability	Habitat	Planned
7	Kan Chaw	Lay Yar Kyaw	Water availability	Habitat	Planned
8	Me Pauk	Me Pauk	Water availability	Habitat	Planned
9	Tat Ywar	Tat Ywar	Water availability	Habitat	Planned



No intervention from NGOs yet for development activities in Shwe Bo Township

Myanmar Information Management Unit

Monywa Township - Sagaing Division

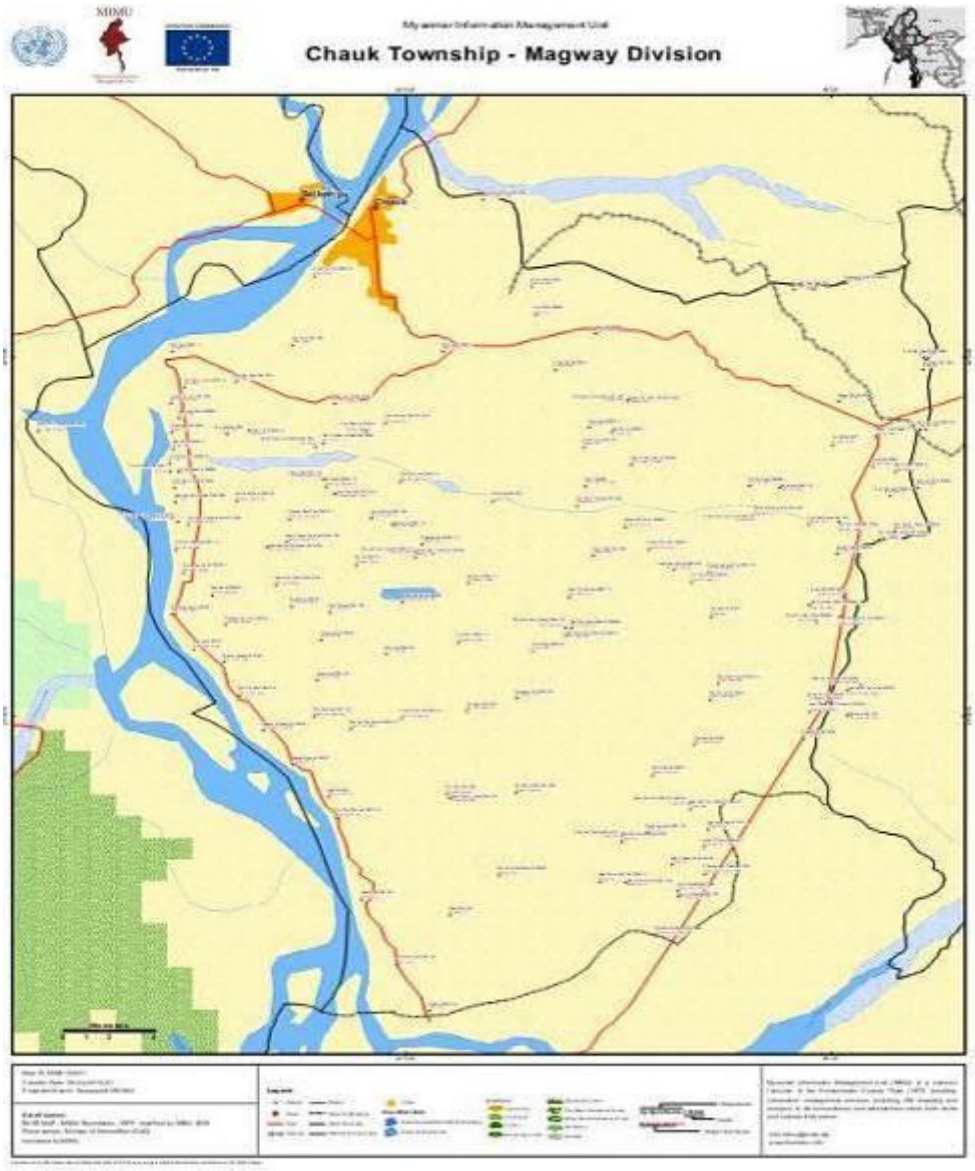


Legend

Disclaimer: The names shown and the boundaries used on this map do not imply official endorsement or acceptance by the United Nations.

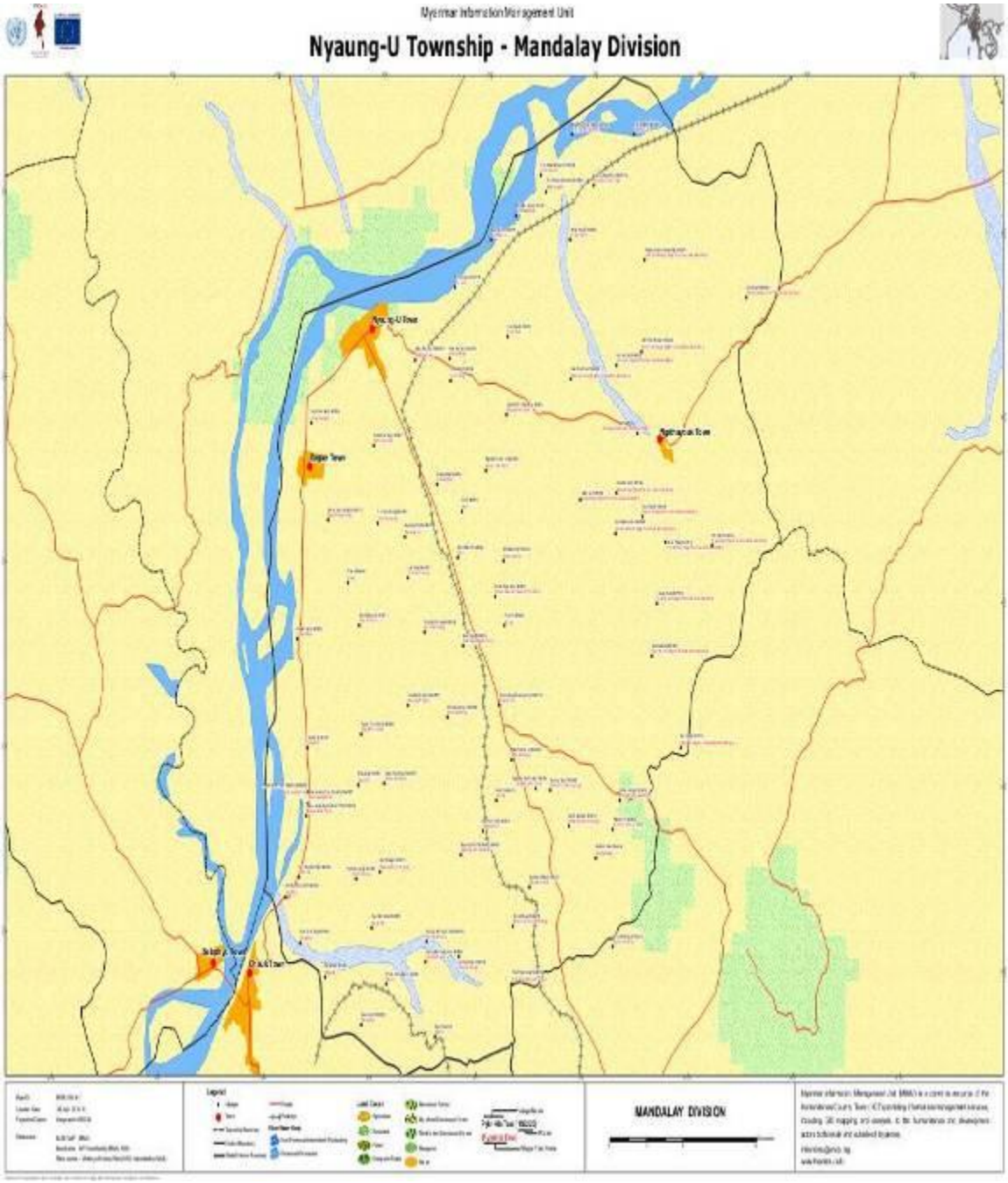
A list of villages where Small scale irrigation and individual tree planting were carried out by GRET INGO in Monywa Township

No	Village Tract	Village Name	Institution
1	Kyoe Kyar Kan	Moke Soe Kone	GRET
2	Kha Tet Kan (S)	Myaing Si	GRET
3	Kha Tet Kan (S)	Hle Dar	GRET
4	Kha Tet Kan (N)	Kyauk Kwe	GRET
5	Kha Tet Kan (N)	Nyaung Pin Thar	GRET



Water Resource availability intervention by different Organizations in Chauk Township

No	Village Tract	Village	Activity	Institution	Remark
1	pyay pin	bone bwe	Tube well	DDA	completed
2	pyay pin	pyay pin	Tube well	DDA	completed
3	na ywe taw	ka tie (south)	Tube well	DDA	completed
4	pote pa kan	tat kan	Water availability	DDA	completed



Water Resource availability intervention by different Organizations in Nyaung Oo Township

No	Vilage Tract	Village	Water Supply	Institution	Remark
1	Taungzin	Htanaungsu	Deep tube well	BAJ	Done
2	Kan thar yar	Kan thar yar	Deep tube well	BAJ	Done
3	Taung b lay	Tharyarchaung	Deep Tube well	BAJ	Done
4	Baung Bi Lay	A Yar Taw	Pond	Habitat	Planned

5	Chaung wa	Chaung wa	Pond	Habitat	Planned
6	Ka Bar Ni	Ka Bar Ni	Not decided yet	Habitat	Planned
7	Kan ni pauk	Kan ni pauk	Not decided yet	Habitat	Planned
8	Kantain	Kan tain	Not decided yet	Habitat	Planned
9	Kutaw	Kutaw	Not decided yet	Habitat	Planned
10	Myaynaegyi	Myaynaegyi	Not decided yet	Habitat	Planned
11	The pu	Sinn luu aei	Not decided yet	Habitat	Planned
12	Yansan	Yoartharaye	Not decided yet	Habitat	Planned

ANNEX- J: Parallel co-financing contribution from the Government of Myanmar

Sr.	Activities	Proposed Townships with budget calculation					Total (USD)
		Shwebo	Monywa	Myingyan	Nyaung Oo	Chauk	
1.	Plantation establishment for the year 2012	5,416	1,676	4,204	9,516	3,612	24,424
2.	Plantation establishment for the year 2013	-	-	-	-	17,504	17,504
3.	Fire protection for plantation	940	1,148	404	1,552	1,176	5,224
4.	Weeding	1,412	1,764	884	1,060	1,060	6,176
5.	Survival counting for plantations (2011-2012)	940	1,176	588	704	352	3,764
6.	Survival counting for plantations (2012-2013)	112	240	92	224	76	744
7.	Protection of remaining natural forests (First year)	-	-	-	12,152	-	12,152
8.	Protection of remaining natural forests (Second year)	-	1,884	-	-	-	1,884
9.	Natural regeneration	-	-	-	1,176	-	1,176
10.	Digging ponds	916	-	-	916	-	1836
11.	Construction of sediment storage dams	352	472	236	352	116	1,528
12.	Drilling tube wells	-	-	-	5,648	-	5,648
13.	Gap planting	-	2,392	-	-	-	2,392
14.	Contour bund plantation	-	160	-	-	-	160
15.	Recruitment of Fire Guards	-	1,184	-	-	-	1,184
16.	Recruitment of labours for watering	-	14,232	-	-	64,036	78,268
17.	Maintenance of water pumping facilities	-	-	-	-	368	368
	Total	10,096	26,324	6,404	33,052	88,304	164,180

Note: current exchange rate 1USD= 850 Myanmar Kyat is applied

Parallel Contribution from MoECAF in terms of Human Resources in Five Project Targeted Townships

Cost items	Year 1	Year 2	Year 3	Year 4	Total US$
Staff officer	6,000	6,000	6,000	6,000	24,000
Deputy Staff officer	6,000	6,000	6,000	6,000	24,000
Assistant staff officer	8,640	8,640	8,640	8,640	34,560
Forester	16,860	16,860	16,860	16,860	67,441
Subtotal					150,001
Office Rental	60,000	60,000	60,000	60,000	240,000
Environmental work* (see annex J)	41,045	41,045	41,045	41,045	164,180
Total amount					554,181

The contribution from MoECAF in terms of complementary environmental conservation work, human resources (office staffs), and offices at 5 townships is 554,181 US$.

ANNEX K: Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s)	**Project Objective Indicator(s)**	**Fund Outcome**	**Fund Outcome Indicator**
To reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security.	% of households in target site implementing climate change adaptation livelihood measures introduced by the project	Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress
		Outcome 5.:Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress
	% of Dry Zone farmers using climate risk information to adjust their livelihood behavior	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Modification in behavior of targeted population
	% of Dry Zone farmers with access to early warning information on sudden onset of disasters	Outcome 1: Reduced exposure at national level to climate related hazards and threats	1.2. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis
		Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. No. of targeted institutions with increased capacity to minimize exposure to climate variability risks
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**
OUTCOME 1. Continuous freshwater availability is ensured during the dry seasons in 280 villages in the Dry Zone	Number of Dry Zone farmers reporting increased freshwater availability during dry periods	Output 4: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change
		Output 5: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change
OUTCOME 2. Climate-resilient agricultural and livestock practices enhanced in Myanmar's Dry Zone	Number of climate-resilient agricultural/livestock practices demonstrated to support adaptation of vulnerable farmers	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1. No. and type of risk reduction actions or strategies introduced at local level
OUTCOME 3. Timeliness and quality of climate risk information disseminated to Dry Zone farmers enhanced through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-	% of Dry Zone farmers using climate risk information to adjust their livelihood behavior % of Dry Zone farmers with access to early warning information on sudden onset of	Output 1: Risk and vulnerability assessments conducted and updated at a national level	1.2. Quality of relevant risk and vulnerability Assessments
		Output 2.1: Strengthened capacity of national and regional centers and networks to rapidly respond to extreme weather events	2.1.2. Capacity increase of staff from targeted institutions trained to respond to and mitigate impacts of climate related events

term climate scenario planning	disasters		

ANNEX L:

a) **Letter from MoECAF, authorizing UNDP to execute this project through direct execution, dated on 25th July, 2012**

b) **Letter of Endorsement for AF Concept, dated on 22nd December, 2011**

c) **Letter from UNDP, confirming co-financing support**