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
PROJECT DURATION:	4 YEARS (2012-2016)

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 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

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

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 constituted 34% of the country's total population of about 53 million in 2003. 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 1016 mm per annum with high variability and uneven distribution. The monsoon rain is bimodal with a drought 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 and small agricultural crops such as paddy, sesame and groundnut. 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:

According to the Asian Development Bank (2009), Myanmar is one of the countries most vulnerable to climate change. 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 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.

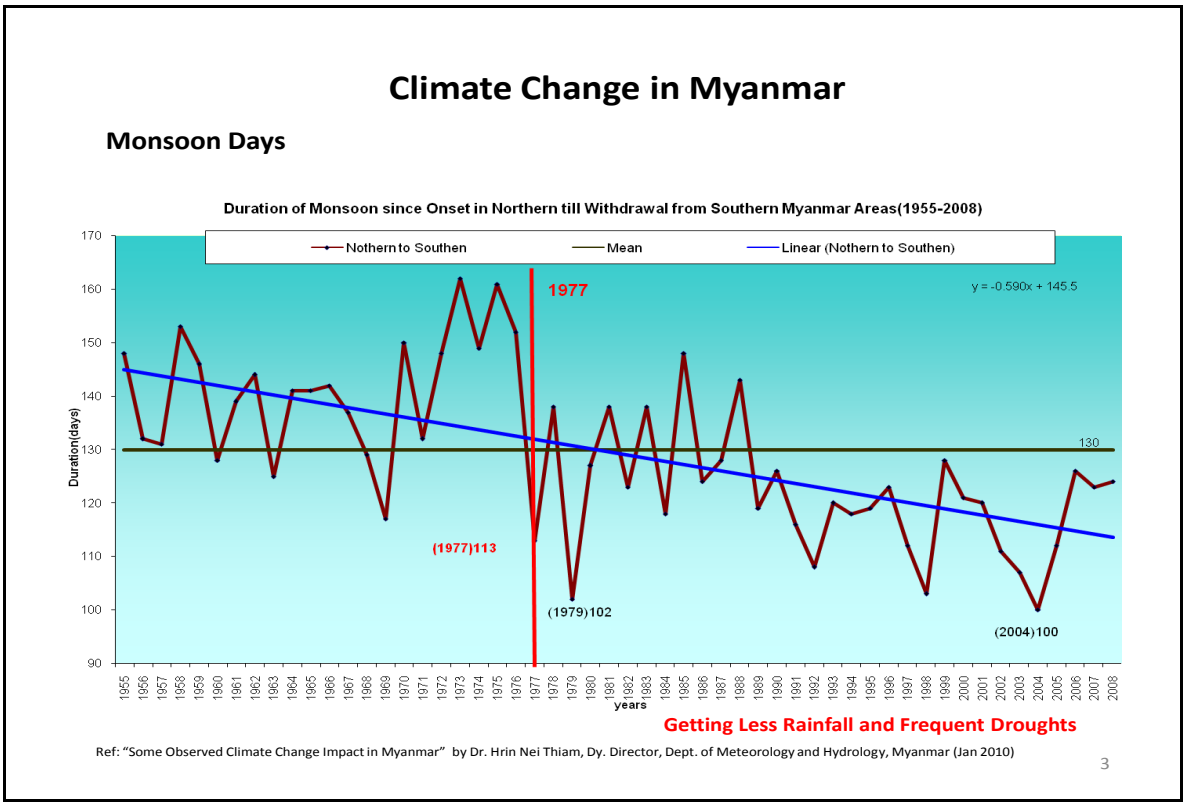
[2] In Myanmar, drought is defined as the 'dekad' (10 days) with below normal rainfall preceded by at least two dekads with below normal rainfall recorded by the nearest hydro-meteorological station (Sub-States/Sub-Divisions) of interest. In Myanmar the third dekad of May and the third dekad of October 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.

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 is in line with an observed decrease of about 45-65% of rainfall over the last 5 years. 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). An abundance of agricultural crop pest (leaf roller) was recorded, and farmers incurred extraordinary expenses on buying fodder during dry periods. This reduced their incomes, as their livestock was sold at a loss. 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 regard to drinking water availability during dry periods, water sources and reservoirs are sufficient for household consumption, but not for livestock and agriculture. Families often need to dig deeper wells or travel longer distances for accessing water; in some places, there is extreme water scarcity that requires families to sell tools and livestock and migrate from their homes.

An Integrated Household Living Conditions Assessment Project (IHLCA, 2005 and 2010) found that chronic poverty in Myanmar's Dry Zone is directly correlated with the effects of drought and dry spells. 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. This, in turn, has led to increasing reliance of many rural households on debt financing; a decrease in farm labor opportunities associated with the failure in rice and oilseeds crops; a failure in agricultural loan repayment in the worst affected areas as interest rates rose as high as 30 per cent; and increasing out-migration (especially of female-headed households).

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. 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 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). As no Regional Climate Models (RCMs) are available, 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) are generally less conclusive (especially with regards to rainfall distribution), but they largely confirm increased drying and soil evaporation over the Dry Zone.



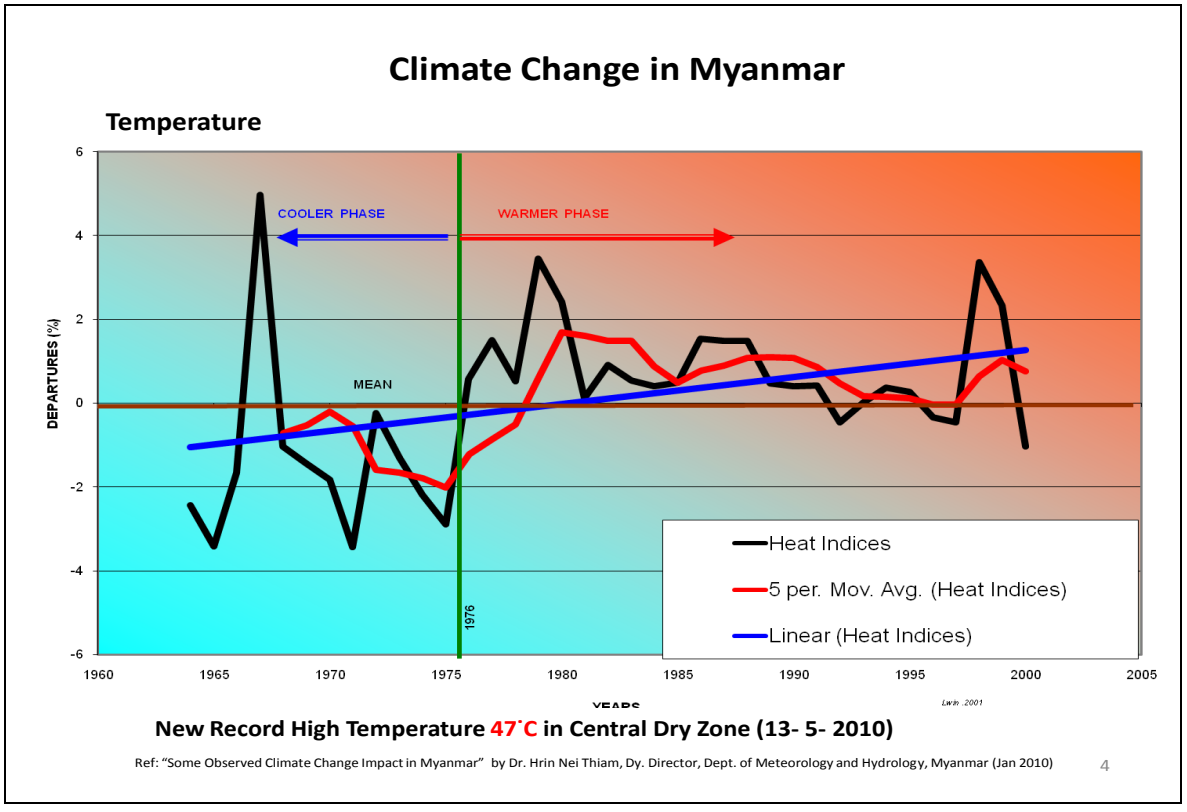


Fig.1: Climate change trends in Myanmar's Dry Zone: Rising temperatures and shorter rainfall periods

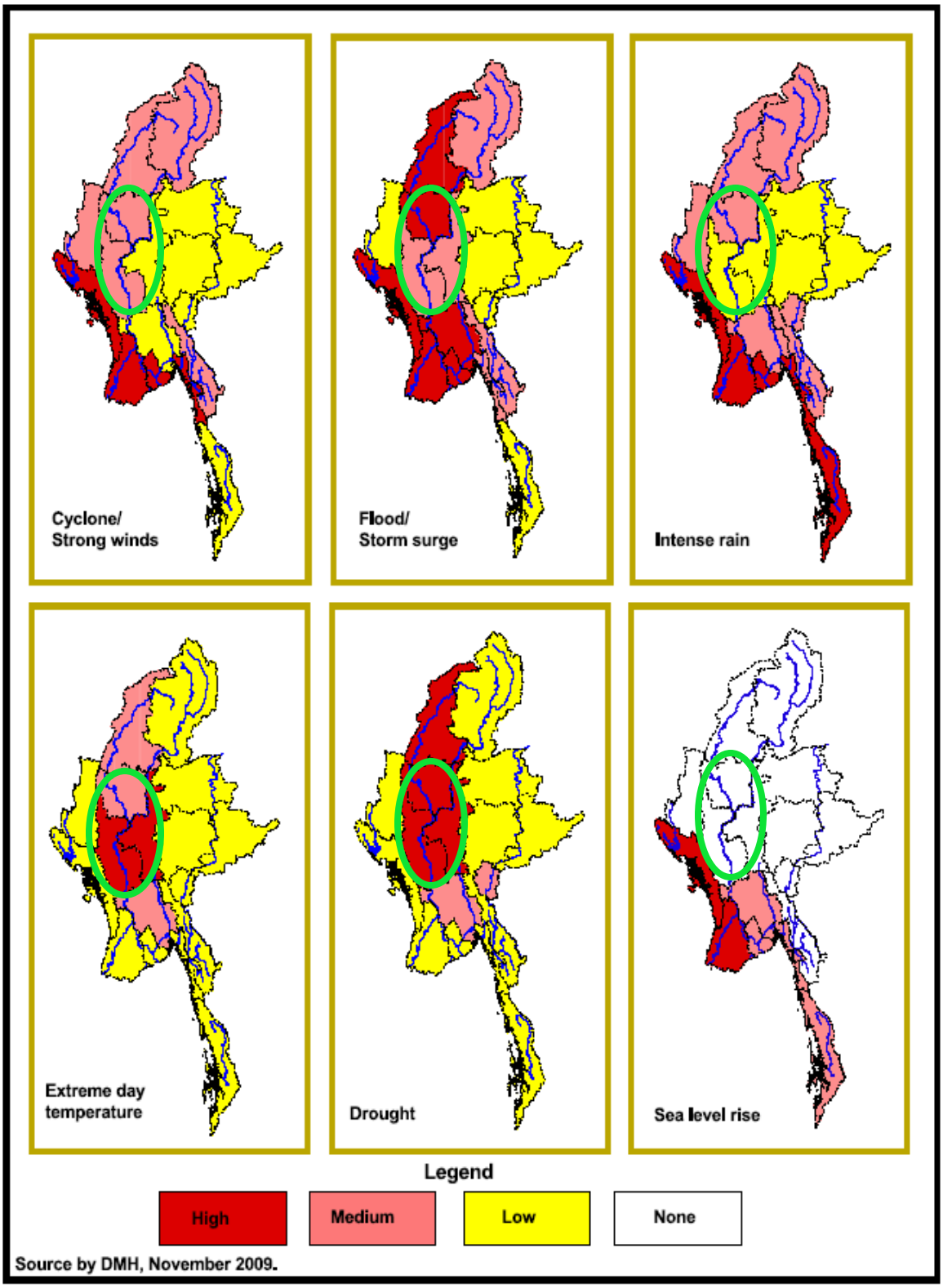


Fig.2: Risk levels for different climate-related hazards in Myanmar, based on extrapolation of observational time-series data and confirmed by GCMs. Project area (Dry Zone) encircled in green.

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[3] . 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.

- 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 GCMs confirms the current Dry Zone climate hazard assessment, which is largely based on observational data from the past 50 years. As summarized in Fig.2, flood hazard levels are assessed as median to high; intense rainfall hazards are projected as

[3] 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

low to medium; extreme day temperatures are assessed as medium to high; and drought risks are assessed as high.

Barriers to Addressing the Climate Change-induced Problem:

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

At present, Dry Zone farmers have limited access to the knowledge and financing that is required to establish and maintain resilient rural water management systems in a changing climate. There is a clear lack of replicable models that can provide a useful, visible basis for natural upscaling and replication. 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 (e.g. through cash for work programmes) 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. At present, considering the wide range of no-regrets adaptation measures that are potentially useful and applicable in Myanmar's Dry Zone, there is an urgent need to demonstrate, replicate and upscale adaptive water management systems and technologies to meet the water needs of households, crops and livestock in a changing climate.

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

Rice, despite being the staple food crop, is not the primary choice of crop grown by farmers in the Dry Zone. Soil type and rainfall patterns are generally not conducive to rice cultivation; 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. 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 still has potential to be upscaled as an adaptation practice across the Dry Zone. Livestock rearing also plays a crucial role in household food security, as it provides a source of income and nutrition as well being a key asset (especially during times of drought and floods). Common livestock include cattle, poultry, goats, sheep and pigs. Livestock mortality has increased considerably over the past decade, mainly due to climate change that resulted in the scarcity of

water and fodder; grazing areas for livestock were heavily affected, 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. With a view on these climate-induced problems and pressures, research on 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 in a changing climate can help farmers to maintain critical resilience of agricultural practices across the Dry Zone. At present, there are no concerted efforts to promote and support the diffusion and uptake of these practices on a critical scale.

c) Weak institutional framework to support community-based climate change adaptation

In Myanmar, all land belongs to the state. On agricultural lands, farmers are given land use rights to cultivate their holdings and profit from the yields. Although land use rights are inheritable, the law doesn't allow the land to be transferred, mortgaged or used as collateral to other persons, except with the approval of the local authority. Those with land use rights must cultivate their holding or risk losing it. With regard to forested lands, the Community Forestry Instructions (CFI, 1995) provide communities with an initial lease period of 30 years. This applies to forest in designated Reserve Forest, Public Protected Forest (managed by the Forest Department) and marginal land (i.e. land at the disposal of the State). If community-based management achieves satisfactory results, the land lease period can be extended.

At present, land use planning and rural development activities in the Dry Zone do not take into account the protective benefits of intact ecosystems in a changing climate. Land use planning is generally conducted with a view to optimizing yields and incomes, rather than harnessing and maintaining ecosystem services and functions over the long term. Consequently, current land use planning practices in the Dry Zone lack an overarching recognition of ecosystem functions at the landscape level, which is critical for the long-term hydrological resilience of the catchments. Increasing the scale of catchment areas and optimizing the location and/or extent of agroforestry and grassland areas can mitigate the adverse effects of various land uses and ensure that they affect each other as little as possible. However, most on-going support programmes and projects aiming to improve rural livelihoods and food security hardly incorporate these aspects into their design and consequently fail to harness the resilience benefits of ecosystem-based adaptation. In terms of institutional capacity, there is a lack of skills and tools to plan, monitor and enforce climate resilient land use management at both national and local levels. Underlying reasons are insufficient awareness about projected climate change impacts in the Dry Zone, and limited models and examples of how to effectively harness ecosystem services for climate change adaptation and climate risk management. 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 hinder the application of ecosystem based adaptation measures in areas where additional ecosystem restoration is required.

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[4] per year, and the impacts of these 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 and landless workers whose access to arable land is severely threatened by erosion and land degradation. Special emphasis will be placed on women and female-headed households within this vulnerable group.

It is estimated that 42,000 rural households from 280 villages with a high percentage of landless households and marginal/small farmers will benefit directly from the proposed project. Within these 42,000 rural households, approximately 37,800 are estimated to be impoverished landless[5] and marginal farmers' 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 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. An important element of the proposed project is to strengthen the participation and stakes of landless people in Community-based Organisations, especially Forest User Groups.

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

Regions	Townships	Villages	No. of Households	Population
Sagaing	**Shwebo**	60	9,000	46,800
	Moneywa	50	7,500	39,000
Mandalay	**Myin Chan**	60	9,000	46,800
	Nyaung Oo	70	10,500	54,600
Magway	**Chauk**	40	6,000	31,200

Table.1: Targeted townships and size of village population

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

[5] 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.

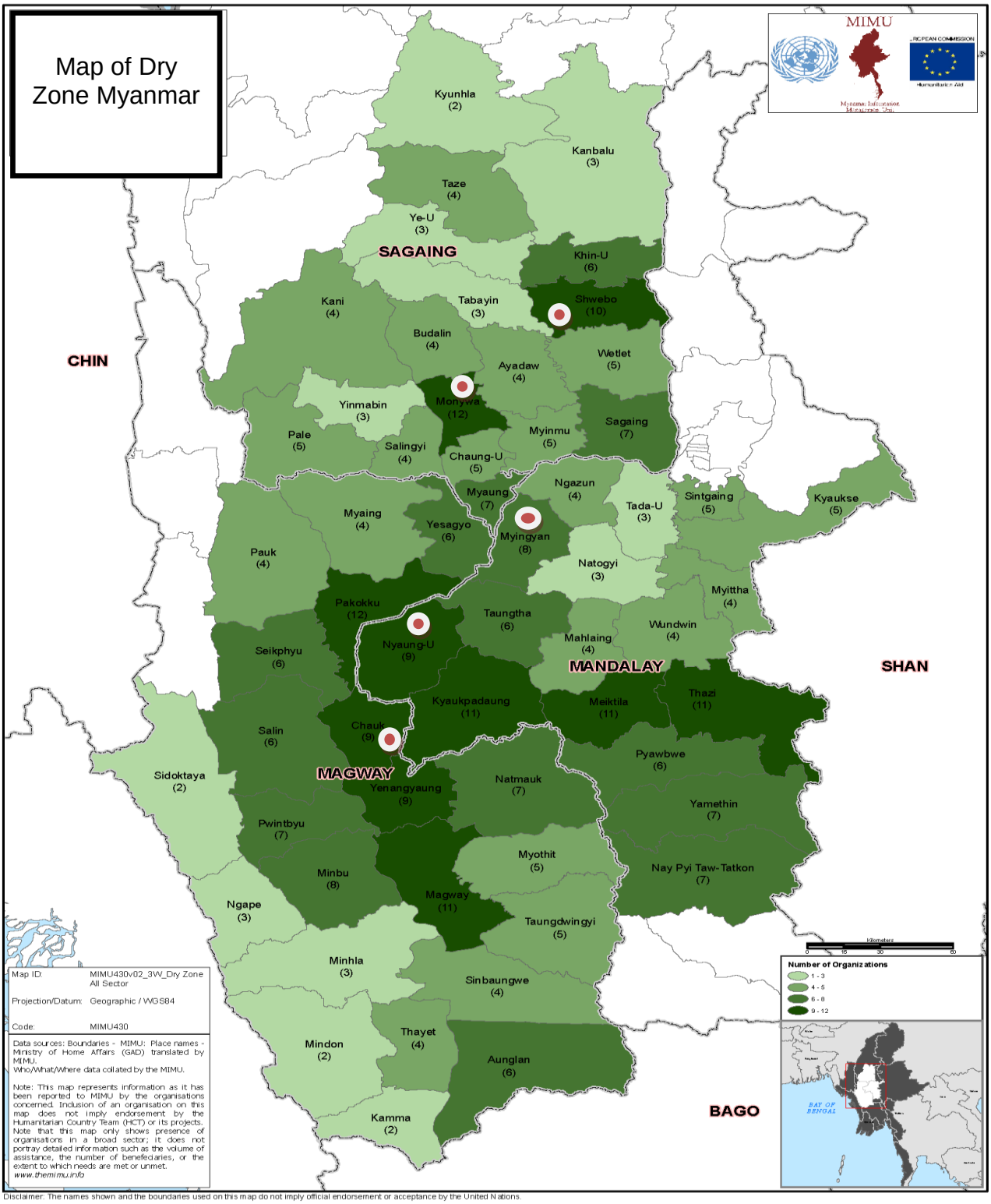


Fig.3: Targeted project locations in Myanmar's Dry Zone

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[6] to "Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels".

The strategy of the project to achieve this objective is to reduce the risks and effects from recurring droughts, floods and erosion through an integrated water management, crop and livestock adaptation programme in five of the most vulnerable townships of Myanmar's Dry Zone. This programme will be based on principles of local empowerment and implemented by grassroots organizations such as farmer groups, communal forest user groups, community-based organizations and local NGOs. The anticipated impact of the project is the reduction of food insecurity and losses from extreme climate events in 42,000 households.

In line with UNDP's operational mandate in Myanmar as reflected in UNDP Governing Council Decision 93/21[7], 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 the Outputs identified 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, summarized below, will be explained in Part III, Section D.

[6] "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)

[7] 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. Respond to the climate-induced reduction of freshwater supply	1.1. Water capture and storage capacities in 280 villages enhanced to ensure sufficient irrigation water supply during dry periods	1. Rainfall capture, storage and natural water retention capacity is increased where rainfall is declining or becoming more variable	1,330,443
	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		1,338,000
	1.3. Community-based agro-forestry plots are established on 7,650 hectares of private and communal lands to conserve soil and water		1,050,000
2. Climate-resilient food and livestock production systems established and promoted	2.1. Drought-resilient crop and fodder varieties and conservation agriculture practices are provided to, and conservation agriculture practiced by, 12,600 households on 5,100 hectares of drought-prone land	2. Diversified and resilient livelihoods of the most vulnerable farmers in Myanmar's Dry Zone	941,400
	2.2. Resilient post-harvest processing and storage systems are introduced in 12,600 households to ensure safe handling and storage of agricultural produce during extreme climate events (droughts, floods, rains)		441,600

	2.3. Diversified livestock production systems are introduced in 6,300 households to buffer the effects of flooding and drought on rural livelihoods		826,800
3. Improve communal climate risk information and monitoring	3.1. Climate hazard maps and risk scenarios are developed in each township to support community-based climate risk management and preparedness planning	3. Capacity of farmers in the Dry Zone to respond and adapt to changes in rainfall is enhanced through use of short-term forecast information and longer-term climate scenario planning	244,000
	3.2. 5 climate risk information centers are established to communicate risk and early warning information to local communities		500,000
4. Project/programme implementation total cost			6,672,243
5. Project/Programme executing cost (9.25%)[8] (cost positions to be detailed in the full proposal)			617,182
6. Total project/programme cost			7,289,425
7. Project cycle management fee charged by Implementing Entity (8.5%)[9]			619,601
Amount of Financing Requested			**7,909,026**

PROJECTED CALENDAR:

MILESTONES	EXPECTED DATES
Submission of project concept to AF Board for review	October 2011
Submission of project document to AF Board for review	July 2012
Start of Project/Programme Implementation	December 2012
Mid-term Review (if planned)	November 2014
Project/Programme Closing	November 2016
Terminal Evaluation	August 2016

[8] See detailed breakdown of project executing costs in Annex B
[9] See detailed breakdown of services provided by MIE fees in Annex A

PART II: PROJECT / PROGRAMME JUSTIFICATION

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: Respond to the climate-induced reduction of freshwater supply

The main Outcome of Component 1 is that in 280 villages, the climate-induced reduction of freshwater supply is countered through increasing rainfall capture, storage and water retention capacity. Consistent with the community-based adaptation strategy of the project, concrete investment activities under Component 1 will be preceded by participative community-based assessments, which are essential for community-based organizations and village stakeholders to agree on the specific locations and site-specific design elements of water supply 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 climate-induced water scarcity issues. Compliant with new environmental and social safeguards that are applied by all UNDP-supported adaptation projects, the principle of 'Free Prior and Informed Consent' (FPIC) will underpin all community-based 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 water supply during dry periods

This Output focuses on the development of water collection, storage and retention capacities through on-farm and off-farm 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). Farm ponds can be constructed for every 10-12 acres (4-5 ha) in the watershed to provide protective/supplemental 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. The aim of these structures is to store fresh water 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.

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.

Activities under Output 1.1 include:

Activity 1.1.1. Conduct participatory, community-based assessments of drought and flood risks in the project area and undertake a community-based resource mapping exercise to identify available surface and sub-surface water resources;

Activity 1.1.2. Based on community input, design a simple network of technically and environmentally appropriate water harvesting, storage and retention structures to conserve water for dry periods and hold erosion in check;

Activity 1.1.3. Establish an effective, participatory water management scheme for communities in the target areas and provide communities with the relevant know-how and technological means to manage the system.

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[10]. 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 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.

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. Climate change impacts on specific locations, communities and vulnerable groups will be reflected in these plans.

[10] 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 lease of land 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.

Activities under Output 1.2 include:

Activity 1.2.1. Based on community input, select relevant tree species for regeneration and reforestation purposes and identify Communal Forest User Groups (CFUG) and other community/farmer-based local groups and institutions which can be engaged in community-based rehabilitation, reforestation and natural resource management

Activity 1.2.2. Train CFUGs, Community Based Organizations (CBOs) and other non-government local stakeholders in nursery establishment and forest management in priority zones;

Activity 1.2.3. Support regeneration of existing vegetation and conserve remnant natural forests through soil conservation and water harvesting techniques

Activity 1.2.4. Undertake additional community-based reforestation works (engaging the bulk of landless laborers in the target area) in heavily degraded areas to complement regeneration of watershed areas

Output 1.3. Community-based agro-forestry plots are established on 7,650 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[11] and cover[12] 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 drought and during dry spells. This results in the improvement of soil structure and texture, and enhances food security. In addition, risks of wind- and water-induced soil erosion are greatly reduced.

Agro-forestry 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 agro-forestry 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).

[11] 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.
[12] 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.

Home gardens are often poor in terms of their composition and diversity, and prone to failure during climatic extremes.

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 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 have equal representation of men and women, will lead on the design of a locally appropriate agro-forestry strategy (home gardens with a greater variety of 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. Undertake a comprehensive community-based survey to identify specific sites for targeted agro-forestry interventions in each village's lands;

Activity 1.3.2. Establish community-based agroforestry groups and provide training on the planning, implementation and management of small-scale agroforestry systems;

Activity 1.3.3. Provide relevant crops and tree species to community groups to establish agroforestry plots on the basis of recognized and appropriate techniques.

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

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 participative community-based assessments, which are essential for community-based organizations and village stakeholders to agree on 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, the principle of 'Free Prior and Informed Consent' (FPIC) will underpin all community-based activities under Component 2.

Component 2 comprises the following Outputs:

Output 2.1. Drought-resilient crop and fodder varieties are provided to, and Conservation Agriculture practiced by, 12,600 households on 5,100 hectares of drought-prone land

This Output promotes improved crop selection in rural farming households and enables access by farmers to drought-resistant crop varieties of rice, pigeon pea, groundnut, sorghum and pearl millet. This is done to enhance and sustain food security during dry spells and periods of drought. Although the Dry Zone is already characterized by a large crop diversity with more than 50% of all farming households growing three or more different types of crops, farmers tend to focus on only one crop variety only when faced with conditions of water scarcity. This, in turn, makes lack of rain the major limiting factor hampering agricultural productivity. The use of drought resistant agricultural crops and/or improved seed varieties for extreme climate conditions needs to be promoted to increase the food security of Dry Zone farmers in a changing climate.

Improved crop management techniques that will be promoted by the proposed project include (in addition to agro-forestry measures implemented under Output 1.3): Improvement of plant density by optimizing plant population and row spacing; 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. Integration of these techniques will make soils more resilient to the impact of recurrent dry spells. This is a form of Conservation Agriculture (CA) which aims to conserve, improve and make more efficient use of natural resources through integrated management of available soil, water and biological resources combined with external inputs. CA is therefore required to be widely practiced as a coping strategy for conservation and adaptation of drought. This will be accompanied by other related practices such as compost making and using fertilizers as appropriate.

The proposed concept 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 enable incremental adaptive improvements in these existing smallholder systems, the proposed Output will analyze seed banks and crop trials in the Southeast Asian region and work with crop research institutions in Myanmar (such as the Yezin Agriculture University) and other countries in the region (Bangladesh, Cambodia, Lao PDR and Thailand) to transfer suitable and improved crop varieties to the Dry Zone where they are made available to Dry Zone farmers. To showcase the yield performance of improved crop varieties, small community plots will be established following 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**).** These plots will also serve as learning platforms for tried and tested climate resilient practices such as CA.

The full AF proposal will provide a list of improved and drought resilient crop varieties which are specific to Myanmar and expected to be disseminated by the project. To ensure continued community-based management of seed banks after the project has ended, the full proposal will integrate targeted activities to maintain the operation of these seed banks without the need for further external assistance.

Activities under Output 2.1 include:

Activity 2.1.1. Work with research institutions and seed banks from Myanmar and neighboring countries (Bangladesh, Thailand, Lao PDR, Cambodia) to select and transfer drought-resistant crops to Dry Zone farmers

Activity 2.1.2. Train non-governmental village extensionists on the use of drought-resilient crop varieties and climate-resilient farming techniques (such as Conservation Agriculture);

Activity 2.1.3. Establish participatory plant breeding schemes at village level which enable access of farmers and non-governmental community extension workers to seed banks for drought resistant, heat-tolerant and early maturing crop varieties and conserve the diversity of plant genetic resources;

Activity 2.1.4. Support farmer innovators to establish participatory, experimental plots on drought resistant crop farming to facilitate local dissemination and know-how transfer.

Output 2.2. Resilient post-harvest processing and storage systems are introduced to 12,600 households to ensure safe handling and storage of agricultural produce during extreme climate events (droughts, floods, rains)

This Output focuses on the promotion of climate-resilient post-harvest crop processing and storage. 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 combine with anthropogenic effects such as labour shortages and lack of timely labour to result in a 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. Properly considered, a 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. Analyze existing maladaptive practices and loss patterns from insufficiently climate-proof post-harvest handling and storage practices;

Activity 2.2.2. Provide 140 local made, community-managed rice threshers to 50% of villages in the target areas, to ensure communal food security and price stability in flood-prone areas;

Activity 2.2.3. Introduce community-managed crop handling and storage processes and facilities in each township to avoid losses during times of flooding and drought.

Output 2.3. Diversified livestock production systems are introduced in 6,300 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. Goats, Sheep, Pigs and poultry are the species most widely held in the target areas. Both 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 practices during the rainy seasons, as well as rotational grazing. In conjunction with Output 1.3, the project will increase the extent and adoption 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.

Activities under Output 2.3 include:

Activity 2.3.1. Train non-governmental village extensionists and farmer groups on diversified livestock rearing, improved fodder preparation and storage, fodder bank and livestock shelter practices;

Activity 2.3.2. Support the most vulnerable groups[13] in the most vulnerable communities with locally adapted cattle, poultry and pig stock which can sustain and breed in extreme climate conditions;

Activity 2.3.3. Diversify communal livestock through participatory animal breeding to conserve essential buffer stocks during extreme events and maintain genetic diversity

[13] Beneficiary farmers and households will be selected on the basis of greatest vulnerability, which translates into the poorest households and those who have limited access to capital according to participatory wealth ranking and participatory resource mapping. In the Dry Zone, poor farmers are generally those with land rights to 1 ha of marginal upland or less and who have no alternative way to earn a living other than farming. In comparison, economically resilient households are those who have land use rights to at least five ha of land with good water access and who have other, non-farming alternatives to earn a living.

Component 3: Improve communal climate risk information and monitoring

The main Outcome of Component 3 is increased capacity of Dry Zone farmers to respond and adapt to changes in rainfall through the use of short-term forecast information and longer-term climate scenario planning. 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 non-governmental organizations. The aim is to enable informed 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 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. Based on existing data from various sources in the regions, a comprehensive risk information system for climate-related risks and vulnerabilities, with a particular focus on drought, flooding, storm damage and erosion, needs to be established. Accompanying training activities for local stakeholders, NGOs and CBOs need design such a system relevant for different planning purposes.

Concrete deliverables under this Output will include a number of comprehensive climate risk, hazard and vulnerability maps which can 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).

Activities under Output 3.1 will include:

Activity 3.1.1. Reconciling research results about hazard exposure and community-level assessments about hazard sensitivity, generate climate hazard, risk and vulnerability maps for all townships targeted under the project;

Activity 3.1.2. Disseminate climate risk information to Dry-Zone farmers and non-governmental communal institutions in a user-friendly manner (e.g. through agro-meteorological bulletins, communal hazard maps);

Activity 3.1.3. Facilitate understanding and use of risk-relevant data, risk hazard maps and hydro-meteorological information by community and local planners.

Output 3.2. 5 climate risk information centers are established to communicate risk and early warning information to local communities

This Output focuses on the establishment of protocols for the collection, analysis, communication and dissemination of climate risk data to local farmers. The aim of this Output is to enable timely communication of climate risk and early warning information to Dry Zone farmers so that human and material losses from climate-related extremes can be avoided. Community-based Disaster Risk Management (CBDRM) committees will be established in all targeted townships to serve as climate risk information and technical knowledge hubs. A community-managed climate risk information center in each township will communicate monthly and seasonal weather forecasts, as well as rapid Early Warning on impending storms and floods. Linkages with existing national Early Warning Systems, and over-regional Early Warning Systems, such as the Regional Multi-Hazard Early Warning system (RIMES) that is hosted by the Asian Disaster Preparedness Center (ADPC) in Bangkok, 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. Analyze indigenous knowledge and autonomous interpretation of risk information in target communities;

Activity 3.2.2. Design and establish 5 climate risk information centers (including operational models for continued financial sustainability) which are actively connected to volunteer hazard monitoring networks, radio and TV-based hazard communications, operation of warning flags, flood gauges, communal sirens, and other elements as appropriate, taking advantage of with existing national and regional warning systems;

Activity 3.2.3. Establish connectivity of climate risk information centers with regional hazard warning and communication systems (such as RIMES), e.g. through communication trees, and information systems between national and regional level down to township communities.

Activity 3.2.4. Form Community-based Disaster Risk Management Committees (CBDRM) in 280 villages and develop peoples' skills on climate risk information and early warning;

Activity 3.2.5. Conduct tests and mock drills of the Climate Risk and Early Warning System to test and improve the established protocols.

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 42,000 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 42,000 rural households, approximately 37,800 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 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 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 Organisations, especially Forest User Groups.

The programme will have a range of interlinked social, environmental and economic benefits, all of which will contribute to increasing community resilience and adaptive capacity to increasing climate variability and change. The project focuses on increasing adaptive capacity through integrated management of sustainable agricultural, forestry, livestock and water resources. The following table provides a summary of key benefits of the proposed project.

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 on 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 monocropping in times of drought	
	- Limited diversification of livestock, due to economic pressures and a lack of breeding stocks	- Diversified crops and livestock production increase coping abilities after disaster events

	- Limited awareness of climate change-related impacts, emerging risk patterns and appropriate no-regrets adaptation options - Ongoing migration and encroachment on sensitive natural resources in search of animal fodder, water, fruit and fiber products	- Increased risk awareness and improved knowledge on climate change impacts enhances capabilities to undertake autonomous adaptation actions - Project interventions will improve food safety and security, enabling a balanced diet and providing additional household income from Cash for Work schemes
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	- About 500 small-scale irrigation schemes will be rehabilitated, 4,300 ha of micro-watershed will be rehabilitated, and 7,650 ha of community-based agroforestry plots will be established. This will ensure water security and reduce soil erosion, resulting in increased production from about 5,100 ha of drought-prone lands and 6300 units of additional livestock for coping mechanism - Improvements to natural livelihood capital, such as land, water, forests and biodiversity, will improve the coping mechanisms of the most vulnerable people in the target area and reduce human and material losses during extreme weather events - Dissemination of climate resilient and locally adapted varieties of crops and livestock will reduce the risk of catastrophic crop failure and irreversible losses of livestock - Effective post-harvest and storage management of improved crops and livestock will enhance food security and improve business and economic conditions
Environmental benefits	- Climate-related pressures are necessitating poor people to over-exploit natural resources which is leading to the degradation of vegetative	- Water conservation and reforestation will improve soil fertility, retain moisture, and restore ecosystem resilience

	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.	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

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 non-governmental and community-based institutions (NGOs and CBOs). '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[14] 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.

[14] 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.

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 stability: By 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 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 Organisations, such as farmer groups, self reliance groups and forest user groups. Under the UNDP-supported HDI programme, there are approximately 3400 community based organizations with 310,000 members. UNDP will build on this engagement and work with local non-governmental organizations 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 Human Development Initiative (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.

- *Cost-effectiveness of different technical options:*

During preparation of this concept, a number of different options to promote groundwater recharge and increased fresh water availability in the Dry Zone were compared in terms of cost-effectiveness and sustainability. The option to develop a large-scale spate irrigation structure on the Irrawaddy River and pump irrigation waters from the Irrawaddy into the structure was ruled out for reasons of 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. In contrast to this approach, pond renovation for villages, small diversion structures off tributaries and small-scale treadle pumping systems were found to have a better cost-benefit ratio. The use of locally available materials and the perspective to operate and maintain these systems autonomously by local communities is a critical part of the project's exit strategy, and reduces transport and operational costs.

With a view on project activities in forestry and forest conservation, the project has considered the alternative option of contracting private sector organizations to rehabilitate eroded lands. This was ruled out based on high costs of up to US$ 1000 per hectare, and the obvious reasons of limited community ownership and lack of long-term sustainability.

- *Increasing cost effectiveness through community contributions:*

Based on experiences from the UNDP-supported Human Development Initiative (HDI), out of the total cost of establishing new forest plantations, approximately 30% of costs can 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, 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.[15]

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

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

[15] With community contributions already factored in, it is not possible to confirm at this point that a larger area than the one that is proposed under Output 1.2 can be covered under the full proposal. Additional community consultations will be necessary to determine if the scope can be extended. While costs have already been compared with other internationally funded projects during AF concept preparation, the full proposal preparation phase will undertake a detailed review of costs per hectare for all plantation- and FMNR-related activities. Any savings that can be achieved will be used to increase the geographic extent of FMNR.

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.

- *Cost/beneficiary ratio of the proposed project:*

The relationship between costs of different components (provided by AF resources) and the number of direct beneficiaries is shown in the following table:

Project Components	Project Costs (US$)	Beneficiaries
Component 1 Respond to the climate-induced reduction of freshwater supply	3,718,443	42,000 households
Component 2 Climate-resilient food and livestock production systems established and promoted	2,209,800	12,600 households
Component 3 Improve communal climate risk information and monitoring	744,000	Entire Project Area

Table 3: Financial inputs per beneficiary

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 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 NAPA is expected to be completed in early 2012, with the thematic area of agriculture and forestry focusing 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.

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 the proposed strategy focuses on the mainstreaming of climate change adaptation into local planning processes. These planning processes are largely facilitated and driven by Community-based Organisations (CBOs). As the context of Myanmar is characterized by public investment shortfalls and policy implementation gaps between the national, regional and local levels, many communities in the Dry Zone are depending on autonomous ways to cope and adapt to the effects of climatic extremes. 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. 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) and the Environment Thematic Working Group (ETWG). In addition, 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.

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 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 LNGOs 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).

As shown in Fig.3, some other 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.

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 develop 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.

Over the course of the formulation phase for the full AF proposal, all stakeholders and donor-funded projects in the Dry Zone will be consulted to identify if any additional projects are under preparation or in the pipeline. The full proposal will also contain a detailed baseline analysis of existing early warning systems in the Dry Zone and their shortfalls in reaching vulnerable communities. This will avoid any duplication of efforts and geographical coverage, and enhance financial synergies with other ongoing or planned interventions.

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

Under Components 3, the project will apply the following knowledge and learning tools:

- Local media news items in local language;
- Public & school presentations;
- School field visits;
- Water management and agriculture briefs with local community groups;
- 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 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. 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.

Throughout execution of the project, lessons learned will be captured, codified and discussed among stakeholders. 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 concept note was developed in consultation with the Environment Thematic Working Group (ETWG)[16], which is currently chaired by UNDP Myanmar and comprises government departments, NGOs, academic institutions, media, donor represents, UN agencies, and representatives from the private sector. Consultations with the primary stakeholders of the project in target areas (farmer and livestock groups) have taken place and will be intensified throughout the project preparation phase to fine-tune project Outputs and Activities and finalize a cohesive implementation strategy in the target sites.

[16] 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 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.

Nr	Stakeholders	Remark
1	Farmer and livestock groups in target townships	Consultations already conducted & to be further intensified after concept approval
2	National Environment Conservation Committee (NECC)	Ministry of Environmental Conservation and Forestry (MOECAF)
3	Dry Zone Greening Department (DZGD)	
4	Forest Department (FD)	
5	Planning and Statistics Department (PSD)	
6	Livestock Breeding and Veterinary Department	Ministry of Livestock and Fisheries
7	University of Veterinary Science	
8	Department of Meteorology and Hydrology (DMH)	Ministry of Transport (MoT)
9	Drought Monitoring Centre	
10	Planning Department	Ministry of National Planning and Economic Development (MNPED)
11	Land Settlement and Record Department	Ministry of Agriculture and Irrigation (MoAI)
12	Yezin Agriculture University (YAU)	
13	Myanmar Agriculture Service	
14	• Myanmar NGO Network • Mangrove Environmental Rehabilitation Network (MERN) • Renewable Energy Association Myanmar (REAM) • Social Vision Services (SVS) • Swanyee • Myanmar Bird and Nature Society (MBNS) • Water, Research and Training Centre (WRTC Myanmar) • Forest Resource Environment Development and Conservation Association (FREDA)	Local NGOs
15	• CARE Myanmar • Solidarities • Wildlife Conservation Society (WCS) • World Concern • Mercy Corps • Action Aids • Spectrum • Biodiversity & Natural Conservation Association (BANCA) • Istituto Oikos	International NGOs
16	Royal Tree Services	Private Company
17	• FAO • UNICEF • UNDP • UN-HABITAT • UNESCO	UN agencies

Table 4: List of stakeholders consulted during AF concept preparation

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. UNDP has consulted with a number of stakeholders in identifying the targeted areas of the proposed project, and created awareness among stakeholders. UNDP has facilitated a participative process to formulate the proposed AF project with ETWG members. Information on this concept was also shared with the director of the NECC.

The Ministry of Environmental Conservation and Forestry (MOECAF) was consulted during the concept formulation phase. 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 UNDP 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 with the MOECAF, NCEA and line agencies, particularly the Ministry of Agriculture and Irrigation (Myanmar Agriculture Services, Department of Agriculture Research, 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 concept 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. In this concept, the perceptions, desires and indigenous knowledge from villagers and farmers have been incorporated based on meetings with farmers' groups, livestock groups, landless, women and youth groups. Upon approval by the AF Board, another field mission will be arranged to intensify local consultations with a broader range of people, including village elders and vulnerable/marginalized groups.

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. As indicated under the response to CR2, 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 Organisations (CBOs), such as farmer groups, Self Reliance 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.

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 the watershed areas, results have not achieved due to requirements of their full potential and an inadequate budget to follow through with policy implementation at the local level. 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 planned and 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.

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 rainfall capture, storage and water retention. After the project has ended, these communities will have access to sufficient irrigation water 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 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.

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 highlights 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 water buffalo 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.

Investment in improved varieties of crops and livestock to increase yields and buffer periods of drought is generally restricted 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 can hardly be 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 LNGOs 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.

Component 3: Improve communal climate risk information and monitoring

Baseline situation:

At present, the Department of Meteorology and Hydrology (DMH) in Myanmar provides various services 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. The disseminated information includes daily and monthly weather forecasts, cyclone and strong wind warnings, flood warnings, untimely rainfall warnings; and earthquake news. According to MAPDRR (RRD, 2009), a comprehensive Early Warning system is envisaged by the government to alert the population under threat of an imminent disaster in sufficient 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 failure of Myanmar's national early warning chain in 2008 to communicate early warning information to local villages ahead of cyclone Nargis has been an indicative weakness that needs to be urgently addressed if climate-induced threats to local villages in the Dry Zone are to be reduced in the future.

At the moment, the capacity of community based organizations in the target townships to receive, interpret, communicate and disseminate climate risk and early warning signals is very limited. 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. 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.

Adaptation alternative

Component 3 of the proposed project will enable the establishment of climate risk information centers and community-based disaster risk management committees in each of the 5 target townships. The centers will serve as information hubs for the communication of flood, drought and storm-related risk and early warning, and the CBDRM committees will serve as local multipliers. In connection with the establishment of climate risk information centers and CBDRM committees, the proposed AF project will undertake training measures to enable Dry Zone farmers to respond and adapt to changes in rainfall on the basis of short-term forecasts and longer-term climate change scenarios. The participatory establishment and analysis of climate risk and hazard maps will enable villages in the target townships to undertake decentralized preparedness and risk mitigation planning. Together, this bundle of processes will ensure that the current information and communication gap around climate risk and early warning information at the local level can be closed and villages are empowered to undertake timely and appropriate precautionary measures to counter climate-related threats.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Arrangements for project/programme implementation

In Myanmar, UNDP works under a special mandate from the 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.

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 is endorsing this AF project to be executed by UNDP directly, with a focus on delivery through local-level institutions (NGOs, CBOs).[17]

At the national level, the Project will be supported by a **Project Steering Committee (PSC).** The PSC will be formed to keep abreast of project progress and to 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. The PSC will be chaired by UNDP and include representatives from the Ministry of Environmental Conservation and Forestry (MOECAF), donor representatives and representatives from development partners (who will be nominated over the course of the project preparation phase). Please see detailed ToR in Annex C.

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

- 1 National Project Manager,
- 1 Monitoring and Evaluation Officer (data)
- 1 Financial and Administrative Assistant and
- 4 Sector Specialists (agriculture, livestock, forestry, soil conservation and water harvesting) based in Yangon.

Township-based project officers and technical and operational support staff will be stationed at townships in the target locations to facilitate smooth local implementation and backstopping of the project. The UNDP country office will cover the costs for administration and recurrent operational expenditure to run the field based project offices. Local farmer groups, community-based organizations and NGOs will lead participative 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, forestry, food security and risk information/communication. This TAG will include

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

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 TWG 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.

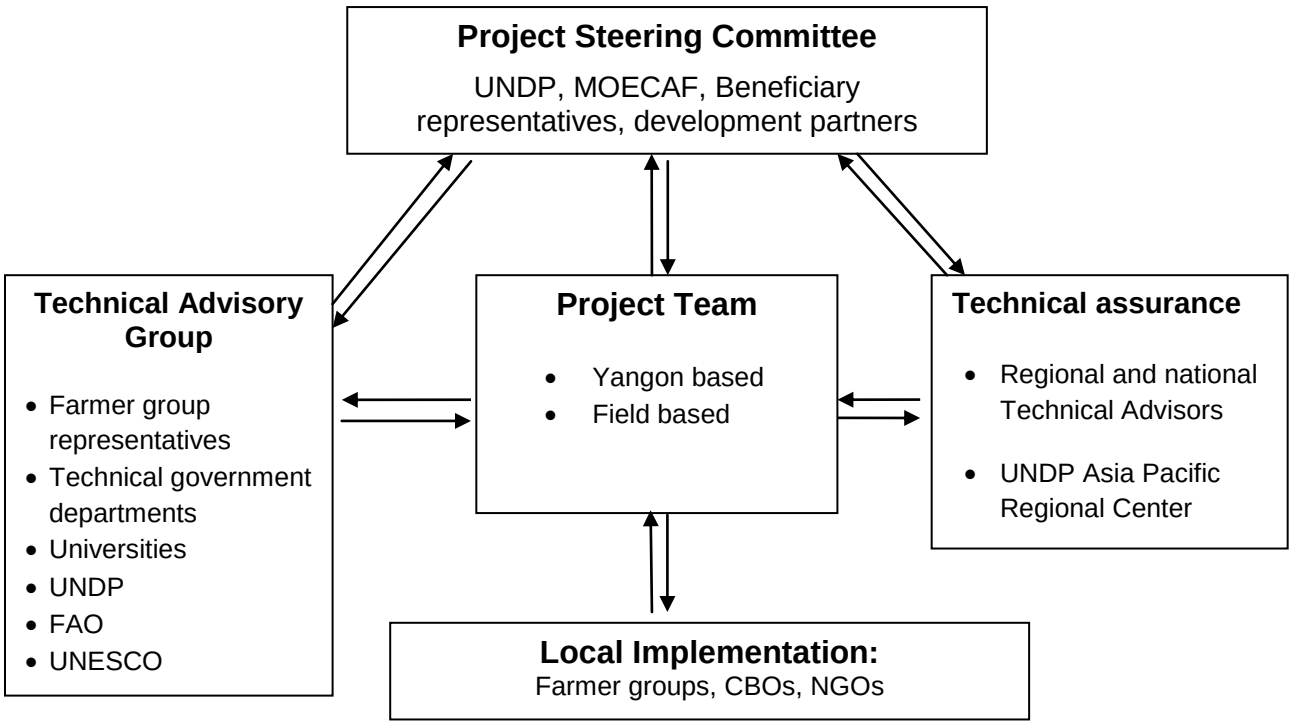


Fig.3: Organigram of the proposed project

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

A number of potential risks have been considered and analyzed in the process leading up to this AF concept. The risk management strategy of this AF project will be further fine-tuned during the project preparation phase.

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 participative 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. Primary target groups for these efforts are herder groups and community-based institutions.
3	Adaptation measures increase inequity in communities	Environmental Social	Impact: 3 Probability: 3	Local level implementation through farmer 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 vulnerable and marginalized groups.
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 participative 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 enhances capacity in a practical 'learning by doing' manner.

Table 5: Project risks

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

The monitoring and evaluation (M&E) scheme of the project will be applied in accordance with the established UNDP procedures throughout the project lifetime. The UNDP Country Office in Yangon will ensure timeliness and quality of project implementation. The M&E plan will be implemented as proposed in Table 6. Technical guidance and oversight will be provided by UNDP's Asia Pacific Regional Center (APRC) and Project Team (PT). Project audits will follow UNDP finance regulations and rules and applicable audit policies.

Project start: A Project Inception Workshop will be held within the first 3 months of project start with all persons and organizations that have assigned roles and responsibilities in the project organization structure. Representatives from the UNDP Country Office, as well as Regional Technical Advisors and other stakeholders will contribute to the inception workshop as necessary. The Inception Workshop is crucial to building ownership for the project results and developing the first year annual work plan of the project.

The Inception Workshop will address a number of key issues including:

a) Assist all partners to fully understand and take ownership of the project;

b) Detail the roles, support services and complementary responsibilities of UNDP staff vis à vis the project team;

c) Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms;

d) Confirm the Terms of Reference for project staff as needed;

e) Based on the project results framework, review and finalize the first annual work plan;

f) Verify and agree on project indicators, targets and their means of verification, and recheck assumptions and risks;

g) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The M&E work plan and budget should be agreed and scheduled;

h) Discuss financial reporting procedures and obligations, and arrangements for audits; (i) Plan and schedule Project Steering Committee meetings.

i) Roles and responsibilities of all project organization structures will be clarified and meetings planned. The first Project Steering Committee meeting will be scheduled within the first 2 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 Review/Project Implementation Reports (APR/PIRs) are extensive key reports which are prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). UNDP will assess the quality of PIRs through an external consultant, who reviews all PIRs prepared by UNDP-supported adaptation projects for completeness, comprehensiveness, analytical rigor and lessons learned.

The APR/PIR 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 Evaluation at the mid-point of project implementation. The Mid-Term Evaluation 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; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. 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 evaluation will be prepared by the UNDP CO based on guidance from the 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 Final 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. The Terms of Reference for this evaluation will be prepared by the UNDP CO 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.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager ▪ UNDP CO	Indicative cost: $10,000	Within 3 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.	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	To be determined as part of the Annual Work Plan	Annually prior to APR/PIR and definition of annual work plans
Annual Project Implementation Report (PIR)	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC	None	Annually
Periodic status/ progress reports	▪ Project manager and team	None	Quarterly
Mid-term Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC ▪ External evaluators	Indicative cost: $20,000	At the mid-point of project implementation.
Final Evaluation	▪ Project manager and team ▪ UNDP CO ▪ UNDP APRC ▪ External evaluators	Indicative cost: $20,000	At least three months before the end of project implementation

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Project Terminal Report	▪ Project manager and team ▪ UNDP CO ▪ Local consultant	None	At least 3 months before the end of the project
Audit	▪ UNDP CO ▪ Project manager and team	Indicative cost $15,000	As per UNDP regulations
Visits to field sites [18]	▪ UNDP CO ▪ UNDP APRC ▪ Government representatives	To be determined as part of the Annual Work Plan	Yearly
TOTAL indicative COST Excluding project staff time & UNDP staff / travel expenses		US$ 65,000	

Table 6. M & E Plan of the Project

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

A detailed Results Framework, including project Outcomes, Outputs and measurable, verifiable Indicators will be developed during the project preparation phase. Gender-related indicators will be specified during the project preparation phase.

[18] 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)

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

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[19]

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: 11/7/2011

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 6, 2011*	Tel. and email:undpef@undp.org
Project Contact Person: Gernot Laganda (Green-LECRDS)	
Tel. And Email: +66-81-1719740; gernot.laganda@undp.org	

[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.

ANNEX A:

UNDP 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. Any additional Implementation Support Services (ISS) which have been requested by the national entity carrying out the project are reflected directly in the project budget.

Category	Services[20] Provided by UNDP[21]	Estimated Cost of Providing Services[22]
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 idea 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. Verify technical reports and project conceptualization. Verify technical soundness, quality of preparation, and match with AF expectations.	$123,920 (20%)

[20] 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.
[21] 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.
[22] The breakdown of estimated costs is indicative only.

Category	Services[20] Provided by UNDP[21]	Estimated Cost of Providing Services[22]
	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 B:

Preliminary Breakdown of Programme Execution Costs:

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

Myanmar is a country in a special development situation, in which several UN agencies, including UNDP, work under a restricted operational mandate. This mandate precludes UNDP from supporting national implementation modality and channeling funds through government institutions. The standard implementation modality for UNDP-supported projects in Myanmar is to execute projects directly, working through local NGOs and CBOs but maintaining full financial accountability of the funds entrusted by development partners. The Government of Myanmar is aware of this modus operandi and - recognizing UNDP's positive track record in delivering community-based projects in partnership with NGOs and CBOs - has requested UNDP to implement the proposed AF project under the same institutional arrangements. The accompanying letter of support by the Ministry of Environmental Conservation and Forestry serves to explain and confirm this modus operandi, which is very specific to Myanmar and not currently applicable to any other AF projects UNDP is engaged in.

With regards to measures mitigating any conflict of interest, 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 has a financial 'firewall' that segregates project execution costs from Implementing Agency fees. 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 strictly separated and transferred to different business units. 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 A) will cover specialized services for technical and financial quality assurance of AF funds, thereby safeguarding the use of funds in line with the interests and operational modalities of the donor (AF), project execution costs are required to manage AF-funded inputs to achieve the corresponding Outputs as per project document. A preliminary breakdown of these execution costs is provided in the table below.

Cost item	Year 1	Year 2	Year 3	Year 4	Total (US$)
Human Resources					**188,248**
National Project Manager	27,600	27,600	27,600	27,600	110,400
Finance and Admin Assistant + Data Assistant	11,591	11,591	11,591	11,591	46,364
Drivers	7,171	7,171	7,171	7,171	28,684
Mandatory courses for staff	700	700	700	700	2,800
Operation costs					**239,746**
2 project vehicles	90,000	0	0	0	90,000
Fuel (vehicles and generator)	17,080	17,080	17,080	17,080	68,320
License renewal for cars	500	500	500	500	2,000
Vehicle repair and maintenance	2,500	2,500	2,500	2,500	10,000
Stationery for project office	3,000	3,000	3,000	3,000	12,000
Equipment repair and maintenance (project office)	2,500	2,500	2,500	2,500	10,000

Security + uniform costs	6,481	450	845	450	8,226
Internet usage & VSAT	3,500	3,500	3,500	3,500	14,000
Project office running cost / Sundry	6,300	6,300	6,300	6,300	25,200
M&E					**158,328**
M&E-related travel expenses	22,222	22,222	22,222	22,222	88,888
External evaluations (mid-term & terminal)	0	20,000	0	20,000	40,000
Inception and PSC meetings	10,000	1,480	1,480	1,480	14,440
Audit costs	3,750	3,750	3,750	3,750	15,000
DSC[23] and Communication[24]	7,715	7,715	7,715	7,715	**30,860**
Grand Total	222,610	138,059	118,454	138,059	**617,182**

Note: UNDP Myanmar will cover the costs for administration and recurrent operational expenditures to run all field-based project offices. The corresponding co-financing amount will be detailed and outlined in the project preparation phase.

[23] Cost of providing administration, HR and financial support to project by DEX service center in Yangon-UNDP
[24] Cost of supporting communication and advocacy

ANNEX C:

Draft Terms of Reference for Project Steering Committee (PSC)

The Project Steering Committee will be formed to keep abreast of the project progress and to 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. 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

Project Steering Committee Members:

- Senior Resident Representative UNDP Myanmar (Chair)
- Director-General, Planning and Statistics, Ministry of Environmental Conservation and Forestry
- Director-General, Dry Zone Greening Department, Ministry of Environmental Conservation and Forestry
- Donor Representatives
- 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.

ANNEX D:

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:

- Assistant Resident Representative, UNDP Myanmar (Chair)
- Representative from Ministry of Environmental Conservation and Forestry
- Representative 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
- 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.

ANNEX E:

Resources used in the preparation of this AF concept

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ANNEX F:

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
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