

Terminal Evaluation Report

April 2019

Addressing Climate Change Risks on Water Resources & Food Security in the Dry Zone of Myanmar

UNDP PIMS ID: 4703

AF Project ID: MMR/MIE/Rural/2011/1 - UNDP CO Project ID: 89618

Country:	Myanmar
Region:	Asia
Focal Area:	Climate Change Adaptation
Implementing Agency:	United Nations Development Programme
Executing Agency /Implementing Partner:	United Nations Development Programme
Government Counterpart:	Ministry of Natural Resources and Environmental Conservation
Project Timeframe:	Aug 2014 – June 2019

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Project Details Page

Project Name:	Addressing Climate Change Risks on Water Resources & Food Security in the Dry Zone of Myanmar		
AF Project ID:	MMR/MIE/Rural/2011/1		
AF CO Project ID:	89618		
UNDP Atlas ID:	79682		
UNDP PIMS ID:	4703		
Country:	Myanmar		
Region:	Asia		
Focal Area:	Climate Change Adaptation (AF)		
FA Strategic Framework:	AF Results Framework – Outcomes 1-5		
AF Endorsement Date:	Feb 2014		
Project document Signature	Aug 2014		
Planned Timeframe:	Start:	Aug 2014	Closure: Sept 2018
Actual Timeframe:		Aug 2014	June 2019
Implementing & Executing Agency /	UNDP		
Implementation Modality:	Direct Implementation		
Government Counterpart	Ministry of Natural Resources and Environmental Conservation		
Other Responsible Parties:	Dry Zone Greening Department		
Project Cost:	US\$ 8,468,604		
AF Project Grant:	US\$ 7,289,425		
Co-Financing:	US\$ 1,179,179		
	UNDP	US\$ 624,998 (grant)	
	Government	US\$ 554,181 (in-kind)	
TE Review Timeframe:	March- April 2019		
Evaluation Team:	Richard Sobey, International Consultant / Team Leader		
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- Exhibit 1: Project Information Table
- Exhibit 2: Ratings Summary Table
- Exhibit 3: Ratings & Achievement Summary Table
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Disclaimer

The TE views were discussed with UNDP, PSC members, the Dry Zone Greening Department, local government partners and other key stakeholders. There was a debriefing workshop held with the Technical Advisory Group (TAG) to present views and refine findings. UNDP, their RTA and DZGD provided comment on the report before finalization. The views held within this report are those of the TE team.

Acknowledgement

The evaluation team would like to acknowledge all project partners who supported the development of this TE. In particular, the TE would like to thank: UNDP including the Resident and Deputy Representative, and Head of Sustainable & Inclusive Growth Unit (SIGU) and staff who coordinated the TE; and the Project Implement Team (PIT) of the project who closely supported the mission in the field.

Abbreviations and Acronyms

AF	Adaptation Fund
ATLAS	UNDP tracking system
AWD	Alternate Wet Dry – water-saving tool
AWP	Annual Work Plan
AWS	Automatic Weather Station
CESVI	Cooperazione e sviluppo (an Italian NGO and project partner)
CDA	Community Development Association (a project partner)
CF	Community Forestry
CRI	Climate Risk Information
DAR	Department of Agricultural Research (MoALI)
DALMS	Department of Agriculture, Land Management & Statistics (MoALI)
DAN	A disaster early-warning application
DDM	Department of Disaster Management (Ministry of Social Welfare)
DIM	UNDP Direct Implementation Modality
DMH	Department of Meteorology & Hydrology
DoA	Department of Agriculture (MoALI)
DRD	Department of Rural Development
DZGD	Dry Zone Greening Department (MoNREC) – designated government counterpart & co-chair of PSC
EA	Executing Agency (UNDP)
ECD	Environmental Conservation Department (MoNREC)
EWS/I	Early-warning system or information
FBD	Farm Business Development (a project partner)
FD	Forest Department (MoNREC)
FERD	Foreign Economic Relations Department (Ministry of Investment & Foreign Economic Relations) – country counterpart to UNDP
GAD	General Administrative Department (of all levels of government ~ civil service)
GEF	Global Environment Facility (GEF guidelines for Terminal Evaluations are utilized)
IPs	Implementing Partners (International procurement of service providers for UNDP, a.k.a. ‘project partners’)
LBVD	Livestock Breeding & Veterinary Department (MoALI)
LFG	Livestock Farmer Group
M&E	Monitoring and Evaluation
MoALI	Ministry of Agriculture, Livestock & Irrigation
MoNREC	Ministry of Natural Resources and Environmental Conservation (government counterpart)
MTR	Mid-term review of the project
NAG	Network Advisory Group (a project partner)
O&M	Operation & Maintenance
PIMS	UNDP Project Information Management System
PIT	UNDP Project Implementation Team
PPR	Project Performance Review Reports (of/to AF)
PRF	Project Results Framework (~logframe / Strategic Results Framework)
PSC	Project Steering Committee (co-chaired by UNDP / DZGD)
Rimes	Regional Integrated Multi-Hazard Early Warning System for Africa & Asia (an inter-government & project partner)
RP	Responsible Parties (~ local hire service providers or implementing on behalf of the IPs)
S&W	Soil & Water (Conservation)
Sesame	A weather application produced by Rimes
SMART	Specific, Measurable, Achievable, Relevant and Time-bound - Indicators
TAG	Technical Advisory Group (of the PSC)
TE	Terminal Evaluation (of the project)
ToT	Training of Trainers
UNDP CO	United Nations Development Programme (AF Implementing Agency, co-chair of PSC) Country Office
UNFCCC	UN Framework Convention on Climate Change (UNFCCC)
UNITS	US\$ - US dollar; m - million or meters; ha - hectare (100 m x 100 metres); 1 ha = 2.47 acres; national currency 1,500 MMK ~ 1US\$. Local unit – basket = 21kg; gallon ~4.55 litres

Executive Summary

The executive summary is an 10-page summary of the the Terminal Evaluation (TE) report.

Project Information Table			
Project Title:	Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar		
UNDP Project ID (PIMS #):	4703	Project Concept Approval	Dec-11
AF Project ID:	MMR/MIE/Rural/2011/1	AF Board Approval	Feb-14
AF CO Project ID:	89618		
Country	Myanmar	Project Document (Prodoc) Signature	Aug-14
Region	Dry Zone (Mandalay, Sagaing, Magway)	Project manager hired	Aug-15
Focal Area	Climate Change Adaptation	Inception Workshop	Aug-15
Strategic Program	Reduce vulnerability & increase adaptive capacity to respond to climate change impacts	Terminal Evaluation	01 Mar - 30 Apr 2019
Source of Fund	AF	Closing Date	30-Jun-19
Modality	Direct Implementation		
Executing Agency / Implementing Partner	UNDP and their Project Implementation Team		
Other partners	Contractors - Hydroconseil, Win Top Engineering, Well Done Engineering, Network Activity Group, Dry Zone Greening Department, Cooperazione e sviluppo (Cesvi), Aung Than Wai, Regional Integrated Multi-Hazard Early Warning System for Africa & Asia (Rimes), Chalk & Slate, Myanmar Survey Research Farm Business Development, Aung Zayar Social Organization, Community Development Association		
Project Financing:	at CEO endorsement (USD)	at Terminal Evaluation (USD)*	
[1] GEF financing: AF	7,289,425	7,289,425	
[2] UNDP contribution:	624,998	656,430	
[3] Government:	554,181	460,245	
[4] Other partners:	0	0	
[5] Total cofinancing [2 + 3+ 4]:	1,179,179	1,116,675	
PROJECT TOTAL COSTS [1 + 5]	8,468,604	8,406,100	

*Actual expenditures and co-financing contributions through end 2018

Project Description

Climate change in Myanmar is discernable in terms of extreme weather which is unusual, severe or unseasonal weather. Examples include heat waves, extended and unseasonal droughts, and intense and unseasonal rainfall. As the world becomes warmer, extreme weather will become more common, with a greater need for climate change mitigation and adaptation. This project mainly works towards addressing the latter in the dry zone of Myanmar. The project design identified three main 'problem to solution' chains:

- Rural households and farmers have limited access to water infrastructure. Increasing soil water retention, improving the supply of clean water, and introducing efficient irrigation are recognized as measures to raise the adaptive capacity and resilience of rural farmers. Rainwater storage can reduce the need for groundwater extraction from aquifers.
- Farmers often mono-crop and rear livestock for subsistence not for sale. Seed banks only provide a limited range of certified seeds, including a few drought-tolerant varieties, but their use by farmers is limited.
- DMH produces daily, weekly and seasonal weather forecasts, but they are not effectively used by farmers in changing their livelihood practices. For example, selecting new drought-tolerant crop varieties, adjusting sowing schedules, or obtaining extra forage in preparation for a projected dry spell.

Project Strategy & Description

The project was designed with three outcomes and eight outputs:

1. Water availability is ensured during the dry seasons in 280 villages
 - a. Water capture & storage capacity enhanced to ensure sufficient water during dry periods
 - b. 4,200 hectares of micro-watersheds protected & rehabilitated through community natural regeneration

- c. 5,100 hectares of community agro-forestry plots on private & communal lands to conserve soil & water
2. Climate-resilient agricultural & livestock practices enhanced in the dry zone
 - a. Drought-resilient farming introduced to enhance the resilience of subsistence agriculture in the dry zone
 - b. Post-harvest processing & storage introduced to reduce post-harvest losses (droughts & floods)
 - c. Diversified livestock production introduced in 6,300 households to buffer the effects of drought
3. Climate-risk information disseminated through use of short, medium & long-term early warning and weather forecasts
 - a. Climate hazard & risk mapping to support community climate risk preparedness & management
 - b. Local climate & disaster risk management strengthened with climate & early warning communication

Project Location

The project was implemented in three regions and five townships: Sagaing Region - Shwebo and Monywa Townships; Mandalay Region - Myingyan and Nyaung U Townships; Magway Region - Chauk Township. The project worked in 135 out of 316 Village Tracts (43%) in the five townships with ~50,000 households.

Purpose and Methodology

The objective of the TE was to gain an independent analysis of the results of the project. The TE focused on identifying project design issues, assessing progress towards the achievement of the project objective. Findings of this review were also incorporated as sections on sustainability and impact, as well as identifying lessons learned and recommendations for the future.

Evaluation Ratings Summary

AF-financed UNDP-supported projects of this type require the TE to evaluate the implementation according to set parameters and ratings. The result of this TE is presented (see **Annex 10** for rating scale):

Exhibit 2: TE Ratings Summary Table

1. Monitoring & Evaluation	Rating	2. Implementing Agency & Executing Agency (UNDP) / Partner Execution (PIT)	Rating
Overall quality of M&E	MS	Overall quality of Implementation / Execution	S
M&E Design at entry	MS	Quality of Implementation	S
M&E Implementation	MS	Quality of Execution	S
3. Assessment of Outcomes	Rating	4. Sustainability	Rating
Overall Project Outcome (<i>Objective</i>)	S	Overall Likelihood of Sustainability	ML
Effectiveness of Outcome 1	S	Financial resources	MU
Effectiveness of Outcome 2	HS	Socio-economic	ML
Effectiveness of Outcome 3	HS	Institutional framework & governance	ML
Efficiency	S	Environmental	MU
Relevance	R		
5. Impact	Rating		
Impact	M		

Detailed ratings are tabulated below in **Exhibit 3**. A description of the scales is provided in **Annex 10**.

Exhibit 3: TE Ratings and Achievement Summary Table	
Project: UNDP AF Addressing Climate Change Risks on Water Resources & Food Security in the Dry Zone	
TE Rating	Achievement Description
	Outcomes/ Results
Results Overall Project Objective Achievement Satisfactory	<p>Objective: To reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security</p> <p>The overall TE rating at the project objective level is Satisfactory.</p> <p>Justification: Climate-change adaptations and enhanced resilience measures for rural farmers and the environment were successfully implemented in the form of: improved water supply, soil & water conservation at catchment and farm level, watershed re-greening to enhance water retention, drought</p>

	<p>and heat-resistant crop varieties, post-harvest technologies to improve food security and income, asset diversification for the landless with livestock provision, weather information for farmers and an early-warning system established. The project has achieved most of its objectives, in terms of farmer uptake of these dry zone adaptation measures. Agricultural – meteorology advisory information that is more tailor-made for the farmers still needs to be developed under a future project, as does a combined government-social approach to forest conservation</p> <p><u>Uptake of climate adaptation measures</u> – Outcome Indicator rating is Highly Satisfactory - The endline survey reported that households with insufficient food decreased from 53% (baseline) to 33%. That is equivalent to 10,109 households or 20% less. The total numbers participating in climate-resilient training was also impressive at 27,634, which included 10,026 women.</p>
Effectiveness - Outcome 1 Achievement Satisfactory	<p>Outcome 1: Water availability is ensured during the dry season in 280 villages</p> <p>The overall TE rating for the outcome is Satisfactory</p> <p>Justification: The project has achieved most of its objectives, in terms of improved village water supply, and tree planting targets. However more work was needed on the approaches for certain interventions, including: the management of trees planted on vacant land; the strategy for community forestry; the watershed water retention design and logic from check dam to collection channel to pond; and the effectiveness of agroforestry in conjunction with on-farm soil conservation.</p> <p><u>Dry zone farmers with increased water availability during dry periods</u> – The outcome indicator rating is Satisfactory - The numbers reporting a sufficient or reliable water supply rose from 82 to 91% (baseline, Sept 2016 to endline, Nov 2018). Household access to drinking water taps increased from 6% to 13%. For livestock, from 78 to 95% of survey respondents indicated a sufficient and reliable water supply, which was in part also due to the deep tube wells from which 63% (from a baseline of 32%) of respondents indicated their use for livestock in dry periods, thus increasing resilience. The project reported that 112,357 people who faced water shortages have received support and report increased water availability. That is equivalent to 49%.</p>
Effectiveness - Outcome 2 Achievement Highly Satisfactory	<p>Outcome 2: Climate-resilient agricultural & livestock practices enhanced in the dry zone</p> <p>The overall TE rating for Outcome 2 is Highly Satisfactory</p> <p>Justification: The project achieved its objectives in the transfer of dryland farming skills and introduction of new and improved varieties of staple crops – rice, groundnut, pigeon pea. It created a supply source of new seed and a delivery mechanism through lead farmers and farmer field school representatives. It worked well with and integrated activities with the DoA and DAR. Post-harvest losses were reduced, and livestock for landless and marginal farmers was successfully provided as a revolving fund. The outcome can be presented as ‘good practice’.</p> <p><u>Adaptation practices demonstrated</u> – The outcome indicator rating is Highly Satisfactory - Nine drought-resilient agricultural practices were introduced and demonstrated: Paddy rice water-saving tool; Participatory rice varietal selection; Participatory dryland farming (7 types of demonstration); (Farmer Field School - which was mainly cross-cutting with the dryland farming); Farmer seed multiplication (5 types of demonstration); Perennial trees with inter-cropping; Drip irrigation; and Post-harvest processing and storage. For livestock, the main purpose was to diversify income sources to increase resilience. The interventions were successful and competently implemented.</p>
Effectiveness - Outcome 3 Achievement Highly Satisfactory	<p>Outcome 3: Climate-risk information disseminated to dry zone households through use of short, medium and long-term weather and early-warning forecasts</p> <p>The overall TE rating for Outcome 3 is Highly Satisfactory</p> <p>Justification: The project has achieved its objectives and can be presented as ‘good practice.’</p> <p>The project was very successful in developing a basic mobile weather application for farmers, although future work is needed to include agri-advisory information, on a technical and local geographic level.</p> <p>The project was very successful in creating an approach for disaster risk planning, then implementing it with the creation of disaster risk committees, which were institutionalised within the DDM. Added to this the project was successful in creating a mobile application for EWI which was managed by DDM.</p> <p><u>Use of climate information</u> – The outcome indicator rating is Satisfactory. The endline survey reported 39% of households convert weather information into response options, mainly via TV and radio. This is equivalent to 19,712 households. This was slightly below the target, with the delivery of weather information remaining mostly via traditional media.</p> <p><u>Access to early-warning information</u> - The outcome indicator rating is Highly Satisfactory - The project produced a Disaster Alert Notification application for mobile phones, which was downloaded 13,557 times. Assuming one download per household, this would indicate 27% coverage. The project also established 75 disaster risk committees which would coincidentally indicate a 27% coverage. Thus, it</p>

	would appear that access to this EWI is in direct correlation to the households and villages that the project worked in, but without any upscaling or replication to non-target villages within the townships.
	Efficiency
Efficiency Satisfactory	<p>Efficiency Rating – Satisfactory</p> <p>Without the IPs hired to implement the activities, the project would not have been able deliver the expected results, thus in this respect, the project approach to sub-contracting was efficient. Whilst a number of interventions were often found within a village or surrounding area, it was very rare for them to be together on the same piece of land – e.g. soil conservation bunding and agro-forestry plants on the bunds; or livestock with (any) fodder production. However, there were often a number of interventions within a village, thus moving towards multi-intervention climate-smart villages in the future would be a logical step. This would include the early-warning system which should also be considered as efficient.</p>
	Relevance
Relevance Relevant	<p>Relevance Rating – Relevant</p> <p>The project was based on NAPA (2012) priorities with dry zone farming adaptation at the forefront. Sectors in which level 1 priority adaptation projects to be implemented first included agriculture, early-warning and forestry. The project design and implementation remained highly relevant, especially with climate change becoming more acute. E.g. rainfall patterns include insufficient rains for rainfed rice at the expected planting dates, which necessitate identifying shorter growth-cycle varieties, and / or using external water sources (boreholes for irrigation), for which the dry zone is not suitable.</p>
	Implementation - Execution
Implement- ation Satisfactory	<p>Project Implementation: According to the given five categories (Implementing Agency - IA or Executive Agency - EA coordination & operational matters, partnership arrangements & stakeholder engagement, finance & co-finance, M&E systems (see next), and adaptive management (work planning, reporting & communications)</p> <p>Overall Rating: Satisfactory</p> <p>IA and EA Coordination & Operational Management</p> <p><u>UNDP – Satisfactory</u></p> <p>Despite the prodoc signature in August 2014, the Chief Technical Advisor only arrived in April 2015. The Inception Workshop was held in August 2015, thus it took a year to really start the project. The 1st full workplan was only approved by the 1st PSC meeting in Dec 2015 (16 months after project start). The IPs were not hired until November 2016 (over 2 years from project start). The delay in IP hire was due to UNDP needing to develop work packages and go through standard UNDP procurement processes. Thus, despite the project being designed to start in August 2014 and end in September 2018, it was only by the end of 2016 that it began field implementation. So it was clear that an extension would be needed to create at least ‘two years’ of field work. The two years were to allow the project two annual cycles within the seasonal farming and forestry calendars. An extension until end-June 2019 was granted.</p> <p><u>Project Implementation Team – Satisfactory</u></p> <p>Partnerships arrangements were established for implementation, but these were driven by UNDP under DIM, using UNDP procurement for goods and services. Thus, the project was largely run by UNDP procuring, contracting and monitoring inputs / outputs, with PSC endorsement. The partnership between the PIT and DZGD should have been stronger, not least in DZGD gaining project management experience for the future. The PIT contract management included a tracking system with IP against deliverables against payment milestones. To give an indication of the scale of this, there were 17 IP contracts with 94 payment milestones. The project was multi-sector, but the government counterpart (DZGD) was not organized to coordinate work across sectors. Their capacity and interest of was not a perfect fit with the project design. Under the project agreements, they lacked any mandate for project management, administration or supervision, apart from facilitating the PSC as co-chair once the project was well underway in August 2016 (date of 2nd PSC meeting), i.e. two years already into the 4-year project. From the government side, they also lacked an ‘official’ mandate, having been delegated the project at this point.</p> <p>Partnership Arrangements & Stakeholder Engagement</p> <p>Institutional mechanisms are the backbone for delivering new policies and services. The project developed a number of key partnerships including:</p>

	<ul style="list-style-type: none"> - DoA and Department of Agricultural Research (DAR) – The project on behalf of government, could not have achieved its capacity building objectives in agriculture without the close interest and involvement of these two departments. - DDM – They were instrumental in taking leadership in the creation of village and township-based disaster risk management committees. They established a new key institutional mechanism for the delivery of early-warning information - Yezin Agricultural University – They collaborated closely with both the DoA / DAR and the project in the field testing on new drought-tolerant rice varieties <p>Finance</p> <p>Under DIM, the PIT submitted invoices to UNDP on behalf of the IPs, who were then paid directly. The project didn't undergo any audits, except as part of general country audits in 2018 and 2019. Up to end-December 2018, US\$6.63m has been spent from a budget of US\$6.74m. Expenditures were kept within outcomes and largely within 10% of expected output budget lines. Expected expenditure at closure is \$8,406,100 including government and UNDP co-financing of \$460,245 and \$656,430 respectively.</p> <p>Adaptive management (work planning, reporting & communications)</p> <p>The project maintained a regular work planning regime – monthly, quarterly (project and with the TAG), biannual review together with annual planning and budgeting. The reporting system was extensive, although it should not be confused with or seen as replacing M&E requirements. Annual reports indicated progress against workplan and budget; the PIT kept AF project performance reviews (PPRs) covering finances, risks, ratings, indicators, lessons, and a results tracker.</p> <p>UNDP and PIT communications were good, however the PIT, despite being housed within DZGD, didn't really manage to mobilise sufficient or added institutional support from DZGD. For example, the DZGD as the officially designated government counterpart should have been co-hosting workshops, gaining a consensus and working towards common implementation approaches, such as on community forestry.</p>
	Monitoring & Evaluation
M&E Moderately Satisfactory	<p>M&E Systems – Design & Implementation</p> <p><u>Overall quality of M&E – Moderately Satisfactory</u></p> <p><u>M&E at Design – Moderately Satisfactory</u></p> <p>The M&E Framework largely reiterates project documentation, especially reporting requirements and the results framework with its targets. What it doesn't do is differentiate reporting tasks from standard M&E tasks in terms of results tracking requirements. The framework does include the AF best practice and lessons learned templates.</p> <p><u>M&E Implementation – Moderately Satisfactory</u></p> <p>The M&E system included excel spreadsheets on all trainings conducted by output, with title, date, location, participants – disaggregated by gender. The project also kept the logframe results updated, such as total hectares planted or numbers trained. However further data on interventions was largely kept by project staff and the IPs, thus collating (e.g. number of villages an intervention was delivered in; number of demonstration plots; length of catchment channels) was not easy. The M&E system also failed to keep a tally on the planting figures (which were complicated), partly because the M&E system was designed to fit into the logframe and was not as a bespoke system monitoring what the project actually did. This is a common short-coming.</p> <p>The project initiated external baseline and endline surveys, which provided some useful information, with respect to capturing higher level impacts on food and water security. An MTR was undertaken / reported rather late in December 2017 / January 2018. The TE ratings are the same, except for the three outcomes where this TE indicates one grade higher for each. The project's exit strategy was usefully undertaken.</p>
	Sustainability
Sustainability Moderately Likely	<p><u>Sustainability:</u> According to the four risk categories (financial, socio-economic, institutional & governance and environmental), present status, and towards the future is assessed.</p> <p>Overall Rating: Moderately Likely - There are moderate risks, but expectations are that at least most of the outcomes will be sustained.</p> <p>Financial Risks to Sustainability – Moderately Unlikely – There is a significant risk that key outcomes will not carry on after project closure, although some outputs should carry on.</p> <p>Since 2012, there has been a significant increase in government funding in climate change, environment, rural development, dry zone greening; agri-research, and weather forecasting systems. The level of funding from donor projects has also significantly increased since the beginning of the decade.</p>

	<p>However, without proven sustainable re-greening methods, and without the government interest in community forestry, the willingness of donors to support forestry in the dry zone is unknown. The rural development approach here probably needs to start at the beginning with 'village development planning'. For forestry as a key output, there is a significant risk that any success and lessons learned will not be built upon after project closure, due to a lack of ownership and responsibility.</p> <p>Socio-Economic Risks to Sustainability - Moderately Likely - There are moderate risks, but expectations are that at least some or most of the outcomes will be sustained</p> <p>The livelihoods of project households have improved significantly. Water supply had been lessening for 20 years, due to higher watershed degradation and changing climate patterns. The project made an extensive investment in water supply and conservation infrastructure. With a number of modern design tube wells installed, there is greater water security. The project development and support to paddy rice field trials is yielding benefits, as is the DAR groundnut selection program. The FFS approach has been highly successful. Capital asset diversification in the form of 'livestock banking' for marginal households has been successful.</p> <p>Institutional Framework & Governance Risks to Sustainability – Moderately Likely - There are moderate risks, but expectations are that at least some or most of the outcomes will be sustained</p> <p>The forestry tree planting on vacant land lacks management and ownership. There was a lack of partnership between DZGD and FD concerning community forestry (CF), in part due to the lack of political willpower by higher government levels. This may have been due to the expectation that extensive CF without checks & balances could open up forest land tenure and management rights, not only in the regions, but in the (ethnic) states as well. As a process, CF needs to be implemented together with VDP and land use planning and land allocation (LUPLA). MoNREC in its present form was established in 1992 and is considered stable, but also with their FD, did not take any lead in the CF process.</p> <p>Water user groups were established to operate and maintain the tube wells, pumps and tanks, which largely negates the need for government funds. Thresher and grain storage groups have been established to operate and maintain the equipment, which should ensure their sustainability. Lending to livestock farmer groups has been underwritten, which should also support sustainability. The capacity built within DoA and DAR bodes well for the future.</p> <p>The disaster risk management system committees set up at township and village level with the key institutional support of DDM are expected to be sustainable. The weather and early-warning mobile applications – Sesame and DAN are government-owned, thus they can be considered sustainable.</p> <p>Environmental Risks to Sustainability - Moderately Unlikely – There is a significant risk that key outcomes will not carry on after project closure, although some outputs should carry on.</p> <p>The project afforested ~5,500 ha, which is ~10% of the overall DZGD plan, annually for two years. However, there is a significant management issue, with it being too early to evaluate longer-term watershed benefit. There is a significant risk that key outcomes such as forest cover will not be maintained after project closure, due to lack of grazing control and the in-grained habit of pre-monsoon land clearance using fire. In the future, an additional important impact from tree planting may be carbon capture.</p> <p>The project supported an extensive livestock production intervention, without really supporting fodder production. One of the key driving forces for land degradation in the dry zone is lack of grazing control. Thus whilst, the project may have diversified income for the poor, marginal and landless, it has come at an environmental cost which the project was trying to address.</p>
	<p>Impact</p>
Impact Minimal	<p><u>Impact:</u> According to the three categories (Significant, Minimal or Negligible), present status and towards the future</p> <p>Rating: Minimal</p> <p><u>Reduction in stress on ecological systems</u></p> <p>It is too early to assess any reduction in stress on the ecosystem. For example, whilst water supply from aquifers has been increased, without monitoring usage (especially if livestock production heavily increases due to year-round water availability secured), a significant draw-down may occur over the next 20 years. Thus, the solution is medium-term, not long-term.</p> <p>Over the last 20 years, the farmers in both Myingyan and Shwebo indicated that their paddy rice crop losses amounted to over 50% lost 5-6 times. Over the same period, in Shwebo, their rice yield is 1,037 kg / ha higher due to farmer and state varietal breeding, increase inputs, and better storage. Under the project, the drought-tolerant Yeanaelo-4 rice variety, showed a 519 / kg / ha increase.</p>

	<p>Regarding weather information, one of the identified needs for the future, is drought monitoring and forecasting which requires not only rainfall data, but vegetation index and well as surface - groundwater data. The project with the support of Rimes, in collating 30 years' of historical weather data. has gone some way towards more accurate drought monitoring.</p> <p><u>Regulatory & policy change</u></p> <p>The project was not designed to support the revision of laws or policies, but it was in-line with objectives and demonstrated approaches in the field, particularly for agriculture, the dissemination of weather information and the creation of an early-warning institutional structure. The only deviation concerned CF, where the forestry laws and political willpower didn't converge, however the project demonstrated an approach in the field.</p> <p>Catalytic Effect</p> <p><u>Scaling-up and Replication</u></p> <p>The project was implemented in 28% of the villages in the five townships, thus there is an opportunity to scale-up. The main catalytic effects concerned agriculture. Seed multiplication involved a cycle of stakeholders and activities from state / farmer seed producers to community seed bank to recipient farmer to technical support from DoA / DAR. Farmer-managed seed multiplication should be scaled up. The project prepared township & village seed maps to identify the availability of seed for distribution. Currently, 411 farmers are receiving the certified rice seed from farmer-managed seed multiplication farms. In the winter of 2018, the project provided 30 tons (1,426 baskets) of certified rice seed to the 36 seed storage user groups to use as revolving funds. Seed multipliers and seed bank committees still require training, with the involvement of FFS lead farmers in the transfer of production knowledge.</p> <p><u>Demonstration and Production of new technologies /approaches</u></p> <p>The project did not always differentiate clearly between demonstration plot and all plots or farmer participation, which meant that understanding the replication / outreach effort was difficult. For the adoption rate of new agriculture techniques, the endline survey (2018) indicated that from those attending training, 41% adopted, which is highly significant. However, from those becoming aware of new techniques, only 17% were able to disseminate such knowledge, which indicates a replication approach and delivery mechanism that is partly missing something. Similar figures exist for livestock husbandry, although more farmers are aware, but with a lower 11% able to disseminate, again indicating the need for an institutional delivery mechanism. On the positive side, the 'landless' target group, trialing / adopting the livestock activity was proportionately higher, as per the project design.</p>
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Conclusions

The project implemented a wide array of interventions in 280 villages in five townships. It took two years to get the project active in the field due to the slow procurement of UNDP's partners (many), and the late agreement by government to start the inception workshop. Without the Team Leader and UNDP identifying the best available service providers / contractors, the project would not have been delivered and certainly not effectively within two and a half years. There was a remarkable effort to attain targets which was facilitated to a large extent by these very capable partners who were hired on two levels – international / external call for proposals and national short-listing and bidding. Four of these main partners were Cesvi, NAG, CDA and FBD for the farm and forestry activities. The tube-well and water infrastructure construction companies were professional and used best practice designs. Other partners, such as Rimes for weather data presentation, and AZSO¹ for the Shwebo canal renovation produced very useful outputs. One government department, DZGD, also acted as a contractor in the supply of 2m tree seedlings.

There was a large support effort from a number of key government departments who were given the opportunity to learn, be active and 'get involved'. These included DoA (and DAR), DMH and DDM. The FD and DZGD became more involved once the tree plantation work got underway. However, in some cases government departments could have been more proactive in learning and building their capacity or perhaps playing a wider role. This was more true of DZGD and FD. In the case of DRD, their interest was high, but defining their supporting role was difficult.

Water supply was significantly improved with modern tube wells installed, which provide year-round water security. With the renovation of the Kin Tat Canal, there has been a significant increase in clean water supply for Shwebo and for irrigated land.

On developing packaged messages, the project didn't quite manage to consolidate the S&W conservation

¹ Aung Zeyar Social Organization

measures at either watershed or farm level. At the watershed level, there were insufficient erosion / flooding side-spur channels connected to the main catchment channels leading to the retention ponds, and the check dams were often missing silt traps. The understanding of this 'watershed to village' S&W conservation model (with check dam to channel to pond linkage) was poor. The added and needed link with tree planting and grazing control was also tenuous. At the farm-level, the physical soil conservation structures such as bunding were not linked with agroforestry or other vegetation planting. In both cases investments were spread thinly with resulting loss of quality in design and demonstration effect. On the plus side, the S&W conservation manual was good.

The project also 'chased its targets', and therefore lost out in a couple of areas including identifying an agreed approach for community forestry (CF). Furthermore, FD and DZGD didn't effectively support the project in CF due to lack of political willpower. CF should have been converted to a demonstration activity with regular regional and national workshops to build such a consensus. However, the technical approach to CF implemented by the project should be considered as a process now demonstrated for government. Concerning re-greening, the project provided a large scale and significant intervention demonstrated across land ownership types and equivalent to ~10% of the government planting target for two years.

Technically, the agriculture interventions were the most impressive, not least because they worked, but also because they included institutional capacity building (with DoA / DAR) and delivery mechanisms (FFSs and the creation of multiplication farmers and community seed banks). They were packaged exceptionally well. The rice and other crop trials are already being replicated without the project and will be sustainable with limited government support to the appropriate line agencies. The alternate wet and dry (AWD) water-saving tool was a success as was the post-harvest equipment – threshers and grain silos – which with self-managed groups and committees and fees for O&M, appear sustainable. Added to this, the silos allow for the improved seed multiplication intervention to become sustainable. Thus, the benefits here are significant. In terms of diversifying income for landless and marginal households, the livestock revolving fund was successful, albeit with concerns regarding the feeding and control of a significant increase in the number of goats.

For weather forecasting, the climate application called Sesame was the latest technology and liked by the farmers, however the data provided is mainly weather data and not agri-advisory as claimed within the project documentation. This is for a future development or project. Also, there are township-level automatic weather stations (AWSs) in the dry zone, but this rainfall data is not being presented to the farmers via agri-advisories or otherwise. DMH does provide a seasonal forecast, which provides more information. With close support of DDM, the project created an early-warning institutional mechanism and system, also with a mobile application called Disaster Alert Notification (DAN). This was useful and appreciated.

This dry zone project was one of first designed after the change of government, with lessons only now just being learnt. On the question of direct versus national implementation modality, this is decided on a UN / central government level, but the question is 'would a future project benefit more from NIM in terms of rural development?' The answer is probably not just yet.

Lessons Learned

Climate resilience & adaptation measures (key lessons)

Watershed management

As a packaged message, the project didn't quite manage to consolidate the S&W conservation measures at either watershed or farm level. At the watershed level, there were insufficient erosion / flooding side-spur channels connected to the main catchment channels leading to the retention ponds (which also needed clay-lining), and the check dams were often missing silt traps. The understanding of this 'watershed to village' S&W conservation model (with check dam to channel to pond linkage) was poor. The added and needed link with tree planting, grazing and fire control was also tenuous. At the farm-level, the physical soil conservation structures such as bunding were not linked with agroforestry or other vegetation planting. In both cases investments were spread thinly with resulting loss of quality in design and demonstration effect. On the plus side, the S&W conservation manual was good, but lacked a designated department to align with.

Water supply from aquifers

For the deep tube wells, the water committees need to monitor water extraction (using meters), so that excess use or low availability (pressure) can be identified early. The dry zone is not generally suitable for irrigation, and groundwater aquifers certainly should not be used for irrigation, as this will only exacerbate future (drinking) water security.

Irrigation

With the renovation of the Kin Tat Canal, there was a significant increase in clean water supply for Shwebo City and for the surrounding irrigated land. However, irrigation water should only be provided by river supply or managed reservoirs in the dry zone.

Agriculture

Technically, the agriculture interventions were the most impressive, not least because they worked, but also because they included institutional capacity building (with DoA / DAR) and delivery mechanisms (FFSs and the creation of multiplication farmers and community seed banks). They were packaged exceptionally well. The rice and other crop trials are already being replicated without the project and will be sustainable with limited government support to the appropriate line agencies. The alternate wet and dry (AWD) water-saving tool was a success as was the post-harvest equipment – threshers and grain silos – plus with self-managed groups and committees and fees for O&M, appear sustainable. Added to this, the silos allow for the improved seed multiplication intervention to become sustainable. Thus, the benefits here are significant.

Livestock

In terms of diversifying income for landless and marginal households, the livestock revolving fund was successful, albeit with major concerns regarding the lack of parallel fodder production and grazing control.

Forestry

Tree planting and community forest management are two very different activities, the former may involve labour being paid to plant, as per the project, whereas the latter often involves protection in return for agreed resource use. Thus, the planting of trees should not be confused with the future management rights of those trees, and not forgetting that if international development funds have paid for the community planting, then there is a case for community management and resource use in these areas. Such land tenure and management agreements need to be agreed by government at the project design phase, which means that the land also needs to be identified at this stage. Tree planting on vacant land without appropriate management is not sustainable. A new strategy with an institutional mechanism and local partnership approach is needed, with the focus on rewards for maintaining tree cover for more than 10 years.

In the case of the community forestry (CF), a technical process was demonstrated for government, but it needed more of a national platform and regional workshops to build a common approach, otherwise the intervention should have been converted to a demonstration activity only. In terms of CF establishment, any future project needs to partner with the forest department (FD) at a much higher governmental level (with MoNREC and MoALI / DALMS) with influence in decision-making and policy. Future projects with village development planning (VDP) and land use planning & land allocation (LUPLA) could also include CF as demonstration activities. VDP is often needed as an entry point to equitable land allocation, especially on a community level.

Replication / Upscaling (key successes)

Packaging and delivering during a project

It is often not the measures per se, but the packaging and dissemination approaches, though government departments and media (radio/ TV), that need to be tested, adopted, and mainstreamed. This was not built into the design. E.g. Agriculture intercropping methods – these were very successful and could quite easily be upscaled via information about the seed banks on local radio.

Agriculture

Crop breeding, i.e. farmer participatory seed selection with farmer multiplication and farmer field schools (FFS) should be expanded and strengthened. The AF project was a major field test in approach (in participation, partnership and in technical delivery), but for continuity and sustainability in resilience, future projects are needed.

Community / National Interest (future consolidation)

Climate-smart villages

The overall benefits of combining a number of interventions in one location would have had a greater overall impact. Future projects could / should move towards multi-intervention 'Climate-smart' villages. To increase income security in these villages, interventions could include: village saving and lending groups, income diversification and improved market linkages / value chain additions. Lessons from other projects often include working with local production groups, but registering them so that they maintain more control over market value and avoiding middle-men.

Gender

The participation figures for women appear acceptable, but their participation could have been written into local group rules, such as 25% committee membership for water, thresher, livestock, and CF groups.

Weather and crop advisories for farmers

The project documentation described 'agri-advisories' but in reality, only weather forecasts were produced, and not allied farming-based information. Cumulative rainfall data from the dry zone AWSs needs to be accessible to farmers and utilised to prepare agri-advisories. A future project probably needs to support training of the next generation of agri-meteorologists. The collaboration with Rimes and the Sesame mobile application should also be continued to develop such tailor-made information for dry zone farmers

Early-warning

With the close support of DDM, the project created an early-warning institutional mechanism and system, also with a mobile application called Disaster Alert Notification (DAN). This should be upscaled.

Soil & Water Conservation

The on-farm S&W conservation measures heavily focussed on major bunding exercises using machinery, and less so on a range of broad S&W conservation measures, including integrating with vegetation establishment. By design, these interventions were largely out of the reach of many farmers. The lesson is that these measures not only need combining, but they need farmer-group establishment to share investment costs with the government and future projects.

Knowledge sharing & management (key lessons)

The project's modus operandi was to extensively train and build capacity, which was effective, but stretched across <30% of the villages in the five townships. There could have been better use of standard dissemination approaches such as using local media (TV and radio). More time should have been spent for consolidation of results, lessons learned and preparation and delivery of knowledge products, but this was largely a design opportunity missed in favour of attaining targets. Neither the project nor the government created a depository or website for project technical reports or data. This is perhaps more pertinent, as there isn't an immediate window for a UNDP / AF second phase. There was however a UNDP portal with project videos and news reports, but this should be considered more of a promotional exercise for the international audience.

The learning objectives were best developed for agriculture which required new thinking (the water-saving tool – same yield with less water), testing conventional wisdom (old variety of crop is better because it looks better) and accepting a theory of change (DoA / DAR wishing to learn from the project so that they could copy in the future). Whereas the learning objectives for forestry, which also required a highly developed approach, as it involved planting on various land types, including mostly untenured land, and needed management agreement on resource use rights, was not developed. In fact, under forestry, there was an opportunity to develop 'community forestry' as a management approach or mechanism, but this was spurned (by government), in favour a tree planting for the sake of the action itself. Another lesson for CF under the project, would be for it to be externally evaluated, with the results becoming part of a more comprehensive review of CF in Myanmar.

Recommendations

Exhibit 4: Key Recommendations Table

The recommendations are listed with the responsible party identified in brackets.

1. Water supply – For the deep tube wells, the water committees need to record aquifer water extraction over time, starting with the installation of water meters if not already done. [government – DRD / Water committees]
2. Water supply – The reservoir at Thaputsu Village (Nyaung U) needs to be reduced in size and clay-lined as a new project. Village protection of this natural conservation forest area also needs to be strengthened. (The UNDP project supported extensive enrichment planting of the watershed to increase water supply to the reservoir). [government / donor community]
3. Watershed management – Catchment-level soil conservation measures – check dams and silt traps need to be constructed in conjunction with flood / erosion control spurs or side channels, which in turn need to be connected to main channels leading to water retention ponds. These catchments additionally need to be vegetated and protected from seasonal fire and livestock. [government / NGO community]
4. Forestry – The next community forestry (CF) project needs to partner with the forest department (FD) at a much higher region or central level. The approach needs to be determined in the light of the new Forest Law (2018) and updating of CF instructions (2016), especially in respect of applications for CF on vacant land [government / donor community]
5. Forestry – Future projects with village development planning (VDP) and land use planning & land

allocation (LUPLA) should include CF as demonstration activities [government / donor community]

6. Forestry – Tree planting on vacant land without appropriate management is not sustainable. A new strategy with an institutional mechanism and local partnership approach is needed, with the focus on rewards for maintaining tree cover for more than 10 years. [government – DZGD / donor community]
7. Agriculture – Crop breeding – farmer participatory seed selection with farmer multiplication and farmer field schools (FFS) need expansion and strengthening - the UNDP project was a significant step for increasing resilience, but for continuity and sustainability, future projects are needed [government – DoA, DAR, YAU / donor community]
8. Agriculture – The concept of climate-smart villages should be explored in future projects [government / NGO community]
9. Soil & Water Conservation – On-farm S&W conservation, physical measures such as bunding need to be prepared in conjunction with vegetating those bunds with agro-forestry or other species [government / NGO community]
10. Weather information for Farmers – Cumulative rainfall data from the dry zone automatic weather stations (AWSs) needs to be accessible to farmers and agri-advisories developed. These advisories could also be presented on farmer radio shows together with key weather forecasts at days at 8, 18, and 28 days. The advisory needs a national delivery mechanism for the dry zone [DMH / donor community and / or RIMES]

1. INTRODUCTION

1.1. The project

The UNDP-supported, Adaptation Fund (AF)-financed project is titled 'Addressing Climate Change Risks on Water Resources & Food Security in the Dry Zone of Myanmar (PIMS 4703)'. The project started in August 2014 and will end in June 2019. The TE was conducted March – April 2019; including preparatory activities, inception report, desk review, field mission (March 2019), and completion of this TE report.

The 4-year UNDP-AF project is under Direct Implementation Modality (DIM) with UNDP as the Implementing and Executing Agency on behalf of AF. The project is implemented in partnership with the Ministry of Natural Resources and Environmental Conservation (MoNREC). The project is managed by a contracted Project Implementation Team (PIT), situated within the Dry Zone Greening Department (DZGD) of MoNREC in Patheingyi Township in Mandalay Region. UNDP and their PIT are supported by a Project Steering Committee (PSC) and a Technical Advisory Group (TAG).

The project is first in Myanmar that directly responds to the country's climate change adaptation needs and demonstrates Myanmar's commitment to the Kyoto Protocol (UNFCCC), to which it is a party. The project is a stepping stone for Myanmar to build its institutional capacities, and to integrate climate risks in development planning, as well as build a strong foundation for future investments in this area.

1.2. Purpose of the evaluation and report structure

This is the Terminal Evaluation (TE) of the project. The objective was to gain an independent analysis of the achievement of the project at completion, as well as to assess its sustainability and impact. The report focuses on assessing outcomes and project management. The TE also considered accountability and transparency, and provided lessons-learned for future UNDP-supported AF-financed projects, in terms of selection, design and implementation.

This report is in six sections - introduction, description, findings, sustainability, impact and conclusions / recommendations. The UNDP-GEF rating scales are described in section 1.5. These are the required scales for AF financed projects. The findings (section 3) are additionally divided into strategy and design, implementation and management, and results.

1.3. Scope and Methodology

Approach

The approach and methodology of the evaluation followed the guidelines outlined in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported GEF-financed Projects (2012). The TE was an evidence-based assessment and relied on feedback from persons who were involved in the design, implementation, and supervision of the project. The TE team reviewed available documents (**Annex 7**), conducted interviews with a full range of stakeholders at national, regional, district and township level including holding focus group discussions in 18 villages (**Annex 6**). The international consultant was the team leader and responsible for quality assurance, consolidation of the findings, and the TE report. Close support was provided by the National Consultant throughout the process. The field mission took place from 4th – 22nd March 2019, according to the itinerary compiled in **Annex 11**. The agreed upon agenda included a UNDP briefing / debriefing on 4th and 22nd March, with a stakeholder workshop (which was also a TAG meeting) on 21st March. There were no security issues which affected the TE. Usual precautions were undertaken, with the project 4WD vehicle provided for the field.

Methods

The TE determined if the project's building blocks (technical, financial, management, institutional) were put in place and then, if together these were catalysed sufficiently to make the project successful. The TE method was to utilise a 'multi-level mixed evaluation', which is useful when evaluating delivery of a new service or approach, being piloted either directly by a multi-lateral organisation or by state institutions. The method allows for cross-referencing and is suitable for finding insights which are sensitive and informative. The rating scales are provided in **Annex 10**. Pro-forma questions on key themes such as those provided by the UNDP GEF guideline were updated by the TE (**Annex 13**).

Main partners and Stakeholder feedback

The TE interacted with the Project Implementation Team (PIT), the UNDP Country Office as well as with technical staff in all the relevant government departments. The TE also visited the project regions to discuss the interventions with local administrators, technical staff and beneficiaries. Gaining a representative view from stakeholders was only limited by time. Additional telephone / email interviews with the stakeholders were arranged as necessary. **Annex 6** provides a list of the 93 persons that the TE met and **Annex 11** is the mission schedule.

The implementing stakeholders met were: Nay Pyi Taw offices (Environmental Conservation Department; LBVD: DMH and YAU, DAR); Mandalay regional government (DZGD, LBVD, DoA, DMH, Irrigation, FD; TAG members); All township governments except Monywa; DALMS offices in 1 district and 1 township; DMH - AWS stations in 3 townships; Yangon – UNDP (start and end), Rimes, UNOPS; Project PIT – a number of meetings; Field – CESVI and NAG. The villages visited for discussions were:

- Shwebo - Gway Pin Gone; Ma Khauk; Min Bay; Ma Eu; Kyaung Pan Kan; Kin Tat Canal (AYSO)
- Monywa – Daing; Auk Saint Taw; Nyaung Pin Ywar Thi; Kyawk Kwe
- Chauk - San Kan; Thit To Kan; Tha Lone Thwe
- Nyaung O - Tha Put Su; Da Hat Kan
- Myingyan - Htan Taw Gyi; Nyaung Won; Kyauk Kan; Tha Nyut Kan

Ethics

The review was conducted in accordance with the UNEG Ethical Guidelines for Evaluators, and the reviewers signed the Evaluation Consultant Code of Conduct Agreement (**Annex 15**). The TE team ensures the anonymity and confidentiality of individuals who were interviewed. In respect to the UN Declaration of Human Rights, results are presented in a manner that clearly respects stakeholders' dignity and self-worth.

2. PROJECT DESCRIPTION

2.1. Development & Political Context

AF Climate Change Adaptation objectives:

The Adaptation Fund (AF), established by the Parties to the UN Framework Convention on Climate Change (UNFCCC), provides access to funds for adaptation projects in developing countries that are parties to the Kyoto Protocol. The project is aligned with the AF Results Framework Outcomes:

- 1 Reduced exposure at national level to climate related hazards and threats
- 2 Strengthened institutional capacity to reduce climate-induced risks linked with socioeconomic & environmental losses
- 3 Strengthened awareness & ownership of adaptation & climate risk reduction processes at local level
- 4 Increased adaptive capacity within development and natural resource sectors
- 5 Increased ecosystem resilience in response to climate change and variability-induced stress

Sector-wide linkage with the International Community

- Under UNFCCC, national priorities were taken into account in the National Adaptation Programme of Action (NAPA, 2012) with thematic areas including agriculture & forestry, and water resources. The 1st thematic area focuses on the need to climate-proof rural water management, safeguard agricultural output from flooding and drought, combat erosion, rehabilitate degraded lands and improve early-warning systems.
- UNFCCC – 1st National Communication (2012) - provides a number of detailed comments on the dry zone, and makes the case for climate change adaptation projects such as this one. It mentions community forestry (p105) as tree planting activities by communities on common lands, based on direct participation, including processing the products. Also, according to community forestry (CF) instructions (Forest Department, 1995), active participation is to play a key role in the rehabilitation of degraded areas, and to meet the needs of rural people.
- The project contributes towards the 2016 UN Sustainable Development Goals (SDGs) and their targets in particular Goal 13 (urgent action to combat climate change and its impacts) including its targets 13.1 (strengthen resilience and adaptive capacity to climate-related hazards & natural disasters) and 13.2 (integrate climate change measures into national policies, strategies and planning).
- UN Development Assistance Framework (UNDAF, 2018-22) - The programme addresses priorities:
 - o Natural resources & environment - (SDG 15.1.1 - Forest area as a % of total land area); Target - Annual increase in

- forest estate of 1.7% during 2016-30 and at 40% of total land area by 2030. This fitted with the project-targeted conversion of vacant land to forest estate / community forest.
- Disaster Risk Management - (SDG 11.5.1) - Deaths and affected persons attributed to disasters. This matched the project interventions on disaster risk management, supporting DDM, & early warning system (EWS) development
 - Country Programme Document (UNDP, UNPF, UNOPS, 2018-22) – The CPD is aligned with the UNDP Strategic Plan (2018-21) and UNDAF (2018-22), including relevance to the project in terms of SDGs: addressing climate change and building disaster resilience (Goal 13); and reducing poverty and inequalities (Goal 1), empowering people, increasing women's employment and financial inclusion (Goal 5).

Project linkage to National Planning

- Forest Law (2018) – MoNREC recognises natural forests conserved by residents with the recommendation of the Nay Pyi Taw Council and the region, state or Myanmar government's approval. Replaces the 1992 Forest Law
- Community Forestry Instructions (2016) – MoNREC Union Minister Office Notification No (84 /2016) - Approved by MONREC according to Forest Law section (57-b). It contains 50 articles in 20 pages on how to establish and register community forests, however this CFI was based on the 1992 Forest Law, Article 57, which has now been replaced.
 - Article 4 – CF can be established in the following lands, by government, those with authority or others who have land management rights or owner permits: (a) Reserved Forest Estate, Protected (Conservation) Areas, Buffer zone adjacent to Protected Areas and Land at the disposal of, or under the management of government; (b) Land under the management of government agencies; and land owned by private and NGOs.
 - Thus Article 4 indicates that vacant land is eligible for CF as it is under the management / disposal of government.
- Sustainable Development Plan (2018-30) - The indicator framework for the Myanmar SDP is under formulation with UNDP. It contains Goal 5: Natural resources & environment for posterity (Strategy 5.1: Ensure a clean environment with healthy and functioning ecosystems; 5.2: Increase climate change resilience, reduce exposure to disasters and shocks while protecting livelihoods; 5.3: Enable safe and equitable access to water and sanitation; 5.5: Improve land governance & sustainable management of resource-based industries ensuring our natural resources give benefit to all)
- National Sustainable Development Strategy (NCEA, 2009): Harnessing seasonal water flows and improving storage capacity; improved water application techniques; and reducing post-harvest loss, developing drought-resistant, fast-maturing varieties, soil conservation (terracing, construction of check dams, afforestation, & natural regeneration) to improve soil fertility; reorienting agricultural extension & research to respond effectively to farmers' needs; introducing agro-forestry, community forestry (MOECA, 1995), Sloping Agricultural Land Technology (SALT) on cleared lands.
- Myanmar Reforestation & Rehabilitation Programme (MoNREC, 2017-27).
 - The 10-year plan indicates the responsibility for forestry: Forest Department (FD) - Assisted natural regeneration; Enrichment planting – which suggests planting inside existing forested areas / forest estate; DZGD - Conservation of remaining natural forest which suggests areas of vacant land (i.e. outside the forest estate); Both, but mostly DZGD in the dry zone - public watershed plantation / village fuelwood plantation
 - Community forests will be established to reduce poverty of rural community, to reduce dependency on natural forest, to stabilize ecosystem, to provide basic needs of local people and to promote participation of local people in conservation. The annual average rate of planting will be 31,189 ha. During the programme, an area of 311,875 ha will be established.
- Myanmar Climate Smart Strategy (MoAI, 64pp, 2015) – It indicates short, medium and long-term steps including: Short: PRA in benchmarking climate change challenges, institutional analysis, strengthening agro-met stations, communication on climate change, cultivation of flood- and drought-tolerant rice varieties, reducing methane from paddies, adaptive crop – livestock farming, climate change research & extension, conservation agriculture including water, pest & disease management. Medium - new high-yielding varieties and livestock breeds, climate-smart management for stressed areas, adaptation / mitigation information & advisory services, creation of climate-smart villages. Long – DRM in farming
- Climate Change Strategy and Action Plan (2016 - 30, MCCSAP, pp161) – It mentions that MoNREC's ECD is the focal point for climate change, including UNFCCC negotiations and reporting. It is responsible for translating global-level decisions for national implementation. This includes endorsing projects for support under different climate change funds — the LDCF, GCF, GEF, SCCF and AF under Kyoto Protocol. The ECD is also responsible for engaging other ministries to address climate change.
- DMH – Disaster Risk Reduction Plan (2017-22) - Actions under the 2015-30 SENDAI framework
- Township Rural Development Strategy and Programme – Guidelines (2017, pp27, MoALI) – includes instructions on Village Development Planning (VDP)

Linkage to National and Other Donor Projects

- Emerald Green Project - Provides climate-resilient livestock species to local communities. More support in market

linkages and livestock diversification is needed in the dry zone area.

- Green Village Project - 75% of rural people require a loan with or without interest, thus the project provides funds – in over 300 townships and 8,257 villages for agriculture (55%) and livestock (29%). The funds are managed as revolving funds with loans and interest rates decided by committees.
- Livelihoods and Food Security Fund (LIFT) is a multi-donor fund managed by UNOPS to improve the lives of smallholders and landless people, including in the dry zone and to ensure that economic transformation is inclusive. Activities include improved food security, climate-smart agriculture and VDP. Note, the UNDP project chose villages where LIFT was not present, which meant any advances in VDP and land use planning for example, could not be utilized. This was an opportunity perhaps lost in terms of the land use planning and allocation needs for CF. Also, LIFT promoted environmentally sound livestock production, which the UNDP project could have more closely aligned methods – especially re. fodder production and grazing control. The UNDP project was more closely aligned concerning income from the sale of livestock and irrigation water supply.
- GEF FAO Sustainable cropland & forest management in agro-ecosystems - Addresses rural dependency on wood energy, low farming productivity, forest degradation, & unsustainable land management.

Institutional support to the project

The project was supported by national partners: Ministry of Natural Resources & Environmental Conservation (MoNREC), Dry Zone Greening Department (DZGD) Forest Department (FD), Department of Agriculture (DoA), Department of Agricultural Research (DAR), Department of Meteorology & Hydrology (DMH), Department of Disaster Management (DDM), Livestock Breeding & Veterinary Department (LBVD), Department of Rural Development (DRD), Environmental Conservation Department (ECD), Irrigation & Water Utilization Management Department (IWUMD), and Yezin Agriculture University (YAU)

Political Context

A key report on state and region government² outlined the political and administrative division of government, whereby the regional councils have limited power in relation to the military-led regional General Administration Departments (GAD) – i.e. the civil service administrative office. It goes on to say, that the councils are only required to pass the annual development plan and budget, and that the judiciary are considered weak (e.g. land disputes), especially where the administrative process is controlled by the GAD / Ministry of Home Affairs (i.e. for land titling).

This had clear impacts on the CF part of the project, where the regional Forest Department (FD) were dismissive of their own CF instructions (2016), as having limited legal basis (as instructions only and not law). Thus, the CF intervention not only lacked a mandated or active counterpart, the project also needed to work with another department, namely DALMS, who also lacked any direction with regard to the designation of vacant land for CF purposes³. Added to these (inactive)

civil service offices at regional level, the project failed to understand that the township and regional council members also lacked any power to influence decisions. Thus, the project need for CF should have been to work at national FD level and build a consensus approach, before embarking on such a large CF programme without backing or understanding.

2.2. Problems that the Project Sought to Address

The main area affected by desertification and drought is the dry zone located in the central part of the country. The dry zone is located between two elevated regions - the Shan Highlands to the east, and the Rakhine Yoma and Chin Hills to the west—it is a lowland, plain area and favours agricultural activity. It is characterized by less than 1000 mm of annual rainfall. The longest river, Ayeyarwady, passes through the region; hence, irrigated cultivation is also possible alongside the river. The boundary encompasses Lower Sagaing, Mandalay and Magway Regions (especially in 13 districts), occupying approximately 87,189 km² or 12.8% of the country. The central core area is confined to Pakokku, Nyaung U and Myingyan districts which are the hottest places in Myanmar during summer

² State & Region Government (Nixon, H, 2013), pp115

³ The land tenure laws were originally written during the British colonial era. They encouraged agricultural expansion at a time when the population was low compared to available agriculture land. But since, the focus has remained on agriculture land, but without a process of sound land use planning. However, the National Land Use Policy (2016) describes 3 type of land: agriculture land; forest land - determined to be part of the permanent forest estate); and other land (urban, village, religious, public, government administrated vacant, fallow, virgin land and wasteland that are not classified as forestland or agriculture land). Article 17 mentions - Legally recognizing and registering legitimate land tenure rights that are recognized by the local community; and Using community consultation and participatory land use mapping methods when approving local land use rights

period, where mean annual rainfall is <600 mm and average monthly temperature ranges from 9 - 42°C. The annual mean rainfall, as well as the mean rainy days in the zone during the last three decades, clearly indicates a declining trend (Yarzar 2012).

Due to tropical storms, the rainfall pattern can be characterized as double maximum (bi-modal), with an early wet season (pre-monsoon) and a late wet season (post-monsoon) occurring. The pre-monsoon starts from April - June and post monsoon extends from September - October. The bi-modal rainfall pattern favours a double cropping system for dryland farming, meaning that farmers can grow two crops a year on the same plot. Due to erratic and scarce rainfall, the farmers also practice mixed cropping - i.e. two or more crops in the same field as an insurance against crop failure. However, 18% of farmers cultivate only one crop, making them susceptible to climate change.

Key barriers that needed to be addressed

- The dry zone has the lowest rainfall which is concentrated in the monsoon period of May to October. Shallow and erosion-prone soils and sparse vegetation do not retain rainfall or prevent surface runoff. During the dry season with high temperatures, evapotranspiration is high. The dry zone climate under change is characterized by more frequent and severe extremes – higher temperature and drier seasons punctuated by more intense rainfall during the dry seasons.
- Population density in the dry zone is three times higher and large proportion of its 18 million residents engages in subsistence rainfed agriculture or livestock rearing. Population pressure, exacerbated by poverty, leads to clearing of forests and use of marginal lands for agriculture. Also, the collection of fuelwood is one of the main causes of forest degradation.
- 99.6% of the national sheep herd, 71% of the goats, and 40% of the cattle are in the dry zone, with 90% of livestock owners operating at the subsistence (landless) or small-scale level. Poor grazing practices (free-ranging) on fragile habitats exacerbate the region's and residents' vulnerability.

2.3. Project Description and Strategy

The project was designed with three outcomes and eight outputs:

1. Water availability is ensured during the dry seasons in 280 villages
2. Climate-resilient agricultural & livestock practices enhanced in the dry zone
3. Climate-risk information disseminated to dry zone households through use of short, medium and long-term weather forecasts

1.1	Water capture & storage capacity in 280 villages enhanced to ensure sufficient water supply during dry periods
1.2	4,200 hectares of micro-watersheds protected & rehabilitated through community natural regeneration
1.3	5,100 hectares of community agro-forestry plots on private & communal lands to conserve soil & water
2.1	Drought-resilient farming introduced to enhance the resilience of subsistence agriculture in the dry zone
2.2	Resilient post-harvest processing & storage introduced to reduce post-harvest losses (droughts & floods)
2.3	Diversified livestock production systems introduced in 6,300 households to buffer the effects of drought
3.1	Climate hazard & risk mapping to support community climate risk management & preparedness planning
3.2	Local climate & disaster risk management strengthened with climate & early warning communication

Project Location and Demographics

The project is being implemented in three regions and five townships: Sagaing Region - Shwebo and Monywa Townships; Mandalay Region - Myingyan and Nyaung U Townships; Magway Region - Chauk Township. With regional government agreement, the project selected 280 out of 998 villages for the interventions (June 2015). Except for Nyaung U and Chauk, villages were clustered.

Profile / Township	Shwebo	Monywa	Chauk	Myingyan	Nyaung U	Total
Total Tracts	72	54	51	65	74	316
Total Villages	168	194	230	186	220	998
Project Tracts	20	22	25	27	41	135
Project Villages	60	50	40	60	70	280
Project HHs	10,614	7,123	6,572	11,090	15,144	50,543
Project Population	47,184	29,633	31,164	46,620	73,262	227,863

Source Project Baseline Records

To note, the project worked in 135 out of 316 Village Tracts⁴ (43%) in the five townships with ~50,000 households. Details of land status and other demographic information was collected. (see **Annex 5**)

The village selection process was an extensive exercise that included a ranking of villages by stakeholders, in two rounds – township level and project level. The criteria included:

- Noticeable impacts of climate change – e.g. temperature extremes, frequency of droughts/year, lack of S&W conservation measures, forest degradation, declining livestock population/productivity?
- Potential to access surface/ground water, river water irrigation, CF, S&W conservation activities?
- Community willing to participate in the project and is there a well-established community engagement mechanism?
- Incidence of extreme poverty / food insecurity in the village. Significant numbers of women-headed households?
- Intended project interventions aligned with needs of the village, and based on government priorities?
- Other development partners operating in the village on similar interventions - higher points for villages with least support

Project Area Map

See **Annex 12**

Project Duration & Milestones

The project timing was from August 2014 until end-June 2019. The project document only mentions milestones in relation to the project framework, but it does not indicate any within the framework itself. The TE assesses outcome indicators (**Annex 1**) in order to determine gradings. However, outputs are also presented in **Annex 2** with their achievement reported and commented on.

Comparative Advantage

UNDP had a comparative advantage in capacity building, provision of technical support in the design and implementation of the project. UNDP also had an advantage working with government especially in strengthening institutional mechanisms, in undertaking risk assessments, in mainstreaming climate change into development and harnessing best practices and community-based approaches across the thematic areas for climate change adaptation.

Replication

The prodop mentioned replication four times:

- The preparation assessed improved and drought-resilient crop varieties. They will be transferred from agricultural research farms at the township level. To ensure sustainability of village-level seed banks and to facilitate replication beyond the project areas, the project will facilitate assistance from DoA / DAR, University of Agriculture (Nay Pyi Taw) and State agricultural institute (Shwebo). (Output 2.1)
- With the replication of a previous good practice of a benefit-sharing agreement, in which the Livestock Farmer Committee will be responsible for revolving livestock or funds, the project will be able to expand beyond initial targets.
- Effectiveness of central government implementation vs. project community resilience & empowerment approach - the application and replication beyond the project area is likely to be higher under local implementation.
- Knowledge management: Implementation of adaptation actions will constitute the primary learning experience, which will feed into awareness, training and knowledge management actions conducted by the project. Close involvement of CBOs/NGOs in non-project target sites, will facilitate smooth replication of good practices during and after the project.

2.4. Implementation Arrangements

Project Management Structure

The project was steered by a Project Steering Committee (PSC), co-chaired by UNDP and DZGD⁵. The project established a Technical Advisory Group (TAG) to support the PSC and Project Implementation Team (PIT). The Chief Technical Advisor position was added by the UNDP CO in agreement with the Regional Office, and agreed during Inception, with the CTA's TOR stating 'take the lead in the technical design and implementation'. Other PIT positions included - National Project Manager, Project Assistant, M&E Officer, Driver, Agricultural Specialist,

⁴ Village Tract is the 4th tier of government after Central, State or Region government, then District, then Township.

⁵ Originally the co-chair was Deputy Minister, MoNREC. DZGD were only delegated as co-chair (& thus project counterpart) in 2015.

Livestock Specialist, Soil Conservation & Water Harvesting Specialist, Environment and Forestry Specialist – were all hired through public competition.

2.5 Key Partners & Stakeholders

A full description of stakeholders – those who are responsible for implementation of the project and those associated with the project, is provided as **Annex 9**.

3. FINDINGS

3.1. Project Strategy

3.1.1 Project Design

The project was designed to: address water security through small-scale infrastructure to reduce the impact of droughts; protect and rehabilitate over 5,000 ha of watersheds to improve water retention and reduce erosion; contribute to food security through the promotion of climate-resilient agriculture and livestock practices; introduce post-harvest processing and storage.

Project Formulation

The project formulation process began in 2011, with endorsement of the Adaptation Fund Board in February 2014, and project document (prodoc) approval in August 2014. The project was prepared on behalf of MoNREC and the Dry Zone governments. However, MoNREC lacked accreditation to nationally implement the project on behalf of UNDP, therefore the project was agreed by the government for DIM, with a UNDP-hired Project Implementation Team (PIT) established to deliver the project.

Until 2013, UNDP worked under a restricted mandate (i.e. with implementation directly by NGOs / CSOs in the townships and not via regional or central government), until their first CPD was produced. Thus, the AF project was one of the first designed by UNDP to work more closely with regional government and implement on such a scale in the field.

The formulation mission didn't manage to clearly identify a project partner, for which there wasn't a perfect fit or natural partner, due to its cross-sectoral nature. This continued through implementation. The project formulation process only managed to select location to township level, which meant that the project needed to spend three months undertaking a village consultation and selection exercise – which they did well. A trade-off, between involving all levels of government and those needed for implementation was also not clearly discussed in the prodoc, for instance Village Tract Level government could have been a closer ally.

Local Project Appraisal Committee (April 2014)

UNDP Direct Implementation Modality (DIM) was presented with the main aspects - UNDP technical support via collaboration with government; technical input by UNDP (via a PIT); with UNDP consultant services and goods procurement; and UNDP direct grants to CSOs / farmers. Designated counterpart offices were determined for particular outputs: Output 1.1 (DZGD, Irrigation, DRD); 1.2 (DZGD, FD); 1.3 (DZGD, DoA); Output 2.1 & 2.2 (DoA); 2.3 (Livestock); Output 3.1 (DDM); 3.2 (DMH). Counterpart officers would be expected to play a key role in monitoring and supervision. It was agreed that DZGD were to be included in the recruitment selection panel.

3.1.2 Design Assumptions & Risks

Selected Assumptions and Risks from the results framework that proved to be correct / incorrect:

Assumption	TE Comment
Objective	
- Climate-resilient farming demonstrates a large enough difference compared to non-climate-resilient practices	- Proved correct – see also replication section
Outcome 1	
- The government will cooperate with the project to perform water resources availability	- The project undertook an extensive village / intervention selection process, then hired a supervising contractor to work with DRD to identify locations for water infrastructure
- Higher-than-usual dry season rainfall during the project does not distort perceptions of the farmers	- The project was not impacted by severe climate conditions
- The government will continue to support in-kind	- Yes, they supported, as far as their capacity / skills allowed

<ul style="list-style-type: none"> contribution and human resources in water resources - The project will mobilize women for income generation and soil-water conservation activities 	<ul style="list-style-type: none"> - Yes, the project made a significant effort across the board
<ul style="list-style-type: none"> - Main responsible department, Forest Dept will cooperate for community forestry (CF) establishment 	<ul style="list-style-type: none"> - Incorrect - Both FD and DZGD were particularly ineffective at supporting CF at township, regional & national level (lacking political willpower), apart from their staff working at village level with the project - The results framework doesn't actually mention CF
<ul style="list-style-type: none"> - Villagers support agro-forestry activities on their private and communal homestead gardens 	<ul style="list-style-type: none"> - Yes
Outcome 2	
<ul style="list-style-type: none"> - DoA / DAR and LBVD support agriculture and livestock activities and are willing to work with the project 	<ul style="list-style-type: none"> - Despite limited capacity of these departments, they worked well with the project and learnt about best practices.
<ul style="list-style-type: none"> - Improved varieties have higher productivity for farmers to adopt - Volunteer farmers whose land will be utilized for research / demonstration continue their commitment 	<ul style="list-style-type: none"> - Yes, although the farmers still tend to select for greater yield and not necessarily against drought, heat-tolerance, duration etc – i.e. climate resilient attributes - The project was able to identify farmers' land for trials / demonstration plots with lead farmers
<ul style="list-style-type: none"> - Continued support by government for post-harvest machines 	<ul style="list-style-type: none"> - Avoided via the collection of fees for use towards O&M costs
<ul style="list-style-type: none"> - Livestock farmers trained to adopt fodder cut and carry system 	<ul style="list-style-type: none"> - The project needed a greater range & volume, of demonstrations and farmer training on new fodder grasses. A far greater effort in design & application was needed. Farmer fodder grown for sale also could have been promoted
Outcome 3	
<ul style="list-style-type: none"> - Seasonal CRI is produced and disseminated in a timely manner for farmers to adjust their practices - Climate risks are captured and disseminated to township Disaster Preparedness Committees 	<ul style="list-style-type: none"> - Weather information is starting to be delivered via mobile Smart phones, but agri-advisories are still lacking - The authorities manage the disaster alert application
<ul style="list-style-type: none"> - Climate risk management planning needs cooperation between a number of government departments 	<ul style="list-style-type: none"> - This was understood, with DMH and DDM taking a real interest and leading when able to.

There are two further risk tables - the UNDP Atlas Risk & Management Response and the PRR risk table (2018) in Annex 8⁶.

3.1.3 Results Framework Indicators & Targets

Within the results framework (prodoc p75), at the objective level, there are three indicators. Each of the three Outcomes has a specific indicator. There are eight Outputs with nine indicators. They are mostly logical, practical and feasible, except for some minor issues. Targets were revised after the MTR⁷, with the expectation that the TE would provide further justification. The project maintained a focus on reporting against these indicators. One or two indicators were not so SMART (Specific, Measurable, Attributable, Realistic/Relative, Timebound). The main problem was that they were not easily measurable. The table gives an indication of the main faults:

Indicator / target	Issue
Objective level	<ul style="list-style-type: none"> - The 50% target of changed practices due to project climate risk information (CRI) is not easily measurable - 75% of the 50,000 households receive early warning information – not easily measurable
Outcome 1	60% of households have increased water availability – not easily measurable? Output 1.3 included agroforestry as did Output 2.1 – they were delivered by differing IPs in differing locations
Outcome 2	Output 2.3 largely lacked any feeding programme for the extra livestock, thus putting extra pressure on the environment
Outcome 3	The two outputs mix up hazard / risk mapping and disaster risk / early warning with weather forecasting for farmers. Fortunately, the project separated them effectively

⁶ A separate Environmental & Social Risk Assessment, prepared during formulation was not accessed by the TE.

⁷ AF were informed / requested to approve at the time

3.1.4 Gender Design

The prodoc mentions gender five times:

- Agroforestry groups will be formed with gender considerations taken into account
- Stakeholder involvement – the project strategy is rooted in community ownership, which would not be achievable without the promotion of participatory and gender-sensitive approaches
- The PSC and TAG will have women representation. The TAG will ensure representation from farmer groups and NGOs
- Risk management - Local implementation through farmer groups, CBOs, NGOs will ensure participative that is gender-sensitive and enable the expression of views from vulnerable and marginalized groups
- Gender disaggregated targets and record-keeping were presented in the workplan (13 times)

The above points and others are discussed in the gender analysis section.

3.2. Project Implementation

3.2.1 IA and EA Coordination & Operational Management

UNDP were the AF Implementing Agency (IA) and the Executing Agency (EA), with MoNREC as the government counterpart. MoNREC delegated government support to DZGD. With the approval of the UNDP Local Project Appraisal Committee (LPAC) meeting, UNDP established a Project Implementation Team (PIT) to operate under UNDP Direct Implementation Modality (DIM), including using UNDP procedures for the procurement of goods, works and services. The project started August 2014, with a closing date end-June 2019, so effectively there was a one-year extension on the 4-year project. A letter of agreement between UNDP and MoNREC was secured at project start. The UNDP CO attended all PSC meetings.

Coordination & Operational Management by Implementing / Executing Agency (UNDP)

Despite the prodoc signature in August 2014, UNDP considered the launch date as February 2015 (6 months later). The Chief Technical Advisor (CTA)⁸, which was a newly created position, arrived in April 2015. The Project Implementation Team (PIT) were mostly hired by the end of 2014, but the Project Manager and M&E officer were only recruited in August and September 2015, which was one year into a 4-year project. The Project office opened May 2015 (9 months after project start) with the 4WD vehicle arriving in December 2015 (15 months after project start). The Inception Workshop was held in August 2015, thus it took one year to really start the project.

The initial selection of villages, public consultation on local priorities and collection of baseline data took from June - November 2015. The 1st full workplan was only prepared / approved by the 1st PSC meeting in December 2015 (16 months after project start). The Implementation Partners (IPs) were not hired until November 2016 (over 2 years from project start). The delay in IP hire was due to the CTA and UNDP needing to develop work packages and go through standard UNDP procurement processes.⁹ At this point, the project still needed clarity on the detailed selection of intervention by village.

Thus, the project was designed to start in August 2014 and end in September 2018, but by the end of 2016 field implementation was yet to begin, making it was clear that an extension would be needed to create at least 'two years' of field work. The two years were to allow the project two annual cycles within the seasonal farming and forestry calendars¹⁰. An extension until end-June 2019 was granted¹¹.

Coordination & Operational Management by the Project Implementation Team (PIT) with support from the government counterpart (DZGD)

⁸ The CTA TOR indicated that the CTA will lead the project, initially for one year. UNDP created the CTA position in addition to the NPM position

⁹ For local hire of service providers, UNDP conducted an NGO / CSO capacity assessment for short-listing before invitations to bid. The international call for proposals for the main IPs was launched in mid-2016. i.e. bidding documents / TORs were only finalised 15 months after the CTA was hired and by now two years from project start. Bidding documents were prepared for the hire of 13 contractors via procurement, and three via NGO modality which took from Sept 2015 – June 2016. For boreholes / tube well construction, due to non-qualification, two procurements cycles were needed, despite having identified a company – Hydroconseil to provide the design (including site selection agreed with DRD) and supervise the works.

¹⁰ Rainfed crop planting and tree planting, plus certain months (July) in the dry zone are too hot to demonstrate / work effectively

¹¹ The UNDP RTA agreed to consider the project launch (start) date as Feb 2015, although project funds were already being utilized from Aug 2014. Then a formal extension from Feb – June 2019 was agreed with MoNREC and AF.

The project was multi-sector, but the selected government counterpart (DZGD) was not organized to coordinate work across sectors¹². Their capacity and interest was not a perfect fit with the project design. They were not even mentioned in the project design. Under the project agreements, they lacked any mandate for project management, administration or supervision, apart from facilitating the PSC as co-chair once the project was well underway in August 2016 (date of 2nd PSC meeting), i.e. two years already into the 4-year project. From the government side, they also lacked an 'official' mandate, having been delegated the project at this point, but without extra budget or formal instructions on expected support to the project.

Furthermore, certain members of DZGD saw this as a difficult position, and took the approach to only engage with the project to a basic level, and as far as possible to remain within their sectoral envelope¹³. Their staff appointed to PSC and TAG also changed as government positions were rotated.

This meant that whilst, their interests in tree planting were liberally aired during PSC and TAG meetings, cross-sectoral support or 'air-time' for other departments (in problem-solving) was not as forthcoming. Furthermore, despite a significant forestry aspect to the project, DZGD and the FD largely failed to support community forestry (CF), despite both having previous experience in this¹⁴. Other departments without such project or government weight on them, managed to engage effectively. In terms of DZGD's sectoral role in tree planting / re-greening in the townships, they supported this well, as with seedling nursery production at regional / district level.

Project Implementation Team (PIT) operational management

Partnerships arrangements were established, but these were driven by UNDP under DIM, using UNDP procurement for goods and services. Thus, the project was largely run by UNDP procuring, contracting and monitoring inputs / outputs, with PSC endorsement. The partnership between the PIT and DZGD should have been stronger, not least in DZGD gaining project management experience for the future.

For each sub-contract, there were various deliverables, which were designed to cover all implementation needs and more, such as end-result impact surveys / reports. However, these deliverables didn't always match with the project design logframe indicators or targets¹⁵ and were not part of the M&E system or as easily accessible to the counterparts. The PIT contract management included a tracking system with Implementing Partner (IP) against deliverables against payment milestones. To give an indication of the scale of this, there were 17 IP contracts with 94 payment milestones, with each milestone listing five or so deliverables¹⁶. To have an idea of the IP staffing support provided to the PIT, Cesvi (agriculture) and NAG (forestry) stationed 30 and 16 staff in the townships for their contracts from the end of 2016. CDA implementing the livestock activity also had had a relatively high number of staff working at this level.

Inception Workshop & Report (Aug / Sept 2015)

UNDP stated that they were implementing in consultation with government departments, but it was important for the departments to propose feasible support options, and mention their gaps in technical capacity, in relation to the design, so both could be included in the work planning. UNDP also stated that government ownership was a key to successful implementation, and that the exchange of technical knowledge and should be a two-way process. The government departments that offered such support:

- DoA (Agricultural Research Farm) - Source of dryland crop varieties - Pulses & oil crops; Agricultural water saving technology
- DAR - Source of dry land crop varieties, Research, Dryland farming
- DoA (Agricultural Extension) - Demonstration plots, Crop trials, Technical transfer
- DoA (District) - Demonstration plots, Crop trials, Pulse crops - DoA -ACIAR, AWST with JICA
- DoA (Post-harvest Technology Training Center) - Post-harvest training
- YAU - Climate Change, Water saving technology (AWD), Technical support

Source Project Inception report - Annex 7

DZGD pointed out that since UNDP were implementing the project, the government's role was only in the monitoring and knowledge-sharing. Thus, it was suggested by DZGD that a more balanced implementation

¹² The cross-sectoral government department, namely the General Administrative Department (GAD), was not chosen due to its overseeing, rather than technical role.

¹³ Which did include tree planting on vacant land

¹⁴ It was almost as if there was an official diktat from central government, in fact there was – concerning CF, the Ministry of Home Affairs Letter (GAD), dated April 2018, specifically stated that land re-titling could not be applied for (headed 'No objection letter')

¹⁵ Due to weaknesses in the logframe, not due to the project needs and how to package them best to achieve outputs

¹⁶ This is one of the reasons that the contracts took so long to get started – the PIT / CTA needed to prepare the TORs for them

approach could be undertaken, so that the capacity of government officials could be built in the process¹⁷.

During inception, revised targets for the results framework were presented, and although endorsed by the PSC, they were just acknowledged at AF level. Interestingly, mentioned in neither the prodoc, nor the Inception workshop / report (>1 year into the project), was the project's *modus operandi* of extensively sub-contracting out services both via international calls for services and pre-qualifying local contractors for invitation to bid for works and services.

Project Steering Committee (PSC)¹⁸

Membership of the PSC included: UNDP (Co-chair), DZGD (Co-chair¹⁹ & member), DZGD, FD, Environmental Conservation Department (ECD), DMH, DRD, DoA, LBVD, DDM, Irrigation Department, and Foreign Economic Relations Department (FERD). PSC meetings were held twice a year, although they didn't begin until December 2015, which was due in part to government unavailability and the late presentation of the inception workshop / report.

History of selected decisions by the PSC

Date	Key Points	TE Comment
1 st - Q4, 2015	<ul style="list-style-type: none"> - Mentions sub-contracting method (Nov 2015) and TORs for sub-contracts - UNDP CD mentioned the project had the potential to benefit 250,000 people - Government co-chair requested that the project be clear in its plans for collaboration with departments; and that field work by government staff outside of duty stations should be recompensed as per the existing UNDP / FERD agreement 	<ul style="list-style-type: none"> - 15 months from contract start - 250,000 is the total population of the 280 with the direct target of ~50,000 households
2 nd - Q3, 2016	<ul style="list-style-type: none"> - Government co-chair reduced from Deputy Minister of MoNREC to Director General, DZGD - FD, DRD and FERD didn't turn-up to meeting - M&E Framework – altered targets endorsed by PSC 	- Significant changes in chair and non-attendance
3 rd - Q4, 2016	- Agreed that the project team will share all reports / assessments with the government departments at the appropriate levels	- Apart from the two co-chairs, only 3 members of the PSC attended, the others were delegates
4 th - Q2, 2017	<ul style="list-style-type: none"> - Financial delivery of 32% as of 15 June 2017; Revision of 2017 budget to US\$ 2,564,091 was endorsed - Sector departments wished to receive the monthly report, which DZGD agreed to share in modified format - The delay in tree planting due to need of GIS maps, and approval of village, township land management committees, and GAD - Forestry planting details dominated the PSC 	<ul style="list-style-type: none"> - Would indicate large advances to the IPs who largely began late 2016 - TE received some comments from township dep'ts & their GADs that the project did not keep them informed. Here it is clear that not only was it the job of the PIT staff to keep the them informed, it was also the job of DZGD- but evidence of how they worked together was not found - It appears that just to get the re-greening / planting undertaken was a significant achievement
5 th - Q4, 2017	<ul style="list-style-type: none"> - DZGD requested the IPs to secure planting land approval one year in advance - DZGD needs to report target changes /progress to FERD & Union Government via MoNREC 	<ul style="list-style-type: none"> - Not sure why DZGD were not taking the lead to support tree planting and land use approval - FERD are UNDP's partner so DZGD 'reporting on them'?
6 th Q1 - 2018	- Meeting dominated by need for tree planting 'no objection letter'	- nc
7 th - Q2, 2018	<ul style="list-style-type: none"> - Planting no objection letters for 2018 received - Agreed for water quality from wells to be tested 	- nc
8 th - Q4, 2018	<ul style="list-style-type: none"> - Application process for CF certificates on-going - Project extension to June 2019 presented 	- Too late in project cycle for this

¹⁷ This was a recurrent theme of DZGD. The role of government departments was not expanded by design, with their involvement varying by interest

¹⁸ The name of ministries where they have changed, has been transposed to the latest official names

¹⁹ The prodoc placed DZGD within the TAG, however they were elevated to the PSC on project commencement, and became the PSC co-chair at the 2nd meeting

(Nc – no comment)

Technical Advisory Group (TAG)

TAG meetings were held quarterly from 2016 onwards. They were set-up to provide technical assistance to the PIT and PSC, including: propose strategies for feasibility of activities; and review technical documents and studies. The membership as per the 12th or 13th meeting included: DZGD, DMH, FD, ECD, DoA, Irrigation & Water Utilization Management Department (IWUMD), Department of Disaster Management (DDM), Livestock Breeding & Veterinary Department (LBVD), DRD, and PIT and UNDP. UNOPS were an occasional presence due to their 'LIFT' project. Out of a nominated 15 representatives, 93 people attended the TAG meetings, which indicated a continuity issue on the government side. The TAG mainly acted as a pre-PSC meeting to iron out issues, provide solutions and assess activities for the coming quarter. After the first two TAG meetings in Mandalay, they were held in the townships on a rotational basis. It was noted that the project / TAG involved nine departments.

3.2.2 Partnerships / Institutional Mechanisms / Stakeholder Engagement

Project-level operational arrangements are described in the previous section, whereas this section considers partnerships, state institutional mechanisms and key stakeholders. Institutional mechanisms are the backbone for delivering new policies and services:

- DoA and Department of Agricultural Research (DAR) – The project on behalf of government, could not have achieved its capacity building objectives in agriculture without the close interest and involvement of these two departments. Strong partnerships were built between them and local stakeholder groups (Farmer Field School lead farmers, Seed multiplication farmers, post-harvest committee leaders).
- DMH – The project worked in close cooperation with DMH with DMH being proactive and taking the lead on occasions during the implementation of Outcome 3.
- Department of Disaster Management – They were instrumental in taking leadership in the creation of village and township-based disaster risk management committees. They established a new institutional mechanism for the delivery of early-warning information.
- Yesin Agricultural University – They collaborated closely with both the DoA / DAR and the project in the field testing new drought-tolerant rice varieties.

A list of stakeholders is presented in **Annex 9**.

3.2.3 Gender Analysis

Gender data tracked from the workplan

Output	Gender milestone (from prodoc workplan)	Result
Water infrastructure	50% women's participation is encouraged in training / workshops	32 out of 547 ~ 6% only
Water infrastructure	Contribution of labour from women &/or landless	N/A as infrastructure was constructed by contractors
Forestry & A/f	50% of women's participation in training	2,917 out of 8,798 ~33%
Community forestry	Roles of women are clearly identified in the community management plans	A minimum % of women as committee members should have been included
Agroforestry	% women-headed households supported with homestead gardening / boundary planting	Data not kept
Post-harvest	Training	31%
Livestock	50% women as training participants	66%
Risk-mapping	Vulnerability assessment will look at gender-differentiated vulnerabilities to climate risks	See risk assessment bullet point
Disaster Risk Management (DRM)	DRM committees to include women with specific roles	Data not kept, 23% in training

Source – project data; N/A – not applicable

Gender-disaggregated capacity-building / training events in 2018

Event / Intervention	% Women
Village level orientation for forest conservation	53
Agroforestry training	6
Training on establishment of watersheds	14
Community Forestry Training	18

Training on seedling handling, maintenance and planting	11
Township meeting with stakeholders for forestry implementation	10
Training on drought resilient farming methods	37
Training on resilient post-harvest processing / storage	12
Township level livestock farmers group (committee members)	6
Village level CBDRM teams	23

(source Annual report, 2018, p17)

Additional gender-related information

- The project placed an emphasis on the need for IPs to report gender-disaggregated data, which for training was diligently done.
- The project relayed gender-related stories from the field for its external audience - UNDP media
- The inception workshop had 67 participants, but only 9 were women (13%)
- The project-level village selection workshop had a gender ratio of 146 men to 58 women (28%)
- The livestock rapid needs assessment and beneficiary selection in 253 villages recorded 35% participation of women; 20% of livestock farmer committee members are women. The project has accorded priority to women-headed households in its livestock distribution activity
- PSC attendance was 89 men to 12 women (13%); TAG was 136 men to 52 women (38%)
- The risk assessment report (57pp, 2018) – The townships showed similar gender profiles with men 46% and women 54% of the population. This indicated that women's representation / participation should have been proportionately higher, although the project rather needed this information in 2014

3.2.4 Finance Management & Co-financing

UNDP Financial management - Under DIM, the PIT submitted invoices on behalf of the IPs, who were then paid directly. The project didn't undergo any audits, except as part of general country audits in 2018 and 2019.

Finance - Up to end-December 2018, US\$6.63m had been spent from a budget of US\$6.74m. To note, the slow start of the project was apparent from the annual disbursements of \$2,823 in 2014, and \$309,678 in 2015. The breakdown of planned and actual expenditures by year is provided in **Annex 4**. Expenditures were kept within outcomes and largely within 10% of expected output budget lines. Expected expenditure at closure is \$8,406,100 including government and UNDP co-financing of \$460,245 and \$656,430 respectively²⁰.

Co-financing - A breakdown of co-financing is provided as **Annex 3**. To note, co-financing contributions, either as direct support funds (grant or in-kind) or as complementary funds (e.g. linking up with similar project in a neighbouring area), are not formally accounted for under these evaluations. Therefore such funds committed at project start may just be re-presented, unless further information is available. However, the extent of co-financing was determined (including concomitant physical inputs) for the three main IPs: Cesvi for \$73,011, Rimes \$48,000, and NAG – unspecified amount. Overall, in comparison to the AF grant, co-financing amounts were quite limited.

3.2.5 M&E Systems – Design & Implementation

The overall rating is Moderately Satisfactory

A Monitoring & Evaluation (M&E) Framework (March 2016, pp103) was prepared by an external consultant, but only 19 months from the project start. The M&E Officer was only engaged in August 2016 and left in December 2018 (2.5 years out of 5). The M&E Framework largely reiterates project documentation, especially reporting requirements and the results framework with its targets. What it doesn't do is differentiate reporting tasks from standard M&E tasks in terms of result-tracking requirements. The framework does include the AF best practice and lessons learned templates²¹. It doesn't include joint government responsibility for monitoring and supervision, as per earlier comments of UNDP during inception, and during 1st PSC meeting.

The M&E system included excel spreadsheets on all trainings conducted by output, with title, date, location, participants – disaggregated by gender – see **Annex 5**. The project also kept the logframe targets (including revised) and results by year updated, such as total hectares planted or numbers trained. However further data on interventions themselves were largely kept by key staff and the IPs, including: number of villages an intervention

²⁰ The TE was undertaken before the end of the project so figures may change

²¹ The prodoc also provides linkage to higher-level AF Results Framework – see **Annex 5**.

was delivered in; number and location of demonstration plots²²; kilometers of catchment and water collection / drainage channels; kilometres of soil bunding; and number of check dams. The M&E system also failed to keep a tally on the detailed planting figures (which were complicated), partly because they were designed to fit in the logframe categories and were not bespoke on how the project was actually implemented. Thus, this information was not easily collated for evaluation purposes.

The project initiated external baseline (September 2016) and endline (March 2018) surveys, which provided some very useful information on higher level objectives, such as food and water security (see **Annex 5** and the impact section of this report)²³.

An MTR was undertaken in December 2017, which was rather late. The MTR recommended that action lists were needed for water and forestry, which were applied from 2018. This meant that seedling production dates were not missed. The main MTR ratings were: Objective – S; Outcomes 1-3 – MS, S, S; Implementation – S. As a comparison the TE ratings are Objective – S (the same); Outcomes 1-3 – S, HS, HS (all one grade higher); Implementation – S (the same).

Exit Strategy

In 2018, the project developed a comprehensive exit strategy which comprised of five elements:

- Water infrastructure and conservation (Output 1.1, 24pp, April 2018) – with a timeline for activities until July, then a handover, monitoring and reporting until the end of 2018. It noted as missing – check dam silt traps and connectivity of the water collection channels to the catchments²⁴.
- Forestry and agroforestry (Output 1.2 & 1.3, 15pp, March 2018) – mentions tree planting area needs advance planning in order to get ‘no objection tree planting letter’ from GAD. Only one sentence on the lack of land titling hindering CF, but it also mentions that for the land approval process, ‘bottom-up approach is not as effective as top down approach’. The TE has made a similar statement.
- Agriculture farming (Output 2.1 & 2.2, pp29, April 2018) – Demonstration plots, seed multiplication and FFS time-lined until November 2018. Very organized plan
- Livestock farming (Output 2.3, pp25, Jan 2018) - Despite the approach to stall and foodstuff feed the livestock, especially for 128 demonstrators, the introduction of 20 plots of fodder (Napier) grass, had not yet started despite the clear need for dry zone fodder production – but it was in the plan (March – July). Mentions 1,486 livestock farmers had already returned the project investments to revolve. The project reported that Napier grass was delivered for 20 plots in 2018.
- Climate & weather information (Outcome 3, 9pp, March 2018) – Mentions to conduct future rain and temperature projections up to 2100 in 20-year periods for the townships with trends and scenarios - which was interesting. Also mentions the climate data usage review (pp53, March 2018)

3.2.6 Adaptive Management (Work planning, Reporting & Communications)

Work planning

- Monthly Meeting / Report – held quarterly from 2016 – for project staff and the partner DZGD
- Project Review & Coordination Meetings / Reports – twice a year for project staff and IPs
- TAG Quarterly Meeting / Report - 2016-18
- Annual planning was January - December, with PSC in December to review last plan and approve the next one

Regarding adaptive management and planning, targets were reduced for water infrastructure and tree planting (due to higher than estimated costs), with changes endorsed by the PSC and the AF Secretariat informed. Also regarding adaptive management, there were changes in the field with the inclusion of the Shwebo canal renovation. There was little or no impact in the changes in water infrastructure targets, except for the watershed-level soil and water (S&W) conservation measures which were reduced but then exceeded their original target. As mentioned these off-farm measures needed more investment per hectare, so maintaining the reduced target would have been better. For the forestry targets, vacant land planting was doubled and public land planting halved, but the issue was more of future responsibility and protection costs.

Reporting

²² Mapping the demonstration plots (main and offshoot) and intervention coverage would allow analysis of the level of project saturation and help identify areas for future replication

²³ The survey was designed to be an impact survey, thus it only partly verifies project baseline figures or targets

²⁴ Both points were independently identified by the TE as an issue, and now known to also have been flagged up one year before. They were not dealt with due to the significant added investment needed to rectify the poor designs (see section on Outcome 1)

The reporting system was extensive, although as mentioned it should not be seen as replacing the M&E requirements, which had it been better designed, could have reduced the volume of reporting. The reporting included:

- Annual Reports - indicated progress against workplan and budget (2016, 2017, 2018)
- AF project performance reviews (PPRs) - Specific to the AF and cover - overview, finances, risk assessment, ratings, indicators, lessons, and a results tracker. Three PPRs were prepared (Aug 2014 - Mar 2016; April 2016 - Mar 2017; & Apr 2017 - Dec 2017)
- Quarterly project performance (progress) reports - AF / UNDP template-generated reports that include an updated risk log, with results and activities according to the results framework (2015 - Q1 2018)
- Quarterly operational reports - PIT summary reports for UNDP, regional hub and AF (2015-18)
- Back to Office Reports – by staff after field visits
- TAG Field visit reports - Quarterly 2017-18

The project final report was not available to the TE. It also meant that much of the information collated by the TE ran to end-2018, not to end of Project June 2018, and together with the partial M&E system, meant that obtaining the latest or agreed figures, with a verifiable source was sometimes difficult.

Communications

UNDP and PIT communications were good, however the PIT, despite being housed within DZGD, didn't really manage to mobilise sufficient or added institutional support from DZGD. For example, the DZGD as the officially designated government counterpart should have been co-hosting workshops, gaining a consensus and working towards common implementation approaches, such as on community forestry. There was little evidence of such leadership, or learning by DZGD beyond their functionality within the PSC / TAG system. The DZGD role was however limited by the prodoc design which afforded UNDP all implementation control, and despite requests early on in the project to have a greater supervisory role, this was also limited. What would have been useful would have been to have a couple of DZGD staff seconded to the PIT to build capacity.

Internal communications within government line agencies and across departments at township and region were acceptable but also variable. There were some issues regarding the PIT staff not providing the documentation to local government. At the higher project office level in Patheingyi, Mandalay, records were kept of communications and documentation provided to government partners. UNDP and the project CTA updated the MoNREC minister and regional chief ministers (~cabinet minister) every six months.

3.3. Project Results

Three levels of the project results framework were assessed - Objective, Outcome and Output. This was guided by the indicators and targets set at each level. Success is also built upon achievement of the Outputs, according to 'framework logic.' The Objective and Outcome levels include a rating according to UNDP GEF guidance as described in **Annex 10**. The PIT provided two tables:

- Progress towards Objective and Outcomes (Indicator-based) which is described in **Annex 1**, and
- Progress towards Outputs which is described in **Annex 2**

According to TE guidance, these tables were rated and commented on. The main ratings are provided in the Executive Summary (Exhibits 2 and 3). A detailed result-level analysis follows firstly of the Objective, Outcomes and their indicators, then secondly of the Outputs. A number of indicators refer to traditional outputs and inputs such as training figures. The latter are presented separately the end of the Outputs section.

3.3.1 Overall Result – Achievement of Objective

Effectiveness - Objective at the Objective Indicator Level (Overall Result)

To reduce the vulnerability of farmers in the Dry Zone to increasing drought and rainfall variability, and enhance their capacity to plan for and respond to the climate change impact on food security (three indicators²⁵)

The overall rating for achievement of the project objective is **Satisfactory**

Analysis of the overall result - Climate-change adaptations and enhanced resilience measures for rural farmers and the environment were successfully implemented in the form of: improved water supply, soil & water conservation

²⁵ Two of these are presented under Outcome 3, where they were also present in the logframe

at catchment and farm level, watershed re-greening to enhance water retention, drought and heat-resistant crop varieties, post-harvest technologies to improve food security and income, asset diversification for the landless with livestock provision, weather information for farmers and an early-warning system established.

Climate change adaptation measures – Livelihood level (% of target households)

(Baseline – Farming based on traditional weather and not suited to more intense & frequent drought; Target – 75% of poor farming households (<0.8 ha tenured land, or the landless ~32,400 households) implement climate-resilient agriculture or livestock practices; Revised target 61% (~17,500 h/hs of which 11,500 agriculture & 6,300 livestock)

Result against the indicator - According to the endline survey²⁶, from the original target number of 50,543 households, at the start of the project 26,788 households (53%) had insufficient food, which the project reduced by 10,109 (20%) to 16,679 households (33%) remaining with insufficient food.

Analysis - The TE could not identify a direct or verifiable figure for this indicator, however the above proxy measure from the endline survey was available, which indicated over 10,000 households more now had sufficient food. The survey was independent and provided this robust figure.

Also, the project reported figure of 19,206 more households (38%) with food security (income) increased (~sufficient food) was not verifiable, nor was the project reported figure of 36,940 (73%) having benefitted from the project. However, the total numbers participating in climate-resilient training was impressive at 27,634, which included 10,026 women.

3.3.2 Effectiveness – Achievement of Outcomes & Outputs

Effectiveness - Outcome 1 at the Outcome Indicator & Output Level

Outcome 1: Water availability is ensured during the dry seasons in 280 villages (1 indicator and 3 outputs)

The overall rating for this outcome is **Satisfactory**

Dry Zone farmers reporting increased water availability during dry periods (280 villages in 5 townships)

The rating is **Satisfactory**

(Baseline - 74% of households face water shortages for domestic and agricultural use; Target - 80% of these households have increased water availability during dry periods; Revised Target 60%)

Result against the indicator - The endline survey reported on this water availability indicator indirectly by measuring three parameters – drinking water, irrigation and livestock water.

The numbers reporting a sufficient or reliable water supply rose from 82 to 91% (baseline, Sept 2016 to endline, Nov 2018). Household access to drinking water taps increased from 6% to 13%, with a significant increase in usage from 87 to 134 gallons per household / month.

Irrigation water supply rose from 14 to 23% of households, however the endline survey was only conducted in Shwebo and Nyaung U Townships, which would have skewed the data, also with only Shwebo and Myingyan having irrigated areas.

For livestock, from 78 to 95% of survey respondents indicated a sufficient and reliable water supply, which was in part also due to the deep tube wells from which 63% (from a baseline of 32%) of respondents indicated their use for livestock in dry periods, thus increasing resilience.

Analysis - It would appear that there was quite some discrepancy between the prodoc design data and external baseline periods when respectively, water shortages were reported for 74% of the households (2011) and then sufficient for 82% of the households (2016). This was more than likely due to very different sampling and calculation methods. However, by end of project and taking the latest endline survey figures, sufficient water supply was reported by 91% of respondents in Shwebo and Myingyan²⁷.

The indicator itself was somewhat convoluted in expecting the project to identify the households with water shortages and then improve supply to 80% of them. The project calculated a figure that this had been achieved for 49% of these households²⁸, but the calculation could not be verified by the TE.

²⁶ The baseline and endline impact surveys were independently commissioned and used standard statistics methodology. However, for example the endline survey was conducted across a sample of 1,200 respondents, but only in two out of 5 townships – Shwebo and Nyaung O. Whereas the baseline was conducted across the three regions with 840 households.

²⁷ The data source was the Myanmar Survey Research Company endline survey presentation provided during the TE workshop and TAG meeting (21st March 2019).

²⁸ The project reported that 112,357 people who faced water shortages have received support and report increased water availability

Results against the outputs -

Output summary table

Intervention	Target	Achieved	Villages
Outcome 1 - Water supply during the dry seasons (280 villages)			
Output 1.1 Water capture & storage for water supply in dry periods			
Water catchment channels (& Shwebo canal)	45	45	51
Water pumping systems	70	70	26
Water tanks & pipes (5,000 gallon)	56	56	56
Village ponds (new/renovated)	150	136	136
Deep tube wells (new /renovated)	10	12	12
Shallow tube wells	40	20	20
Soil & water conservation techniques applied (ha)	1,156	1,629	120
Output 1.2 Micro-watersheds rehabilitated & protected			
Natural forest conservation - (ha)	3,913	3,050	14
Community Forest - preparation with management plans – (ha)	1,458	1,230	18
Tree planting - on public land + state institutions / monasteries / micro-watersheds	770	1,073	21
Output 1.3 Agro-forestry plots on private & communal lands			
Home-garden / Agro-forestry - (ha; villages)	1,000	1,000	203
Farm boundary planting - (ha; villages)	1,500	1,016	204
Gap planting in agroforestry areas – (ha)	1,458	667	4
Demo plots - home-garden / agroforestry; Tree / pasture mix; Intercropping (ha)	-	20; 2; 3	11

Water supply and storage infrastructure (280 villages) (Output 1.1 – Water infrastructure)

The rating is **Satisfactory**

(Baseline - 0 / limited; Target – Groundwater infrastructure - 10 deep tube wells; 40 shallow tube wells; 70 water pumping systems; 56 communal water tanks (5000 gallons); Surface water infrastructure - 45 water catchment channels; 150 communal ponds; Land covered terraces & check dams – 1,156 ha)

Groundwater Infrastructure – Tube wells, water pumping systems & tanks

Result - The project constructed: 12 deep tube wells²⁹; 20 shallow tube wells; 70 water pumping systems; and 56 village water tanks.

Analysis - These were very successful interventions with best practice designs (survey, design, implementation, supervision)³⁰, and Operation & Maintenance (O&M) fees collected by water user committees

Surface water infrastructure – Check dams, catchment channels & village ponds with S&W conservation at the sub-watershed level

Result - Two hundred and five (205) check dams were constructed within sub-watersheds. Forty-four catchment channels - were constructed over a distance of ~26 km. These were directed towards 136 communal water retention ponds, for people / livestock, which were mainly renovated. This water catchment infrastructure was then handed over to village water committees. In addition, on-farm S&W conservation measures were implemented. The total area covered was 1,629 ha.

One canal with six sets of sluice gates (Kin Tat Canal, Shwebo City) was renovated to provide township water supply and irrigation³¹. The scheme increased irrigation (1,215 ha); reduced waterlogging (810 ha); increased farm cultivation (32 ha); and supported the revival of a palm toddy plantation, which had been closed for 10 years due to poor water supply. Management was handed over to the city irrigation department. This intervention was very successful.

Analysis - The intervention logic was to protect and enhance water sources in sub-watersheds close to villages through the construction or renovation of check dams, catchment channels and village ponds. The 'dam to channel to pond' systems were often not functioning effectively as the catchment channels were not connected their catchments. They lacked any flood and soil erosion control 'herringbone' spurs to collect water and reduce

²⁹ The deep and shallow tube wells are borehole drilled to a depth of 250-300 m with a narrow gauge bore and PVC tube-lined. For some deep tube wells, PVC pipes needed to be replaced with galvanized iron pipe to reinforce the rising collar for better circulation.

³⁰ The project contractor Hydroconseil worked with DRD on the tank locations in villages

³¹ Mahanander Lake diversion – canal was 1,128 m long, 15 m wide and 2 m deep with 6 sets of sluice gates (locks) was handed over to the Shwebo irrigation department for O&M. As part of the renovation (non-project-funded) a 2nd holding lake was constructed to provide overflow of (muddied) rainy season water.

erosion from rain deluges. Also, the check dam designs were of limited lifespan and lacked (effective) silt traps. In the case of the ponds, after dredging, any clay siltation or lining would have been damaged, and so not effectively increase water retention. It was also clear that the O&M for this infrastructure was also lacking. For more comprehensive water conservation, holding tanks or cisterns could have been constructed as well.

In short, the intervention should have been replaced with more of a demonstration type activity where the logic of the catchment water to pond system was clear. Instead, and as well as the project implemented S&W conservation at the farm level.

S&W conservation at the farm level

Result - The S&W conservation measures by type of intervention / area, with a total area of 1,629 ha:

- Soil bunding - 1,228 ha covered with 182 km of bunding (bund:area ratio 149 m / ha) [~ 2 x 70m bunds within each ha (100m x 100 m)]
- Contour bunding - 399 ha covered with 125 km of small bunding (contour bund:area 312 m / ha) [~ 3 x 100 m small bunds within each ha]
- 2,774 farmers supported by S&W conservation measures on their land
- S&W demonstrations covered 38 ha (68% soil bund, 28% contour bund, and 5% check dams)
- A S&W Conservation Manual was distributed with 304 copies for trainee resource persons (280 from villages, plus 24 for township government departments (DZGD, DRD and DOA).

Analysis - The bunding of on-farm sloping land needed to be vegetated with shrubs or small agroforestry trees that livestock won't damage. It was not very common to find a number of measures in the same location / field, such as soil and contour bunds with agro-forestry planting (and also integrated with Output 2.3).³² There were no terraces constructed as the farmland was not suitable (i.e. within the standard slope parameters, with highly productive soils). The distribution of the S&W manual across departments also indicated that there isn't a direct match for S&W conservation within government.

Watershed protected through community re-forestation (original target 4,200 ha) (Output 1.2 - Forestry)

The rating is **Moderately Satisfactory**

(Baseline - 50 ha of natural forest conservation; Target - 2,160 ha of NFC; 1,360 ha of tree planting on public land; 680 ha of planting on community-managed land; Revised Target - 3,913 ha, 770 ha & 1,458 ha respectively)

Result against indicator - The project rehabilitated 5,468 ha of degraded watersheds to increase water retention and reduce erosion, of which: 3,050 ha of reforestation under **natural forest conservation**; 1,073 ha of **public land planting**; and 1,230 ha of **community forest** creation. The planting was mainly on two administrative classes of land – vacant (with some on forest estate) and public (communal) land. Added to this there was one management approach, namely community forestry (CF).

Analysis – The three activities were confusing, when considered from land tenure and management aspects³³. Thus, in essence, whilst the focus was on the coverage which was exceeded, the management approach was missing, meaning that the sustainability is questionable³⁴.

Concerning the forestry and tree planting, the impression given was one of raised environmental awareness with good community participation (- they were paid to plant), and a good link between the communities and FD, and lastly with good coordination between UNDP and the IPs with targets being achieved. However, there were some significant issues. Government permission to plant trees took too long, and permission to establish CF outside forest estate was not granted at all. Despite community involvement in planting, the type and scale of land preparation (large pits for the trees according to government standard³⁵), required the project to hire contractors with back-hoe diggers. Tree seedling 'beating-up' and 'gapping-up' took extra resources, and the issue of grazing and fire control was not addressed. On the last point, the dry zone farmers extensively burn the land in March in order to promote new grass growth from the beginning of the rainy season. Whilst this is a traditional and useful practice, it needs better management, especially where erodible soils have undergone tree re-greening / re-

³² 'The bunds and trenches / pits within the S&W conservation demonstrations were impressive, but the others on-farm were not of the same standard (PSC Meeting, Dec 2016)'

³³ Land is usually considered from a hierarchy of ownership, tenure and management rights. Without tenure, the right to use or manage any trees on a planted area is limited, unless by specific legal agreement, (such as being a tenant farmer, which is usually a bilateral agreement with a single tenure owner (landlord)), and not between state & community, which requires different legislation.

³⁴ This followed the prodoc design in focussing on the plantation coverage and missing the management requirements

³⁵ Comparatively expensive

stocking efforts.

Overall, the intervention was heavily focused towards tree seedling planting (1.7m seedlings)³⁶, and initial maintenance, but not on the post-project management needs, which concerned land tenure and resource management rights, which were not addressed. This was apparent when considering the intervention and land tenure type for these seedlings planted. Taking 2017, the stark figure is 59% of the planting of almost 4,000 ha (~10 meter spacing) was on land without governance³⁷.

Natural forest conservation

Result - There was a great effort to regreen by the communities, however the future management (rights) of the trees planted on this land mostly classified as vacant land, was unclear, or at least 'not belonging to the communities who planted it'. The planting of 3,050 ha was undertaken in 14 villages (11 in Chauk and 3 in Nyaung U). In some / most cases, community watershed protection groups were nominally established, but without any legal basis. Survival counts for the 2018 planting indicated 88% survival.

Analysis - For the two main forestry interventions - natural forest conservation and community forestry together - there were 492,709 seedlings planted on 4,279 ha, which was equivalent to only 115 seedlings / ha (~ an average spacing of 9 m x 9 m)³⁸.

For the natural forest enrichment planting, crown cover index measurements (using drone technology, belonging to NAG) indicated the most successful species after six months were: *Ziziphus jujube* (Jujube fruit tree), *Prosopis juliflora* (Prosopis – an exotic introduced species) and *Acacia leucophloea* (White bark Acacia)³⁹.

Against conventional wisdom, it would also have been useful to demonstrate broadcast sowing seed of adapted forest species. This could have been trialed with unprotected and protected (with thorn fences) plots to assess germination and survival differences – to demonstrate the impact of grazing.

Community Forestry

Result - In good faith, the project drafted 39 CF plans covering 1,229 ha of land mostly classed as vacant land, with some already classed as forest estate. This included: Shwebo CF (28 ha, 1 village), which was originally forest estate land and was certificated as a CF under the project. The remaining CF plans (Chauk covering 1,161 ha, 19 villages, and in Monywa with 40 ha for 1 village) were prepared, but mainly covered vacant land, and remain in process / unapproved⁴⁰. The project created forest user groups, with committees and member responsibilities, and prepared forest management treatments. The boundaries were demarcated with villagers, project and local FD staff or in the case of vacant land with local DALMS representatives. Aerial drones were also deployed for boundary identification and the GIS unit of the IP NAG created the maps.

Analysis - FD tended to be present for field work when the land was forest estate, with DALMS only sometimes present when the land was vacant land. There was a lack of collaborative approach and agreed roles from the government side, especially the lower levels of DALMS which included the (unpaid) land committees at tract and village level. At a township and regional level, there was less interest from FD and DALMS didn't want to be involved, as they had not been instructed via GAD to undertake any land survey for the purpose of CF, and especially not for any vacant land.

CF rules were not well known or communicated by government / FD, however the project was also 'chasing paper' at lower government levels without fully appreciating the higher-level approvals and methods needed for CF. The project worked in a participatory 'bottom-up' way with communities, but lacked a robust 'top-down' consensus-building approach, until far too late. On the IP side, consensus-building workshops were not part of their contract and there was no budget for such work. They only managed two CF training courses with communities and

³⁶ By end of project, the number is expected to rise to 1.8m seedlings

³⁷ Land type – vacant land 2,344 ha (59%), forest land 1,606 ha (40%), private land 49 ha (<1%); and Activity – natural forest conservation 2,623 ha (65%), CF 891 ha (22%), watershed 425 ha (1%)

³⁸ For new broadleaf forest plantation, initially stocking is often at 3 m x 3 m spacing ~ 1,111 seedlings / ha. Thus, if this was new plantation, this number of seedlings would only cover 443 ha, not 4,279 ha. (For the natural forest conservation by itself, 254,109 seedlings were planted in 3,050 ha ~ only 83 seedlings / ha (~ an average spacing of 11 m x 11 m). If this was new plantation, this number of seedlings would only cover 229 ha, not 3,050 ha.)

³⁹ Evidence-based impact assessment - ex-ante & ex-post parameters – soil erosion & forest vegetation cover index (NAG, 2018)

⁴⁰ However, for one CF in Chauk (178 ha), the land is to be re-classified as forest estate (under FD), which would facilitate its approval as CF. Also, the project has submitted extra new applications (March 2018) – Chauk Township – 9 CF groups 914 ha; and 15 CF groups 774 ha – mainly natural forest conservation land being applied to the Regional forest Department in Magway for change of land ownership from vacant to forest estate and then to CF

government staff, which indicated that the process and preparation of plans was largely undertaken by their own GIS and forestry staff only.

At issue was that CF was only perceived as permitted on forest estate, but the project prepared CF on vacant land and applied for approval. Despite the CF instructions (2016), supporting CF on vacant land, there appeared to be no higher-level agreement, and certainly not from DALMS on allowing such actions. The Mandalay Regional FD indicated that for CF on vacant land, not only DALMS⁴¹ approval would be needed, but also FD Central level.

In the past, FD staff have received government training in CF and there is a government target for CF, as well as agreed project document targets. Both FD and DZGD had prior recent CF experience⁴², however, on this occasion, they both lacked the willpower to support the UNDP project in this respect.

In 2018, the project obtained CF 'No Objection Letters' from government, but these were ineffective for CF certification, because the subject was approval for tree planting only, with no mention of CF, let alone boundary demarcation, and the Ministry of Home Affairs Letter (GAD) also specifically stated that land re-titling could not be applied for.

The project finally held a CF workshop (Mandalay Nov 2018) with FD, DZGD, DALMS, GAD etc, but with no officials from central government, but this was effectively far too late in the project cycle⁴³. A project approach agreed with government, perhaps to just demonstrate CF in each township was needed in 2016, prior to the responsible IP beginning the largescale CF group formation and mapping exercise.

Politically, the designation and tenure of land is a sensitive issue, and is not dealt with in a transparent way – no land use planning, with individual private applications for agriculture or building development land only⁴⁴. Added to this, if CF was to appear easy, it could be replicated across the country, especially in administrative state areas with minority peoples in majority populations and large forested areas. Added to this, the vacant land law⁴⁵ is not only under review, but its revision is suspended. The regional FD also indicated that despite the CF instructions only being issued in 2016, that they are being updated yet again.

Public land tree planting

Result - There was 1,073 ha of public land planting which included planting in micro-watersheds (667 ha) and planting in and around villages, public institutions and monasteries (406 ha). The micro-watershed planting was undertaken in in water catchments adjacent to 21 villages with 311,378 seedlings (667 ha (~ 467 seedlings / ha ~4.5 m x 4.5 m spacing). The activity was implemented with the creation of village environmental conservation committees (with bank accounts opened, for the payment of tree planting).

Analysis - A criticism, was that in some instances micro-watershed tree planting (and including for the agroforestry gap planting in the next section) was undertaken on (tenured or untenured) agricultural land, which would be contrary to the land law. The management of the trees outside compounds was not always clear. The tree survival on roadsides, outside compounds was estimated at 30% in Monywa. For both types, the project was late to set up village groups, however, letters sent to village leaders regarding protection, in some cases was resulting in village fines for damage by livestock.

Agroforestry (5,100 ha) (Output 1.3)

The rating is **Moderately Satisfactory**

(Baseline – 160 ha of agro-forestry home garden, & 430 ha of farm boundary planting; Target - 1,700 ha of home-garden / agro-forestry plots (110 villages), & 3,400 ha of farm boundary planting (100 villages); Revised target – 1,000 & 1,500 ha resp.)

⁴¹ DALMS belongs to Ministry of Agriculture, Livestock & Irrigation (MoALI), so inter-ministerial agreement with MoNREC may also be needed, as well as the Ministry of Home Affairs (GAD) giving a directive to go ahead

⁴² In 2013, Mandalay Region, under the CFIs (1995), two CFs (in Pyin U Lwin Township) were formed by the FD and two other CFs (in Nyaung U Township) were formed by DZGD, both in conjunction with JICA - Community Forestry in Myanmar (Kyaw Tint, O. Springate-Baginski, 2011) but note, two other CFs in Mandalay were said to be self-initiated by small groups of elites as a forest land grab

⁴³ The project took legal advice re. land tenure, with the recommendation unsurprisingly, to escalate the issue to the MoNREC and Ministry of Home Affairs. This was in 2018, but effectively too late. Effort made by project – but up the wrong paths - from May 2017 until Oct 2017, the project worked with township level administrators (GAD). From Oct-Nov 2017, they met the Chief Ministers for the 3 regions, and in Nov 2017 also finally discussed issues with the Township Land Management Committee (Nyaung U only). In Nov 2017, they met the MoNREC Minister; Feb 2018, the permanent secretary of MoNREC, and in April 2018 got the unaccommodating letter from Ministry of Home Affairs

⁴⁴ Re. sensitivity – Myingyan GAD claimed the conversion of agriculture land to forestry without planning permission.

⁴⁵ The Law Amending the Vacant, Fallow and Virgin Lands Management Law (2018)

Result against the indicator - The project established 2,594 ha of agro-forestry planting which was mostly on-farm based, of which: 1,000 ha in home gardens; 902 ha on farm boundaries; 667 ha⁴⁶ of gap planting; and 25 ha of demonstration plots. There were five activities

- Home-garden agroforestry planting in 203 villages (1,007 ha with a spacing of 17 m x 17 m)
- Gap planting in micro-watersheds and former shifting cultivation plots (667 ha with a spacing of 17 m x 17 m).
- Demonstration plots - agroforestry trees with under planting of crop in 11 villages.
- Soil erosion experiment plots in 4 villages (7.5 ha with 20 m x 20 m spacing) – four treatments against control were established with soil loss measurements of both recorded and by the Universal Soil Loss Equation (USLE) were made, with the main results:
 - o Ploughing down vs. across the contour slope, with groundnut – measured and USLE both indicated that ploughing across slope reduced soil erosion from 1.59 to 0.97 tons / ha / year (USLE) and field measured from 2.85 down to 0.64 tons / ha / year.
 - o Ploughing down vs along the slope with sorghum for measured soil loss from 1.53 down to 0.97 tons / ha / year (USLE was the same)

Analysis - These interventions were quite scattered, and not very well integrated with either the on-farm S&W conservation measures or the agriculture-based agroforestry planting under Output 2. Thus, whilst the impact was difficult to quantify, it was unlikely to be significant. The soil erosion experiments were an unexpected, but welcome find, indicating not only the value of soil conservation measures, but also the level of commitment by the IP, NAG in creating them.

Effectiveness - Outcome 2 at the Outcome Indicator & Output Level

The overall rating for Outcome 2 is **Highly Satisfactory**

Outcome 2: Climate-resilient agricultural & livestock practices enhanced (two indicators and 3 outputs)

The rating is **Highly Satisfactory**

(Baseline - 0; Target – Five agriculture adaptation practices (resilient varieties, on-farm S&W management; planting techniques, post-harvest processing, and diversified livestock rearing); Revised target – 6 practices

Result against the indicator - Nine drought-resilient farming practices were introduced, tested and demonstrated:

- Paddy rice water-saving tool
- Participatory rice variety selection
- Participatory dryland farming demonstration plots (which included seven types of demonstration)
 - o Rainfed drought-tolerant rice variety; Gypsum added to rice field; Groundnut varietal trials; Short duration pigeon pea variety for late sowing; Three types of intercropping, which were groundnut, sesame or pigeon pea based
- (Farmer Field School - which was mainly cross-cutting with the dryland farming)
- Farmer seed multiplication (with five types of demonstration)
 - o Heat-tolerant paddy; Short-duration groundnut; Short-duration green gram; Pest-resistant pigeon pea; and Genetically improved & purified seed - market-oriented sesame; indigenous chickpea; & lab lab bean
- Perennial trees with annual intercropping; and Drip irrigation
- Post-harvest processing; and Post-harvest storage
- Livestock rearing for income diversification and increased resilience

Analysis – The agriculture interventions were very competently and successfully implemented. The details with analysis are provided under the outputs section.

Farmers involved in climate-resilient farming techniques (Adaptation techniques transferred)

The rating **Highly Satisfactory**

(Baseline - Farmers have not been exposed to climate-resilient farming; Target - 12,600 farmers, extension workers and CSO/NGO members are trained in climate-resilient farming; Revised target – 11,500 (11,200 farmers + 350 others)

Result against the indicator - For agriculture and livestock farming, 13,160 farmers and government staff directly

⁴⁶ This is not the same 667 ha as planted under the public land tree planting

received training on climate-resilient farming methods.⁴⁷

Analysis – The figure is for the numbers having directly received project training and includes both agriculture and livestock training. Thus, the number is considered as fairly robust.

Results against the outputs -

Output summary table

Intervention	Target	Achieved	Villages
Outcome 2: Climate-resilient agricultural & livestock practices			
Output 2.1: Drought-resilient farming methods to enhance subsistence agriculture			
Climate-change adaptation - Resilient farming (participants)		1,112	280
Alternate Wet Dry Controlled Irrigation (AWD - water-smart practices (Hh)		261 (222,39)	69
Climate-resilient Seed (Rice) Variety Selection (Villages / research location)	140	150	5
Climate-resilient Seed Multiplication - training (#/hh's/m-f)		366 (316,50)	175
Participatory Demonstration plot on dryland agriculture	50 plots	329 (272, 57)	137
Farmer field schools (#/hh's/m-f)		455 (389,66)	215
Exchange visits & Farmer field demos from non-project villages	20%	98 (86,12)	103
Perennial trees - with intercropping (HH)		215 (185,30)	97
Drip irrigation -fruit trees - demo		153 (136,17)	31
Output 2.2: Post-harvest processing & storage to reduce losses			
Reduced post-harvest losses via improved processing / storage (Hh):	9,240	12,405	
Rice threshers(20); Multi-crop threshers (120)	140	127 (20,107)	127 Groups
Trainings / participatory assessments		170 (145, 25)	
Village Grain Silos	36	36	36 Groups
Output 2.3 Diversified livestock production to buffer the effects of drought			
Marginal / landless / vulnerable have increased the diversity of livestock (HH)	6,300	6855	253 LFGs

Drought-resilient farming to enhance the resilience of subsistence agriculture (Output 2.1 - Agriculture)

Alternate Wet Dry (AWD) water-saving tool (for irrigated rice)

Result - The AWD water-saving tool is a perforated tube that is placed in the paddy field to measure water levels. It improves irrigation 'water use efficiency' without decreasing yields. The aim was to reduce water use and enhance understanding on water-saving, and by saving water, reduce GHG emissions. It was tested in 69 villages in 261 farmer plots on 106 ha. Also trained concurrently were 104 DoA extension staff. 'Sinthukha' rice variety was used in Myingyan, Chauk and Monywa, while 'Pawsan' was used in Shwebo. One and half baskets (21 kg x 1.5) of rice seed was provided to each farmer.

Analysis - The AWD tool reduced the number of paddy-irrigation periods from 11 to 8 per crop. Yields remained the same – with or without the AWD tool, but importantly water use was reduced by ~40%.⁴⁸ It only costs \$3. Also, farmers were taught to transplant single seedlings not later than 20 days (for quicker recovery) which reduced seed requirements from 2 down to 1.5 baskets / acre. In terms of pest and diseases, root rot disease and iron toxicity (due to continuous flooding) were both significantly reduced.

Participatory Rice varietal selection

Result - The objective was to identify with farmers' participation, high yielding and acceptable rice cultivars for heat-tolerance, drought, short-duration and salt-tolerance. These new varietal lines were from Yezin Agricultural University (YAU)⁴⁹ that had been bred and selected for early-morning flowering to avoid heat damage and thus pollination loss. The lines already had drought and salinity tolerance (as salt affected soils are common in the dry zone). The new lines do not cross-pollinate with the standard-use varieties as they flower on different days and earlier in the day. From 2012-17, natural breeding at the YAU station was undertaken. In 2017-18, the varieties were field grown by farmers on location in Shwebo & Myingyan in two trials on rainfed and in two trials on irrigated paddy rice land in 18 'mother and baby' plots. The testing was conducted in five villages with 15 lead farmers, plus 52 DoA extension staff.

- Shwebo – Mother Trial (2017) - with 15 pre-released varieties (lines from YAU and IR64) and one standard check of

⁴⁷ Calculated from the M&E training data

⁴⁸ Cesvi Technical Report (p13, 2019) - After irrigation, the field water depth will gradually decrease over time. When the water level measured in the AWD tube is 15 cm below the soil surface, it is time to re- irrigate to a depth of 5 cm.

⁴⁹ A cooperation agreement between Department of Plant Breeding, Physiology & Ecology, Yezin Agricultural University (YAU), Cesvi and the UNDP- AF Project was made.

Manawthukha variety. With reference to the 1000 grain weight, all the improved lines were higher than the check variety, however the farmer selected preference was for three varieties including their check variety. Three lines (incl. for rainfed and irrigated) have gone on to be registered by YAU

- Shwebo Baby Trial (2018) – in two villages with four improved lines (from the Mother Trial) and one standard check (called 747) were grown in six farmers' fields (0.5 acre each) with seed multiplied by YAU and 2 kg given to each. Under the mother and farmer trial plots, there was a 233 kg / ha increase in productivity, but the selected variety took 115 not 100 days to mature. The farmers indicated that they will test on 10-20% of their land in the following years, and if it sells well, they will increase production against their standard use variety (747).
- Myingyan Mother Trial (2018) - The test included 12 improved lines: 10 from YAU and two local checks from township. There were 36 plots. The three best lines were voted for: YAU 1215-183-3-4-1-1-1 (high-yielding); Salto Sin Thwe Lat (salt-tolerance); and YAU 1214-183-3-1-2-1-1 (high-yielding)
- Miyingyan Baby Trial (2018) - Three improved lines and one standard check (Manawthukha) were grown in 10 farmers' fields - YAU 1214-183-3-1-2-1-1 had 20% higher yield than the local check variety, plus with shorter growth duration, it should have been chosen, but wasn't.

Analysis - This was probably the most technical experiment conducted by the project. 20% of their final technical report by Cesvi is taken up with just this adaptation measure. The varieties included early-maturing, heat-tolerant, early-morning flowering genotypes and breeding accessions of rice. Early-maturing varieties not only reduce the risk of crop losses due to end-of-season drought but can also contribute to reduction of the hunger gap. Heat-tolerant varieties can resist extreme temperature during summer time and early-morning flowering varieties can escape from heat during flowering and fertilization. The positive contribution of this intervention was clear.

Participatory Dryland farming demonstration plots

Result - The intervention was delivered in 137 villages with 329 lead farmers, plus 99 DoA extension staff. There were **seven** types of demonstration in 180 plots. The objectives were to: demonstrate differing cropping patterns under differing agro-climatic conditions; diversify through different crop / row combinations; improve the 'land equivalent ratio' and farm labour distribution; and disseminate best results via farmer field days.

Rainfed drought-tolerant rice variety

Although paddy rice can be produced 2-3 times a year, most production is limited to the wet season, due to limited water in the dry season. Insufficient water or drought is also a reason for low productivity. Drought can occur at different stages of the cropping cycle – early or late. When drought occurs early, it causes a delay in rice transplanting with subsequent loss of yield later due to the delay in flowering. Late-season drought, which develops at the end of the wet season before crop maturation also causes a loss in yield that is often greater. Based on last 10 years' rain pattern, the dry zone is regularly experiencing severe drought in June, July and August, with expectations of a severe impact on agriculture.

As part of participatory activity, the adoption of drought-tolerant rice was implemented in Myingyan and Shwebo under rainfed conditions. The average yields from local Manawthukha and Yeanaelo 4 varieties were compared. The demonstration was in farmer fields in five plots in Myingyan and 1 plot in Shwebo in 2017, and 4 plots in Myingyan and 1 plot in Shwebo in 2018. The Department of Agricultural Research (DAR)⁵⁰ had previously released drought-tolerant varieties (Yeanaelo -3 and Yeanaelo -4), but their uptake was low. The project introduced the farmers to these improved varieties, with the aim to enhance adoption of Yeanaelo-4 in particular. The results were clear in demonstrating a higher yield for the new drought-tolerant variety:

Yield bsk/ac	2017		2018	
(kg / ha)	Yeanaelo-4	Manawthukha	Yeanaelo-4	Shwebo MaNaw
Myingyan	97	70	79	70
Shwebo	80 (4,150)	70 (3,631)	50	50

The yield increase was positively valued by farmers for food security, thus they expect to increase production of Yeanaelo-4 variety in coming years. Moreover, the eating quality of Yeanaelo-4 was found to remain after a long storage as well. However, the market price remains lower than the Manawthukha variety, due to its differing appearance.

Gypsum application to rice field

Gypsum can reduce the salinity of certain soils and is known to reduce methane (a GHG) release in paddy fields. Gypsum application was tested in four plots in Shwebo (2017) and five plots in Myingyan and 10 plots in Shwebo (2018) with 2 bags/acre added on local Manawthukha rice variety being grown. The results were 80 and 70 baskets / acre in Myingyan in 2017 and 2018 respectively against the control (no gypsum added) at 60 baskets / acre. However, the types of soil were not tested or recorded (sand / silt / clay structure and salinity) and the project failed to understand that gypsum is not beneficial for sandy soils. Gypsum improves sodic (saline) soils by removing sodium and replacing it with calcium, however

⁵⁰ The DAR research farm activities include production of heat-tolerant, drought-tolerant and salt-tolerant varieties

if applied to sandy soils, it will depress phosphorus transport and will not improve water retention. Further research by DAR / YAU is needed to demonstrate this.

Groundnut Varietal Trials (+DoA/DAR)

Participatory varietal selection allows farmers access to potential new varieties that are suited to their location. This was an extra activity supporting an on-going DoA / DAR project with six varieties of groundnut tested (the project funded 28% of the plots). At harvest stage, Magway-16 was the most preferable line voted by farmers based on seed and pod shape. However overall YZG-99013 should have been the most preferable line, based on shorter growth duration and higher yield than the local variety.

In addition to the rice and groundnut, the project supported one cotton varietal trial.

Short-duration Pigeon pea variety for late sowing

Changes of rainfall have led to more frequent droughts during early and mid-monsoon. The existing rainfed pigeon pea is a medium/long duration variety at 180 - 200 days, thus without flexibility in sowing date. Crop failure is common due to lack of rain and disease during flowering. The short-duration variety pigeon pea (Yezin 10) was tested in plots in 11 villages in Chauk and 3 villages in Monywa under the FFS activity (42% of plots). The cycle was 100 days long, plus the short-duration variety can be replanted even in mid-monsoon if there's rain. A drawback is the lower market price of Yezin 10, but for food security the benefits are clear.

Three other types of demonstration:

The project via demonstration plots, FFS and lead farmers, introduced multi-crop production with intercropping of groundnut, green gram and pigeon pea – with harvesting at differing times. The plots were introduced partly because rainfed single cropping of groundnut is dependent on erratic seasonal rains. The intervention increased climate-resilience into the farming system. These demonstrations were: Groundnut-based intercropping (with Green gram + Pigeon pea; with Sorghum; with Cotton); Sesame-based intercropping, or in relay; & Pigeon pea intercropping (with Cotton or Sorghum)

Analysis - The success of these interventions was clear. A part from the two rice demonstrations, it was the first example of a project demonstrating differing types of intercropping in the dry zone with farmers' preference. The type of intercropping was two or more species planted in alternate rows. Farmers were introduced to the practice of sowing a fast-growing crop with a slow-growing crop, so that the first crop was harvested before the second matured, which did not require differing planting dates with all crops started at the same time.

Farmer Field Schools (FFS) & Exchange visits

The rating is **Highly Satisfactory**

(Baseline - No initiatives for exchange of techniques in climate resilient farming; Target - 20% of participants in exchange visits and farmers field demonstrations are from non-project villages)

Result against the indicator - Farmer Field schools were implemented in 215 villages with 455 knowledge-sharing farmers (389 men, 66 women), and 65 DoA extension staff (2 men, 63 women). It was a cross-cutting intervention, mainly in conjunction with the dryland farming demonstrations. Separately, exchange visits were arranged for 260 representatives from 103 villages.

Analysis - The creation and support to FFSs was the main 'knowledge transfer mechanism' for this agriculture section of the project and was highly effective. The objectives were to: provide an opportunity to evaluate differing cropping practices; how to organize FFS in their communities; and to sensitize members in new ways of thinking and problem solving. The intervention of establishing and supporting FFSs was successful, however DoA extension staff were not always available for project activities, thus the project trained some of the lead farmers to supervise the FFS activities.

Farmer Seed Multiplication (of drought-resistant crops)

The rating is **Highly Satisfactory**

(Baseline - 5 seed banks; Target - 140 village-level working research farms; Revised target added 50 demonstration plots)

Result against indicator - 369 farmer-managed seed multiplication plots were established, covering 353 ha. The activity was implemented in 175 villages with 1,081 key farmers (828 men, 253 women), plus 75 DoA extension staff (4 men, 71 women).

Analysis against indicator - The farmer-based seed multiplication intervention was conducted in 175 villages (against a target of 140 locations) and was highly effective. The numbers of women involved was also towards being representative.

Result - The farmers traditionally grow long-duration local varieties that provide income only once a year. If there

is drought or lack of rainfall during the flowering period, farmers are vulnerable to loss of harvest. There is a yield gap between improved seed and farmer seed due to varietal differences, low seed replacement, poor seed quality and low adoption of best practices. To increase the uptake of best practices, the project created farmer-managed seed multiplication plots. The five multiplication seed banks were:

- heat-tolerant paddy (Sinthukha), market-oriented paddy (Ayyarmin) - yield increased by one basket/acre (52 kg / ha)
- short-duration groundnut (Sin Padathar-11) and (Magway 16) - twice the yield with two rotations as opposed to the single long-duration variety tradition
- short-duration green gram (Yezin-14) – Yield the same, but 25 days less to maturity reducing drought risk
- pest-resistant Pigeon pea (Monywa Shwedingar) – 2 baskets / acre higher with high pest-tolerance
- market-oriented sesame (Samonnet), indigenous chickpea (white colour V2 variety), and lab lab bean – provided purified, genetically improved seed to support collaboration with DAR farm with the aim to replace old genetically deteriorated seed.

Analysis – The benefits of planting high quality seed to improve crop resilience and productivity were clear.

Perennial trees with annual dryland intercropping and Drip Irrigation

Result and analysis - The project supported planting agroforestry trees (thanaka, mango⁵¹, guava, wild almond, jujube, sterculia) with annual crops in rows – for improved off-season income and S&W conservation. The crops between the tree rows were groundnut, or green gram in pre and mid monsoon. Sesame and chickpea were also grown. 225 plots of thanaka and 150 plots of fruit tree were demonstrated.

For drip irrigation, the objective was to introduce a simplified system for fruit plantation; optimize the available water in the dry season, and increase fruit yield and quality by using fertigation. The intervention was delivered in 31 villages with 127 farmers, plus 1 DoA woman extension worker. 125 plots of drip irrigation plot were established, but the demonstrations were often in remote locations.

Post-harvest processing & storage (Output 2.2)

The rating was **Highly Satisfactory**

(Baseline - Farmers don't use improved post-harvest techniques; Target - 80% of households report reduced post-harvest losses through improved processing & storage; Revised target 80% - 9,240 out of 11,550)

Result against the indicator - The project reported that 12,405 households were introduced to post-harvest processing and storage systems. A post-harvest assessment was conducted. According to cluster-level workshops for thresher and seed storage user groups: crop losses were reduced from 38% to 24% for paddy rice; from 50% to 34% for groundnut; and from 53% to 35% in pulses (green gram, pigeon pea). Reduced losses were due to improvements in harvesting, field drying, threshing, winnowing & cleaning, storage, milled storage, and transport.

Result against the output - In 127 villages, the thresher user group membership totaled 7,942 households who were able to utilize the 127 threshing machines⁵². In addition, 36 villages received elevated storage facilities (silos⁵³). Their membership and use extended to 895 households. Thus, in total 8,837 households directly benefitted from improved post-harvest processing. Thresher user groups and Silo user groups with committees were formed and O&M training given. Fees for O&M were collected for use to make the intervention sustainable.

Analysis - The impact of the reduction in post-harvest crop loss, as a result of the threshers, storage silos and the training was significant.

Livestock to diversify assets and buffer the effects of drought⁵⁴ (6,300 households) (Output 2.3)

The rating is **Satisfactory**

(Baseline - Majority of poor farmers (either landless or those with < 0.8 ha of land) have no or few livestock; Target - 6,300)

⁵¹ Sein Tha Lone variety from the DoA horticultural farm

⁵² Thresher User Groups (105 multi-crop threshers and 20 rice threshers), resulting in 1,577 marginal farmers (1,116 male headed households and 455 female headed hhs) benefited from them and treated 61,611 baskets of rice, 1,673 baskets of sorghum, 9,281 baskets of chickpea, 3,679 basket of pigeon pea, 439 baskets of black gram and 3,000 horse gram were treated by project provided rice and multi-crop threshers (Cesvi Final report – Output 2.2 (March 2019); and 20 rice threshers were provided to 20 villages with usage within the thresher groups extending to 1,333 households and 107 multi-crop threshers provided to 107 villages with group membership / usage extended to 6,609 households (Cesvi ppt)

⁵³ These grain silos were 50C cooler e.g. groundnut~20% less loss with germination up from 50% to 80%

⁵⁴ Added information from - Climate-resilient livestock practices through capacity development, provision of drought-resilient livestock species & associated animal husbandry practices – Completion Report, Community Development Association, 2018, 94pp

poor farmers have increased their diversity of livestock)

Result against indicator - The endline survey stated that 36% of the livestock farmers responded that their income had increased to 577,000 MMK compared with two years before. The project delivered livestock to 3,700 marginal households⁵⁵ in 248 villages, plus in 2018, the project reported that 2,100 households had paid back the funds, which could be used to provide livestock to other households. Thus, in total (according to project partner reports), 5,800 households increased their diversity of income through livestock production. Moreover, the project reported (latest figures) were 6,747 vulnerable households had increased the diversity of livestock assets (source logframe results table). Of equal importance, in 253 villages, livestock farmer groups (LFGs) with village committee-managed revolving funds were established making the intervention sustainable.

Result against output - In 2016, the livestock assessment report (28pp, Nov 2016) clearly mapped out the approach and coverage of the livestock activity. The purpose was to learn to rear and feed with a view to sell to market to raise income, as opposed to keep for self-consumption. The LFGs were established with a total membership of 11,055 households (22% women with 20% women on the committees). (CDA, Completion Report, 2018.) Each LFG required a sub-mutual guarantee group, LFG formation and committee selection. The project provided vaccination for these livestock, as LBVD was not prepare for the extra logistics.

The project advocated forming cluster-level livestock groups (CLGs), in order to share information (prices- and avoid middle-men, diseases). There is a need to share market information (via mobile phones, What's App), probably via cluster or township level groups. The project proposed that CLGs evolve to create township livestock groups to bolster producer sales and marketing power. However, within this scheme, the role of LBVD in the provision of extension services and support to LFGs was yet to be developed. The project introduced community animal health workers to the LFGs during cluster-level training.

Analysis - The intervention to provide livestock under a revolving fund mechanism was successful. However, it was too early to assess all production costs (especially for pigs) against sales, but most participants were able to payback the funds. From the 3,700 original recipients, there were 108 demonstration livestock farmers⁵⁶, which was not many considering that the intervention was present in 253 villages. The project also only created 40 on-farm fodder plot demonstrations (0.25 – 1 acre each) of Napier grass, which was far too few and as an afterthought. This should be considered a concern as poorer recipients are unlikely to buy fodder or foodstuff and free ranging of the goats would exacerbate dry zone degradation.

Interestingly, these households as the poorest section of the project stakeholders were the only ones who had to pay for their interventions – the livestock, but with the revolving fund method, the activity became sustainable.

Effectiveness - Outcome 3 at the Outcome indicator & Output Level

Outcome 3: Climate-risk information disseminated via Weather forecasts (short, medium & long-term) – for farming and disaster planning (two indicators & two outputs)

The overall rating for Outcome 3 is **Highly Satisfactory**.

Dry Zone farmers using climate risk information (CRI) to adjust their livelihood practices (%)

The rating is **Satisfactory**

(Baseline – CRI on sudden disasters has a low level of household response. Outreach / understanding of CRI on slow disasters is even lower; Target - 50% (~25,000 households) have changed livelihood practices based on CRI)

Result against the indicator - The endline survey reported 39% of households convert weather information into response options, mainly via TV and radio. This is equivalent to 19,712 households. This, is slightly below the target, with the delivery of weather information remaining mostly via traditional media.

Analysis – The project was very successful in developing a basic mobile weather application for farmers, although future work is needed to include agri-advisory information, on a technical and local geographic level.

% of Dry Zone farmers with access to Early-Warning Information (EWI) on sudden disasters

The rating is **Highly Satisfactory**

(Baseline – As above; Target - 90% of households (~45,600 h/hs) receive EWI; Revised Target – 75% ~38,000 h/hs)

⁵⁵ 2,448 goats to 743 households, 8,563 meat chickens to 744 hhs, 4,346 to 2185 hhs, and 450 laying hens to 28 hh. The livestock adapted to the dry zone: laying hens; breeding hens / cockerel (Inbin Wa /high production local breed, or external cock); pig – DYL; goat - Htein san or Jateni breed.

⁵⁶ Laying hens 20 households; meat chickens – 8 hh; goats – 40 hh; pig – 40 hh

Result against the indicator - The project produced a Disaster Alert Notification (DAN) application for mobile phones, which was downloaded 13,557 times. Assuming one download per household, this would indicate 27% coverage. The project also established 75 disaster risk committees in 75 villages, which would also indicate a 27% coverage.

Analysis - Thus, it would appear that access to EWI is in direct correlation to the households and villages that the project worked in, but also that there wasn't any upscaling or replication of access to the EWI either via disaster committees or the application. The project reported that 78% of all households receive EWI, with the endline survey pointing out that most receive such information via TV and radio.

The project was very successful in creating an approach for disaster risk planning, then implementing it with the creation of disaster risk committees, which were institutionalised within the DDM. Added to this the project was successful in creating a mobile application for EWI and also institutionalising this application.

Results against the outputs –

Outputs summary table

Intervention	Target	Achieved	Villages
Outcome 3 Climate-risk information for dry zone households - use of short, medium & long-term weather forecasts			
Output 3.1 Climate hazard / risk maps for climate risk management & preparedness planning			
Vulnerability / hazard assessment + Climate risk maps (township)	5	5	n/a
Outputs 3.2 Local-level climate & disaster risk management (DRM) with climate risk & EW communicated			
Community-based disaster risk management (DRM) Committees	70	75	75
Climate Risk Information sub-committees (Township)	5	5	5
Agro-met bulletins (6); Early-warning bulletins (2); Guidance notes on resilient agricultural /livestock practices (4)	12	forecasts 6 per month	280

The wording of the outputs⁵⁷ didn't easily convey the requirements of the outcome, that of climate-risk planning for disasters, an early-warning system, and for farming – weather forecasts with agro-advisory information. However, the project understood the tasks, with this section presented as per the project.

Disaster-risk planning

The rating is **Highly Satisfactory**

(Baseline - No CRI products used by township authorities; Target - Climate risk scenarios & hazard maps created & updated)

Result - The project (Rimes and DMH) prepared a risk assessment which included township-level climate-risk profiles and vulnerability maps (down to village tract level)⁵⁸. They also prepared a shorter risk assessment guideline (35pp, 2017) which indicated the methods to arrive at a risk assessment⁵⁹. These guidelines were then used at a community level by DDM to establish preparedness plans.

Early-warning System (EWS) – An institutional mechanism and a mobile application

The rating is **Highly Satisfactory**

(Baseline - 0; Target - 70 community disaster risk management (DRM) committees formed to communicate with township DDM)

Result - The project created an institutional mechanism in the form of 75 community-based disaster risk committees which were linked to the DDM at township level. The project also developed an EWS disaster alert notification (DAN) application for mobile phones. This was embedded within DDM as their new mobile system, in tandem with the standard telephone call method.

An Institutional Mechanism

Community-based disaster risk management (DRM) training included: inception meetings in the townships,

⁵⁷ Climate hazard & risk maps prepared for community climate risk planning (Output 3.1) and Local level climate & disaster risk management framework for communication of climate risk & early warning information (Output 3.2)

⁵⁸ Risk Assessment Report (pp57, 2018) - Phase I. Baseline data gathering; Phase II. Hazard, vulnerability & capacity assessment - i) literature review, census data, reports, ii) field survey & site observation, iii) interviews at township level, & iv) participatory risk assessment at village tract level (risk ranking & mapping, seasonal calendar & survey); Phase III. Risk analysis - creation of risk maps, risk assessment & their potential impacts. Hazard & vulnerability data analyzed - i) identify risks for action, & ii) determine potential risk management & resource allocation recommendations. (see also **Annex 5** for a diagram of the process)

⁵⁹ In order to decide which climate risks to address, it is useful to understand that risk levels (e.g. high medium or low for a certain factor, e.g. flooding) are often determined by the hazard level x the vulnerability (or value) level which can be presented in a matrix (see **Annex 5**).

followed by two rounds of ToT training. Thereafter climate-risk information sub-committees were created in each township. From there, 75 community-based disaster-risk committees were established (~ one committee for every two tracts). The Department of Disaster Management (DDM) took the lead in this activity and linked well with the project.

The project (DDM and the IP), conducted a participatory vulnerability and hazard (drought, flood, earthquake) assessment in the 75 villages, with the results being 75 risk reduction and rescue plans prepared by the disaster risk committees. The plans include longer-time scale seasonal planning such as flood water management and short-term planning such as for imminent tropical storms. An early-warning communication system was established from village committee to tract to township sub-committee within the DDM⁶⁰. There was added support from DMH. Local government views were recorded – ‘for DDM, we now have better communication and coverage at local level (Nyaung U)’, and ‘due to the project DDM work, government officers now come to village more often’ (Monywa village).’

A disaster-risk management application for mobile phones

The DAN software is part of the early-warning system and is updated by the DDM at regional level. The application has been downloaded 13,557 times with usage at 53,967 ‘hits’ (until April 2019).

Weather forecasting for farmers

The rating is **Satisfactory**

(Baseline – Weekly/monthly weather forecasts on TV/radio; Target - 6 agro-meteorological bulletins; 2 early warning bulletins; 4 guidance notes on resilient agricultural /livestock practices)

Result - The project created a weather forecast mobile application called Sesame, through which a regional organisation called Rimes, posts a 10-day forecast, which is updated every five days (~six forecast bulletins per month). Another product is the 3-day forecast which is also on the application. Additionally, DMH produce seasonal weather bulletins twice a year. DMH in conjunction with Rimes, have also been producing ‘agro-climatic bulletins’, although they remain as prototype bulletins at present, with any further agri-advisory information, such as accumulated rainfall for the month / season and what crops to plant, what pests to control etc. These bulletins are disseminated to local government, but not farmers as yet.

Sesame Weather Application for mobile phones

‘Sesame’ is a weather application for Smart mobile phones⁶¹. The project worked very well to source support with Rimes⁶², to produce this latest technology. The farmers like this application, although they are just beginning to download and use in higher numbers. The number of downloads by April 2019 was 1,470. Sesame uses data from 15 Automatic Weather Stations (AWS)⁶³ (with Adcon telemetry and installed by Rimes), in the dry zone.

The data is used mainly for monitoring as opposed to forecasting, i.e. the bulletins are published after the time period. It needs some refinement (e.g. using data from more AWSs in the dry zone)⁶⁴ in providing more accurate accumulated rainfall data for each township. At present, it also lacks agri-advisory information for farmers⁶⁵. There are three main forecast products on a township level:

- The 10-day forecast⁶⁶. They are issued via the app every five days and contain the weather from the last five days and the forecast for the following five days
- The 3-day forecast (produced by Rimes) via the app
- DMH also produce seasonal weather bulletins twice a year based on the SE Asia Climate Outlook and South Asia Climate Outlook Forum bulletins.

⁶⁰ ‘The engagement of government, especially from GAD, DDM, DMH and the fire service was vital in planning and implementing DRM activities at township and village level. These departments were not just participating but leading and training communities, such as mock drills and disaster risk reduction trainings.’ Annual report, 2018

⁶¹ Launched at 18th Monsoon Forum in Nay Pyi Taw

⁶² Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) is a regional collaboration including Myanmar to provide localised climate / weather data. Sesame is running in 7 countries.

⁶³ Nation-wide, there are 51 AWSs that transmit into the global system every 3 hours

⁶⁴ However also national meteorological data from other AWSs (installed by Japan & Korea) in the dry zone is not accessible to Rimes for use in Sesame. This would improve the accuracy of localised weather data, especially dry zone rainfall.

⁶⁵ Agri-advisories were being presented through the Rimes website <http://cdaas.rimes.int/>, however the TE was unable to find these

⁶⁶ Is based on the European Medium-range Weather Forecast (ECMWF)

In order for the forecasts, to be able to provide the to provide 'above, below or average' indications for temperature and rain, Rimes conducted a 30-year analysis of historical climate data for these dry zone townships. Farmers have downloaded the application out of interest, but its usage remained limited, possibly due to its usefulness in comparison to TV/radio forecasts. Prior to Sesame, and on-going is a DMH (official and unofficial) practice of releasing weather information via Facebook⁶⁷, thus there isn't a primary standard method to as yet.

Agri-met Advisories

DMH in conjunction with Rimes, have also been producing 'agro-climatic bulletins' (10-day weather advisory for each township)⁶⁸. The data includes: temperature and rainfall. However, there isn't any further agri-advisory information, such as accumulated rainfall for the month / season, accumulated soil moisture and what crops to plant, what pests to watch out for etc. Thus, at present they remain more so as prototype bulletins. They are disseminated to government departments at a local level, but not farmers as yet.

The project established a weather advisory group in each township under the DoA, however at present the DoA are unable to provide agri / crop information. They lack the skills / capacity to interpret the rainfall / temperature data on Sesame, which is isn't in a very user-friendly format for farming needs (i.e. the rainfall is not presented cumulatively.) The project also provided computer equipment to the DMH Mandalay office as well. Rimes already worked with DMH, so the extra project support / added focus was welcome.

3.3.3 Training

One of the key project approaches, was to train alongside the implementation of activities. This was successfully and significantly undertaken for:

- Outcome 1 - S&W conservation - where on-site demonstrations were established over 12-day training periods; and forestry - where 'learning by doing' tree planting was undertaken by villagers
- Outcome 2 - agriculture - where new approaches were tried and tested, demonstration plots established and FFS techniques utilized; and for the livestock activity
- Outcome 3 - climate-risk planning - where a new disaster reduction and response system was established at village level

Total training number by subject and output:

Output	Men	Women	Total
Water infrastructure / conservation (1.1)	547	32	579
Forestry (1.2 & 1.3)	5,881	2,917	8,798
(Agriculture & Livestock) 2.1 - 2.3	8,351	4,809	13,160
Climate risk & Sesame (3.1)	477	280	757
DRM (3.2)	2,352	1,988	4,340
Total	17,608	10,026	27,634

Source Project M&E system – Training Spreadsheets

Some other notable results of training:

Outcome 1

- 304 trainees received S&W conservation training (280 farmers / villagers, 24 government staff). For S&W conservation, apart from those who were provided with demonstrations, it is estimated that 10% of the trained farmers replicated the activities (Myingyan)

Outcome 2

- For agriculture (i.e. climate-resilient farming under Output 2.1 & 2.2), it was estimated that for the 1,278 farmers and DoA staff trained, that there were another 5,003 indirect beneficiaries⁶⁹
- For agriculture training, the main topics were: improvement of plant density & population; crop diversification / intensification; drought & heat resistant crops / varieties; integrated soil management; integrated pest management; and increase yield with short duration variety.
- For post-harvest O&M training for threshers covered 127 villages with 256 households and DoA extension staff. There was also a cluster level workshop for thresher user groups and storage user groups with 387 participants
- For livestock, it was estimated that 8,790 marginal and landless households (5,072 men, 3,718 women) received training

⁶⁷ Sesame uses data collected internationally from processed synoptic transmissions all across the region, where the Facebook posts may come from a single source, such as the three times daily Indian Met. Office forecast or the Japanese Himawari-B for early-warning information

⁶⁸ All are township-based except Chauk, for which is Minbu in Magway-based.

⁶⁹ The coverage was 280 villages with 1,112 lead farmers and 166 DoA staff.

on livestock production via project-trained ToT trainers at community level – i.e. indirect beneficiaries

Outcome 3

- The trainings were joint delivery for both outputs with Rimes, DMH, and DDM

The scale and impact of the training was considered highly significant by this evaluation. A list of training courses by name against output is provided in **Annex 5**.

3.3.4 Efficiency

Efficiency is rated as Satisfactory

Without the IPs hired to implement the activities, the project would not have been able deliver the expected results, thus in this respect, the project approach to sub-contracting was very efficient. Whilst a number of interventions were often found within a village or surrounding area, it was very rare for them to be together on the same piece of land – e.g. soil conservation bunding and agro-forestry species on the bunds or as boundary planting; or livestock with (any) fodder production. However, there were often a number of interventions with a village, thus moving towards multi-intervention climate-smart villages in the future would be a logical step.

With regard to tree planting, the cost-benefit can only be assessed in the future. Also concerning engaging the DZGD to produce seedlings, UNDP undertook a market survey, which indicated there was no other capacity, thus single source selection was agreed. A letter of agreement was prepared for the nursey production of 2m seedlings. Regarding planting costs, the government norm was over twice that of the project budgeted estimate, thus in 2018, a higher rate was agreed to facilitate a higher quality of planting / survival expectation, but with reduced overall numbers. In 2018, the project undertook an extensive joint survival count with the resulting figure at 88%. Whether this figure will remain in 5-10 years is unknown. Local seed collection and broadcast sowing with enhanced protection (from fire and grazing) was not tested. Concerning S&W conservation, there were a few erosion control experimental demonstrations created, at the farm level, but more assessment of the impact of soil bunding and catchment level interventions on S&W conservation is needed.

3.3.5 Relevance

The project remained relevant. The project was based on NAPA (2012, pp127) priorities with dry zone farming adaptation at the forefront. Sectors in which level 1 priority adaptation projects to be implemented first included agriculture, early-warning and forestry. The project design and implementation remained highly relevant, especially with climate change issues becoming more acute. E.g. rainfall patterns include insufficient rains for rainfed rice at the expected planting dates, which necessitate identifying shorter growth-cycle varieties, and / or using external water sources (boreholes for irrigation), for which the dry zone is not suitable.

3.3.6 Country Ownership & Mainstreaming

The level of country ownership varied by department, with a TE comment here on their overall level of involvement in the project:

DZGD - high – as the government counterpart, & as a service provider for seedlings
FD – medium – should have been high due to the significant size of the forestry component
DoA – high – due to the extensive agriculture component and their interest to work closely with the project
DMH – high – due to close involvement with project on provision of climate information
DDM – high – due to close involvement on provision of an institutional mechanism for early-warning
LBVD – low – limited due to staff availability.
DRD – low – limited due to their role not being a clear fit with the project interventions
IWUMD – low – only involved in the Shwebo canal and irrigation scheme and its handover to them
ECD – low – only involved in TAG meetings and reporting back to MoNREC

The project was not designed with a component to update and mainstream legislation concerning climate change adaptation (CCA), however best practice designs have been implemented with new capacity built (e.g. deep tube wells, soil conservation bunding). In order to implement the project, UNDP needed to outsource the delivery of the interventions to consultants and contractors. In this sense, in-house capacity-building was limited.

National and regional budgets were not disclosed, thus the level of financial mainstreaming was unknown, except in 1-2 cases, where conscious decisions were made for the government to focus on one intervention aspect, the project another – e.g. government groundnut trials - project rice trials; or DMH working closely with the project (IP Rimes) on the climate information outcome. Methods and approaches are being taken on-board, concerning:

weather forecasting and local disaster planning; innovative rice variety selection trials; and S&W conservation guidance at a community level. Unfortunately, the latter is largely without an allied government department or state sponsor.

4. SUSTAINABILITY

The overall rating for sustainability is that it is Moderately Likely

4.1. Financial Risks to Sustainability

Since 2012, there has been a significant increase in government funding in climate change, environment, rural development, dry zone greening; agri-research, and weather forecasting. DMH has also had a significant investment in technologies by donors, including Korea and Japan. The level of funding from donor projects has also significantly increased since the beginning of the decade.

However, without proven sustainable re-greening methods, and without the government interest in community forestry, the willingness of donors to support forestry in the dry zone is unknown. The rural development approach here probably needs to start at the beginning with village development planning (VDP). For forestry as a key outcome, there is a significant risk that any success and lessons learned will not be built upon after project closure. There is a Clean Development Mechanism (CDM) project in Chauk which could be requested to support CF and carbon capture.

4.2 Socio-economic Risks to Sustainability

The livelihoods of project households have been significantly improved. Water supply had been lessening for 20 years, especially during March – May, due to watershed degradation and a changing climate. The project made an extensive investment in water supply and conservation infrastructure – soft and hard. With a number of modern design tube wells installed, there is greater water security. The project development and support to paddy rice field trials is yielding benefits, as is the complementary DAR groundnut program. The FFS approach has been highly successful. Capital asset diversification in the form of ‘livestock banking’ for marginal households has been successful.

4.3. Institutional & Governance Risks to Sustainability

The forestry tree planting on vacant land lacked management and ownership. There was a lack of partnership between DZGD and FD concerning community forestry (CF), in part due to the lack of political willpower by higher government. This may have been due to the expectation that extensive CF without full procedures with checks & balances could open up forest land tenure and management rights, not only in the regions, but in the (ethnic) states as well. As a process, CF needs to be implemented together with VDP and land use planning and land allocation (LUPLA). MoNREC in its present form was established in 1992 and is considered stable, but also with their FD, did not take any lead in the CF process.

Water user groups were established to operate and maintain the tube wells, pumps and tanks, which largely negated the need for government funds. Thresher and grain storage groups were established to operate and maintain the equipment, which should ensure their sustainability. Lending to livestock farmer groups was underwritten, as well as funds revolving, which should also support sustainability.

The disaster risk management committees were set up at township and village level, and with the key institutional support of DDM, they are expected to be sustainable. The weather and early-warning mobile applications – Sesame and DAN are government-owned, thus they can be considered sustainable, added to which any licence fee for use would be at government discretion.

At present, YAU doesn’t recognise farmer rice seed property rights under the UN Nagoya agreement on access to and benefit-sharing of genetic resources, despite the source of the genetic material from and subsequent breeding trials undertaken with farmers.

4.3. Environmental Risks to Sustainability

The natural regeneration (planting) plan for DZGD (2017-19)⁷⁰:

Region/ ha	2017-18	2018-19
Mandalay	18,097	18,097
Magway	2,146	2,146
Sagaing	0	0
Total	20,243	20,243

In comparison, the project planted ~5,500 ha, which is ~10% of the overall DZGD plan, annually for two years⁷¹. However as mentioned there was a significant management issue, with it being too early to evaluate longer-term watershed benefit. With regard to tree species selection, Eucalyptus (*E. camaldulensis*) can be coppiced for a number of generations for fuelwood, but it doesn't naturally regenerate from seed in the dry zone⁷², thus eventually the Eucalyptus will need to be re-planted or replaced. Fortunately, the project planted a fairly balanced mixture of ~20 species, with Eucalyptus only accounting for just under 10%⁷³. Jujube (*Ziziphus mauritiana*, Chinese date) was not so widely planted (~3%), but has the added benefit of the fruits dried as a high energy fuel and used in stoves. An additional positive impact from tree planting would be carbon capture.

The project supported an extensive livestock production intervention, without really supporting fodder production. One of the key driving forces for land degradation in the dry zone is lack of grazing control. Thus whilst, the project may have diversified income for the poor, marginal and landless, it has come at a heavy environmental cost which the project was trying to address. Admittedly, only the goats could be free-grazing, and the project was promoting pen feeding with enhanced nutritional diets. But in all, nearly 2,500 goats were provided to nearly 750 households and only eight demonstration plots of fodder production per township covering an overall total of only ~10 ha.

There is a significant risk that key outcomes such as forestry will not carry on after project closure, due to planting on land without tenure or management rights, and community forests planned but not approved.

5. IMPACT & CATALYTIC EFFECT

5.1. Impact

Reduction in stress on ecological systems

It is too early to assess any reduction in stress on the ecosystem. For example, whilst water supply from aquifers has been increased, without monitoring usage (especially if livestock production heavily increases due to year-round water availability secured), a significant draw-down may occur over the next 20 years. Thus, the project solution was medium and not long-term.

Over the last 20 years, the farmers in both Myingyan and Shwebo indicated that their paddy rice crop losses amounted to over 50% lost 5-6 times. On the positive side, over the same period, in Shwebo, their rice yield is 1,037 kg / ha higher due to farmer / state varietal breeding, and increased inputs (fertiliser and pest management, better storage). Under the project, for the drought-tolerant Yeanaelo-4 rice variety, just taking the '10 basket' increase over local varieties amounted to 519 / kg / ha increase. Also, under one of the Shwebo rice varietal trials, the increase in yield for a variety with greater climate resilience was 233 kg / ha.

Regarding weather information, one of the identified needs for the future, is drought monitoring and forecasting which requires not only rainfall data, but vegetation index and well as surface and groundwater data⁷⁴. The project with the support of Rimes, in collating 30 years' of historical weather data has gone some way towards more accurate drought monitoring.

⁷⁰ Myanmar 10-year reforestation programme

⁷¹ Using another scale, the project planted 2.13 million seedlings, which if converted at 1,111 / ha (standard 3 x 3 m spacing), this would be equivalent to 1,917 ha. [Country-wide, FD and DZGD plant around 45,000 ha annually - UNFCCC 1st National Communication (2012) - <https://unfccc.int/resource/docs/natc/mmrnc1.pdf> (p42)]

⁷² It does germinate though under nursery conditions

⁷³ However, in assessing new plantation areas under the project's natural forest conservation activity and other DZGD sites for comparison, the TE would suggest that the reliance on Eucalyptus, especially by the DZGD is much higher at ~50%.

⁷⁴ Also soil moisture is one of the 4 key parameters needed, but it can be derived from rainfall data

Regulatory & policy change

The project was not designed to support the revision of laws or policies, but it was in-line with objectives and demonstrated approaches in the field, particularly for agriculture, the dissemination of weather information and the creation of an early-warning institutional structure. The only deviation concerned CF, where the forestry laws and political willpower didn't converge, however the project demonstrated an approach in the field. There is now a new law on forestry (2018), and CF instructions again being updated, but how they address CF has not been assessed, nor in terms of the new vacant land law.

In terms of agri-advisory information, there needs to be some policy adjustment. For example, there doesn't appear to be a clear mandate for DMH to produce such advisories, added to which, drought forecasting is not standardised due to differing (official) drought definitions. The role of DoA in the interpretation of such advisories is also unclear. Rimes, for their part provided training to DMH and DoA, in the requirements for agri-advisories, but there remain other barriers, such as the need for vegetation index (cover / dryness) data, the need for DMH and DoA meteorologists to interpret the weather data into advisories and farmer-friendly crop planting information, and not least the use of the AWSs (there are 15 stations at present) in the dry zone, to provide location-specific and cumulative rainfall data. In essence, the latter could easily be the subject of a DMH / Rimes follow-up collaboration in preparing the software needed.

5.2. Catalytic Effect

Scaling-up and Replication

The project was implemented in 280 villages out of 998 villages in five townships ~28% coverage, thus there is an opportunity to scale-up within the townships and across the dry zone.

Soil & water conservation / supply and Forestry

For S&W conservation, apart from those who were provided with demonstration interventions, it is estimated that 10% of the trained farmers have replicated the activities (Myingyan). For CF, a re-think is needed with any new CF project working from a much higher government forestry office level, probably centrally.

Agriculture

Seed multiplication involved a cycle of stakeholders and activities from farmer seed grower to community seed bank to recipient farmers with improved technical support from DoA / DAR and FFSs. Farmer and community-based seed multiplication should be scaled up in tandem with DAR research. The project (IP – Cesvi) prepared township & village seed maps to identify the availability of seed for distribution. This was helpful for DoA / DAR and future projects.

For agriculture, the levels of replication was calculated with a view to identify approaches / demonstrations being taken up by the farmers without external support. The figures are presented in **Annex 5**. Of note:

	Project support		Post-project unsupported replication / repeat – within or outside project area	
	acres	farmers	acres	farmers
Seed multiplication by farmers	360	360	1,032	411
Participatory demonstrations	327	327	713	308
FFS	113	450	1,089	212

From Output 2.1 and 2.2 in 2019

Currently, 411 farmers are receiving the certified rice seed from farmer-managed seed multiplication farms. In the winter of 2018, the project provided 30 tons (1,426 baskets) of certified rice seed to the 36 farmer seed storage user groups to use as revolving funds. The seed committees also provided 89 baskets of chickpea seed to 85 extra seed multiplication farmers. In March 2019, farmers harvested 8 baskets / acre of chickpea compared with low purity seed at 4 baskets / acre. Scaling-up the short-duration pigeon pea (Yezin 10) is also recommended, especially when there is delayed sowing due to drought / high temperature in the early monsoon season. Using this variety, farmers can grow the pigeon pea also in mid and late monsoon, again increasing resilience.

For scaling-up rice variety selection, YAU needs to continue working with farmers at field level. It would be appropriate for farmers to be part of the new variety registration, but failing that, they should be exempt from copyright production fees (which are expected to be levied on production over 1 ha.) After registration, seed multiplication can be undertaken with DoA / DAR with YAU technical oversight. Seed multipliers and seed bank committees still require training, with the involvement of FFS lead farmers to transfer techniques.

For the AWD water saving tool, currently, there are 39 farmers applying AWD practices covered on 75 acres of rice land without any project support. However, the on-farm soil conservation & agroforestry activities needed integrating with a clearer message.

Demonstration and production of new technologies /approaches

The project did not always differentiate clearly between 'demonstration plot' and all plots / participant farmers or those attending training, which meant that understanding the replication / outreach impact was more difficult. The adoption rate of new agriculture techniques (endline survey, 2018) indicated that from those attending training, 52% trialed the technique (& thereafter 41% adopted), which appears highly significant. However, from those becoming aware of new techniques, only 17% were able to disseminate such knowledge, which indicates a missing replication approach and delivery mechanism. Similar figures exist for livestock husbandry, although more farmers are aware, but with a lower 11% able to disseminate⁷⁵, again indicating the need for an institutional delivery mechanism. On the more positive side, the 'landless' target group, trialing / adopting the livestock activity was proportionately higher, as per the project design.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The project implemented a wide array of interventions in 280 villages in five townships. It took two years to get the project active in the field due to the slow procurement of UNDP's partners (many), and the late agreement by government to start the inception workshop. Without the Team Leader and UNDP identifying the best available service providers / contractors, the project would not have been delivered and certainly not effectively within two and a half years. There was a remarkable effort to attain targets which was facilitated to a large extent by these very capable partners who were hired on two levels – international / external call for proposals and national short-listing and bidding. Four of these main partners were Cesvi, NAG, CDA and FBD for the farm and forestry activities. The tube-well and water infrastructure construction companies were professional and used best practice designs. Other partners, such as Rimes for weather data presentation, and AZSO⁷⁶ for the Shwebo canal renovation produced very useful outputs. One government department, DZGD, also acted as a contractor in the supply of 2m tree seedlings.

There was a large support effort from a number of key government departments who were given the opportunity to learn, be active and 'get involved'. These included DoA (and DAR), DMH and DDM. The FD and DZGD became more involved once the tree plantation work got underway. However, in some cases government departments could have been more proactive in learning and building their capacity or perhaps playing a wider role. This was more true of DZGD and FD. In the case of DRD, their interest was high, but defining their supporting role was difficult.

Water supply was significantly improved with modern tube wells installed, which provide year-round water security. With the renovation of the Kin Tat Canal, there has been a significant increase in clean water supply for Shwebo and for irrigated land.

On developing packaged messages, the project didn't quite manage to consolidate the S&W conservation measures at either watershed or farm level. At the watershed level, there were insufficient erosion / flooding side-spur channels connected to the main catchment channels leading to the retention ponds, and the check dams were often missing silt traps. The understanding of this 'watershed to village' S&W conservation model (with check dam to channel to pond linkage) was poor. The added and needed link with tree planting and grazing control was also tenuous. At the farm-level, the physical soil conservation structures such as bunding were not linked with agroforestry or other vegetation planting. In both cases investments were spread thinly with resulting loss of quality in design and demonstration effect. On the plus side, the S&W conservation manual was good.

The project also 'chased its targets', and therefore lost out in a couple of areas including identifying an agreed approach for community forestry (CF). Furthermore, FD and DZGD didn't effectively support the project in CF due to lack of political willpower. CF should have been converted to a demonstration activity with regular regional and national workshops to build such a consensus. However, the technical approach to CF implemented by the project should be considered as a process now demonstrated for government. Concerning re-greening, the project provided a large scale and significant intervention demonstrated across land ownership types and

⁷⁵ Also from the survey of 500 livestock households, only 43 could additionally adopt the income diversifying measure

⁷⁶ Aung Zeyar Social Organization

equivalent to ~10% of the government planting target for two years.

Technically, the agriculture interventions were the most impressive, not least because they worked, but also because they included institutional capacity building (with DoA / DAR) and delivery mechanisms (FFSs and the creation of multiplication farmers and community seed banks). They were packaged exceptionally well. The rice and other crop trials are already being replicated without the project and will be sustainable with limited government support to the appropriate line agencies. The alternate wet and dry (AWD) water-saving tool was a success as was the post-harvest equipment – threshers and grain silos – which with self-managed groups and committees and fees for O&M, appear sustainable. Added to this, the silos allow for the improved seed multiplication intervention to become sustainable. Thus, the benefits here are significant. In terms of diversifying income for landless and marginal households, the livestock revolving fund was successful, albeit with concerns regarding the feeding and control of a significant increase in the number of goats.

For weather forecasting, the climate application called Sesame was the latest technology and liked by the farmers, however the data provided is mainly weather data and not agri-advisory as written within the project documentation. This is for a future development or project. Also, there are township-level automatic weather stations (AWSs) in the dry zone, but this rainfall data is not being presented to the farmers via agri-advisories or otherwise. DMH does provide a seasonal forecast, which provides more information. With close support of DDM, the project created an early-warning institutional mechanism and system, also with a mobile application called Disaster Alert Notification (DAN). This was useful and appreciated.

This dry zone project was one of first designed after the change of government, with lessons only now just being learnt. On the question of direct versus national implementation modality, this is decided on a UN / central government level, but the question is ‘would a future project benefit more from NIM in terms of rural development?’ The answer is probably not just yet.

6.2. Lessons Learned

Climate resilience & adaptation measures (key lessons)

Watershed management

As a packaged message, the project didn’t quite manage to consolidate the S&W conservation measures at either watershed or farm level. At the watershed level, there were insufficient erosion / flooding side-spur channels connected to the main catchment channels leading to the retention ponds (which also needed clay-lining), and the check dams were often missing silt traps. The understanding of this ‘watershed to village’ S&W conservation model (with check dam to channel to pond linkage) was poor. The added and needed link with tree planting, grazing and fire control was also tenuous. At the farm-level, the physical soil conservation structures such as bunding were not linked with agroforestry or other vegetation planting. In both cases investments were spread thinly with resulting loss of quality in design and demonstration effect. On the plus side, the S&W conservation manual was good, but lacked a designated department to align with.

Water supply from aquifers

For the deep tube wells, the water committees need to monitor water extraction (using meters), so that excess use or low availability (pressure) can be identified early. The dry zone is not generally suitable for irrigation, and groundwater aquifers certainly should not be used for irrigation, as this will only exacerbate future (drinking) water security.

Irrigation

With the renovation of the Kin Tat Canal, there was a significant increase in clean water supply for Shwabo City and for the surrounding irrigated land. However, irrigation water should only be provided by river supply or managed reservoirs in the dry zone.

Agriculture

Technically, the agriculture interventions were the most impressive, not least because they worked, but also because they included institutional capacity building (with DoA / DAR) and delivery mechanisms (FFSs and the creation of multiplication farmers and community seed banks). They were packaged exceptionally well. The rice and other crop trials are already being replicated without the project and will be sustainable with limited government support to the appropriate line agencies. The alternate wet and dry (AWD) water-saving tool was a success as was the post-harvest equipment – threshers and grain silos – plus with self-managed groups and

committees and fees for O&M, appear sustainable. Added to this, the silos allow for the improved seed multiplication intervention to become sustainable. Thus, the benefits here are significant.

Livestock

In terms of diversifying income for landless and marginal households, the livestock revolving fund was successful, albeit with major concerns regarding the lack of parallel fodder production and grazing control.

Forestry

Tree planting and community forest management are two very different activities, the former may involve labour being paid to plant, as per the project, whereas the latter often involves protection in return for agreed resource use. Thus, the planting of trees should not be confused with the future management rights of those trees, and not forgetting that if international development funds have paid for the community planting, then there is a case for community management and resource use in these areas. Such land tenure and management agreements need to be agreed by government at the project design phase, which means that the land also needs to be identified at this stage. Tree planting on vacant land without appropriate management is not sustainable. A new strategy with an institutional mechanism and local partnership approach is needed, with the focus on rewards for maintaining tree cover for more than 10 years.

In the case of the community forestry (CF), a technical process was demonstrated for government, but it needed more of a national platform and regional workshops to build a common approach, otherwise the intervention should have been converted to a demonstration activity only. In terms of CF establishment, any future project needs to partner with the forest department (FD) at a much higher governmental level (with MoNREC and MoALI / DALMS) with influence in decision-making and policy. Future projects with village development planning (VDP) and land use planning & land allocation (LUPLA) could also include CF as demonstration activities. VDP is often needed as an entry point to equitable land allocation, especially on a community level.

Replication / Upscaling (key successes)

Packaging and delivering during a project

It is often not the measures per se, but the packaging and dissemination approaches, though government departments and media (radio/ TV), that need to be tested, adopted, and mainstreamed. This was not built into the design. E.g. Agriculture intercropping methods – these were very successful and could quite easily be upscaled via information about the seed banks on local radio.

Agriculture

Crop breeding, i.e. farmer participatory seed selection with farmer multiplication and farmer field schools (FFS) should be expanded and strengthened. The AF project was a major field test in approach (in participation, partnership and in technical delivery), but for continuity and sustainability in resilience, future projects are needed.

Community / National Interest (future consolidation)

Climate-smart villages

The overall benefits of combining a number of interventions in one location would have had a greater overall impact. Future projects could / should move towards multi-intervention 'Climate-smart' villages. To increase income security in these villages, interventions could include: village saving and lending groups, income diversification and improved market linkages / value chain additions. Lessons from other projects often include working with local production groups, but registering them so that they maintain more control over market value and avoiding middle-men.

Gender

The participation figures for women appear acceptable, but their participation could have been written into local group rules, such as 25% committee membership for water, thresher, livestock, and CF groups.

Weather and crop advisories for farmers

The project documentation described 'agri-advisories' but in reality, only weather forecasts were produced, and not allied farming-based information. Cumulative rainfall data from the dry zone AWSs needs to be accessible to farmers and utilised to prepare agri-advisories. A future project probably needs to support training of the next

generation of agri-meteorologists. The collaboration with Rimes and the Sesame mobile application should also be continued to develop such tailor-made information for dry zone farmers

Early-warning

With the close support of DDM, the project created an early-warning institutional mechanism and system, also with a mobile application called Disaster Alert Notification (DAN). This should be upscaled.

Soil & Water Conservation

The on-farm S&W conservation measures heavily focussed on major bunding exercises using machinery, and less so on a range of broad S&W conservation measures, including integrating with vegetation establishment. By design, these interventions were largely out of the reach of many farmers. The lesson is that these measures not only need combining, but they need farmer-group establishment to share investment costs with the government and future projects.

Knowledge sharing & management (key lessons)

The project's modus operandi was to extensively train and build capacity, which was effective, but stretched across <30% of the villages in the five townships. There could have been better use of standard dissemination approaches such as using local media (TV and radio). More time should have been spent for consolidation of results, lessons learned and preparation and delivery of knowledge products, but this was largely a design opportunity missed in favour of attaining targets. Neither the project nor the government created a depositary or website for project technical reports or data. This is perhaps more pertinent, as there isn't an immediate window for a UNDP / AF second phase. There was however a UNDP portal with project videos and news reports, but this should be considered more of a promotional exercise for the international audience.

The learning objectives were best developed for agriculture which required new thinking (the water-saving tool – same yield with less water), testing conventional wisdom (old variety of crop is better because it looks better) and accepting a theory of change (DoA / DAR wishing to learn from the project so that they could copy in the future). Whereas the learning objectives for forestry, which also required a highly developed approach, as it involved planting on various land types, including mostly untenured land, and needed management agreement on resource use rights, was not developed. In fact, under forestry, there was an opportunity to develop 'community forestry' as a management approach or mechanism, but this was spurned (by government), in favour a tree planting for the sake of the action itself. Another lesson for CF under the project, would be for it to be externally evaluated, with the results becoming part of a more comprehensive review of CF in Myanmar.

6.3. Recommendations

The recommendations are listed with the responsible party identified in brackets.

1. **Water supply** – For the deep tube wells, the water committees need to record aquifer water extraction over time, starting with the installation of water meters if not already done. [government – DRD / Water committees]
2. **Water supply** – The reservoir at Thaputsu Village (Nyaung U) needs to be reduced in size and clay-lined as a new project. Village protection of this natural conservation forest area also needs to be strengthened. (The UNDP project supported extensive enrichment planting of the watershed to increase water supply to the reservoir). [government / donor community]
3. **Watershed management** – Catchment-level soil conservation measures – check dams and silt traps need to be constructed in conjunction with flood / erosion control spurs or side channels, which in turn need to be connected to main channels leading to water retention ponds. These catchments additionally need to be vegetated and protected from seasonal fire and livestock. [government / NGO community].
4. **Forestry** – The next community forestry (CF) project needs to partner with the forest department (FD) at a much higher region or central level. The approach needs to be determined in the light of the new Forest Law (2018) and updating of CF instructions (2016), especially in respect of applications for CF on vacant land [government / donor community]
5. **Forestry** – Future projects with village development planning (VDP) and land use planning & land allocation (LUPLA) should include CF as demonstration activities [government / donor community]
6. **Forestry** – Tree planting on vacant land without appropriate management is not sustainable. A new strategy with an institutional mechanism and local partnership approach is needed, with the focus on

- rewards for maintaining tree cover for more than 10 years. [government – DZGD / donor community]
7. **Agriculture** – Crop breeding – farmer participatory seed selection with farmer multiplication and farmer field schools (FFS) need expansion and strengthening - the UNDP project was a significant step for increasing resilience, but for continuity and sustainability, future projects are needed [government – DoA, DAR, YAU / donor community]
 8. **Agriculture** – The concept of climate-smart villages should be explored in future projects [government / NGO community]
 9. **Soil & Water Conservation** – On-farm S&W conservation, physical measures such as bunding need to be prepared in conjunction with vegetating those bunds with agro-forestry or other species [government / NGO community]
 10. **Weather information for Farmers** – Cumulative rainfall data from the dry zone automatic weather stations (AWSs) needs to be accessible to farmers and agri-advisories developed. These advisories could also be presented on farmer radio shows together with key weather forecasts at days at 8, 18, and 28 days. The advisory needs a national delivery mechanism for the dry zone [DMH / donor community and / or RIMES]

7. ANNEXES

Annex 1: Delivery of Project Objective & Outcomes against Performance Indicators

Assessment Key:

Green: Completed / Achieved	Yellow: On target to be completed / achieved	Red: Not on target to be completed / achieved
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Extracted from project document			IA / IP fill out with detail text on achievement	TE	TE team
Indicator	Baseline	End of Project target	2018 End term Level & Assessment	Achievement Rating	Justification for Rating
Objective: To reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security					
1. % of households in target site implementing climate change adaptation livelihood measures introduced by the project	Agricultural & livestock practices of subsistence farmers are based on historic climate conditions & are unsuited to increased drought conditions that are increasingly frequent	75% of impoverished farming households ¹ or the landless, equivalent to 32,400 households, benefit from and implement climate-resilient agriculture or livestock practice	36,940 households benefitted from and implement climate-resilient agriculture or livestock practice	S	HS - The endline survey reported that households with insufficient food (often in July – Aug) decreased from 53% (baseline) to 33%. That is equivalent to 10,109 households or 20% less.
2. % of Dry Zone farmers using climate risk information (CRI) to adjust their livelihood behavior	CRI on sudden onset of disasters is delivered only to those with TV/radio and level of interpretation / response is low. Outreach / understanding of information on slow onset disasters is even lower	50% (~25,000) of households, report that they have changed their livelihood behaviour based on CRI produced by the project	37.5 % of households report that their food security/income has increased.		S - The endline survey reported 39% of households convert weather information into response options, mainly via TV and radio.
3. % of Dry Zone farmers with access to early warning information on sudden onset of disasters	As above	90% of households (~45,600), receive early warning in a timely manner	78% of all households in target location receive early warning		S - The project produced a Disaster Alert Notification (DAN) application for mobile phones, which was downloaded 13,557 times ~27% coverage. The project established 75 disaster risk committees in 75 villages ~coincidentally a 27% coverage.

¹ Impoverished households are defined as those with land-use rights but own less than 0.8 hectares.

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Outcome 1: Water availability is ensured during the dry seasons in 280 villages				
1. Number of Dry Zone farmers reporting increased freshwater availability during dry periods	74% of households in project targeted townships area currently face shortages of fresh water supply for domestic and agricultural use	80% of households facing water shortages in 280 villages in the five project targeted townships report increased freshwater availability during dry periods	66% of farmers facing water shortages have received support through the project and report increased water availability (112,357 farmers)	S - The numbers reporting a sufficient or reliable water supply rose from 82 to 91% (baseline, Sept 2016 to endline, Nov 2018). Household access to drinking water taps increased from 6% to 13%. For livestock, from 78 to 95% of survey respondents indicated a sufficient and reliable water supply, which was in part also due to the deep tube wells from which 63% (from a baseline of 32%) of respondents indicated their use for livestock in dry periods, thus increasing resilience. The project reported that 112,357 people who faced water shortages have received support and report increased water availability. That is equivalent to 49%.
1.1 Additional community-based freshwater supply and storage infrastructure put in place in drought-prone villages	0 additional freshwater supply and/or storage infrastructure in drought-prone villages to account for climate change-induced increases in drought	56 canals for water diversion 70 small scale water pumping systems 70 communal water tanks (5000 gallon) incl. pipes 56 shallow tube wells 150 communal ponds 10 deep tube wells 1,563 ha of land covered with terraces and soil storage dams	1 (Kin Tat) irrigation canal renovated (Shwebo). 44 water channels for water retention ponds 135 water retention ponds renovated & 1 # constructed 70 small scale water pumping systems installed 56 communal water tanks (equivalent to total capacity 5000 gallon) incl. pipes installed 20 shallow tube wells constructed 9 deep tube wells constructed 3 deep tube wells renovated 1629 ha of land with soil conservation measures	S - Groundwater Infrastructure – Tube wells, water pumping systems & tanks - 12 deep tube wells; 20 shallow tube wells; 70 water pumps; 56 water tanks These were very successful interventions with best practice designs, and O&M fees collected by water user committees. Surface water Infrastructure - Catchment channels & village ponds - 44 catchment channels - 25,916 m (~25 km) were constructed. These were directed towards 136 village water retention ponds, for people / livestock. - One canal was renovated - Kin Tat, Shwebo City - to provide urban water supply and irrigation The S&W conservation measures were at catchment and farm level. Those at catchment level needed a better understanding of the concept and design and needed to be better developed as

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1.2: Hectares of watershed area protected through community-based afforestation, reforestation and regeneration practices	50 ha of natural forest conservation and community-based reforestation practices in the critical watershed area in the project area	2,160 ha of natural forest conservation 680 ha of plantation on community-managed land 1,360 ha of tree planting on public land	<ul style="list-style-type: none"> - 3050 ha of rehabilitation/reforestation under natural forest conservation completed - 1230 ha of community forests established - 1188 ha of public land rehabilitated/reforested 	demonstrations	<p>MS - The project planted 5,468 ha of sub-watersheds to increase water retention and reduce erosion, of which: 3,050 ha of reforestation under natural forest conservation; 1,188 ha of public land planting; and 1,230 ha of community forest creation.</p> <p>MS - 2,594 ha of agro-forestry planting on private & communal lands, of which: 1,000 ha of home gardens; 902 ha of tree planting on farm boundaries; 667 ha of gap planting with agroforestry and other tree species; and 25 ha of demonstration plot.</p>
1.3: Hectares of land covered by systematic new agroforestry plantations	160 ha of traditional agro-forestry home garden 430 ha of farm boundary plantations currently exist in 280 villages in five targeted townships	1,700 ha of homestead gardening/agro-forestry plots established in 110 villages 3,400 ha of farm boundary plantations in 103 villages	<ul style="list-style-type: none"> - 1000 ha of home gardens established under community-based agroforestry modality. - 25 ha of demonstration plot (mixed plantation with agri crops) established. - 902 ha of reforestation activity on farm boundaries - 667 ha of rehabilitation/reforestation under gap plantation completed 		
Outcome 2: Climate-resilient agricultural & livestock practices enhanced in the dry zone					
2. Number of climate-resilient agricultural/livestock practices demonstrated to support adaptation of vulnerable farmers	Agricultural and livestock practices and extension services in the Dry Zone do not take into account climate change risks.	5 discrete agricultural adaptation practices are demonstrated including: - resilient varieties, - on-farm water management - soil management - planting techniques, post-harvest processing, and - diversified livestock rearing practices.	<ul style="list-style-type: none"> ■ 365 plots of AWD Technology ■ 225 plots of Thanaka plantation ■ 150 plots of Fruit Tree Demo established ■ 369 plots of Farmer Managed Seed Multiplication ■ 7 plots of Participatory varietal selection of rice, ground nut and cotton ■ 329 plots as participatory demonstration plot ■ 125 plots of drip irrigation plot established ■ 474 Farmer Field School ■ Provision of rice/multicrop threshers -127 ■ Formation of thresher user group- 127 ■ Training on O&M of threshers -278 households ■ cost sharing for O&M of threshers-2 ■ Post-harvest management training- 270 households ■ Construction of elevated crop storage system- 36 ■ Training on Climate Resilient Livestock Production -8790 household ■ Climate resilient livestock – 3700 households 	HS	<p>HS - Six drought-resilient agricultural practices were introduced, tested and demonstrated:</p> <ul style="list-style-type: none"> -Paddy rice water-saving tool -Participatory rice var. selection -Participatory dryland farming demonstration plots (which included seven types of demonstration) - (Farmer Field School - which was mainly cross-cutting with the dryland farming) - Farmer seed multiplication (with five types of demonstration) -Perennial trees with cropping - Drip irrigation <p>For livestock, the main purpose was to diversify income sources to increase resilience. 253 livestock farmer groups (LFGs) were established with village committee-managed revolving funds. In addition, the practice of rearing for income was promoted with the method of stall-rearing with animal feedstuff feeding.</p>

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			<ul style="list-style-type: none"> ▪ Demo farm for improved livestock- 108 households ▪ Establish fodder demo plots – 40 ▪ Sharing livestock to waiting beneficiaries -3047 			Note - the evidence of fodder plots being established was contradictory (IP completion report)
2.1 Number of Dry Zone farmers exposed to and involved in climate resilient farming techniques	In project target villages, farmers have not been exposed to climate-resilient farming techniques	12,600 households, extension workers and CSO/NGO members are trained on climate-resilient farming methods	17,680 households, extension workers and CSO/NGO members received training on climate-resilient farming methods			HS - For agriculture and livestock farming, 13,160 farmers and government staff directly received training on climate-resilient farming methods
2.1.2 Accessibility to drought-resilient seed varieties	Only five seed banks are available in the target sites (one per township)	140 village-level research farm is operational	369 village-level research farms are established. (Farmer-managed Seed multiplication Farm)			HS - 369 farmer-managed seed multiplication plots were established, covering 353 ha.
2.1.3 Number of project and non-project community members participating in exchange visits and demonstration plots	There are no initiatives in promoting exchange of practical knowledge on climate resilient farming techniques	20% of community participants in exchange visits and farmers field demonstrations are from non-project target villages	125 (98 HHs, 27 Staff)			HS - Farmer Field Schools were implemented in 215 villages with 455 lead farmers, and 65 DoA extension staff. It was a cross-cutting intervention, mainly in conjunction with the dryland farming demonstrations. Separately, exchange visits were arranged for 260 representatives from 103 villages.
2.2. Number of farmers who report reduced harvest losses due to improved post-harvest processing and storage	No farmers apply improved post-harvest processing techniques	80% of households report reduced post-harvest losses through the use of improved processing and storage technology	12,405 household report reduced post-harvest losses through the use of improved processing and storage technology			HS - The impact of the reduction in losses as a result of the threshers, storage silos and the IPs training was significant. According to cluster-level workshops for thresher and seed storage user groups: food losses were reduced from 38% to 24% for paddy rice production ; from 50% to 34% food loss in groundnut; from 53% to 35% loss in pulses (green gram, pigeon pea) Reduced losses were due to improvements in harvesting, field drying, threshing, winnowing & cleaning, storage, milled storage, and transport In 127 villages, the thresher user group membership totalled 7,942 households who were able to utilise the threshing machines. In addition, in 36 villages, storage silo membership and use extended to 895

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						households. Thus, in total 8,837 households directly benefitted improved post-harvest processing.
2.3 Number of vulnerable households with increased diversity of livestock	Majority of impoverished farmers (either landless or those with > 0.8 ha of land) in the Dry Zone have no or few livestock	6,300 vulnerable households have increased the diversity of livestock assets	6,747 vulnerable households have increased the diversity of livestock assets			<p>S - The project delivered livestock to 3700 marginal households in 248 villages, plus in 2018, the project reported that 2,100 households had paid back the funds, which could be used to provide livestock to other households. Thus, in total, 5,800 households have increased their diversity of income through livestock production. Of equal importance, in 253 villages, livestock farmer groups with committees have been established to revolve the livestock funds making the intervention sustainable</p>
Outcome 3: Climate-risk information disseminated to dry zone households through use of short, medium and long-term weather forecasts						
3 % of Dry Zone farmers using climate risk information to adjust their livelihood behavior	CRI on sudden onset of disasters is delivered via TV/radio, but response is low. The outreach and understanding on slow onset of disasters is lower	50% (~25,000) of households report that they have changed their livelihood behaviour based on CRI produced by the project	37.5 % of households report that their food security/income has increased.	HS		
3 % of Dry Zone farmers with access to early warning information on sudden onset of disasters	As above	90% (~45,600) households receive early warning in a timely manner.	78% of all households in target location receive early warning	<p>HS - The project produced a Disaster Alert Notification (DAN) application for mobile phones, which was downloaded 13,557 times out of 50,543 households. Assuming one download per household, this would indicate 27% coverage.</p> <p>The project also established 75 disaster risk committees which would also indicate a 27% coverage.</p>		
3.1 Number of climate risk communication products in active use by township authorities, NGOs and CBOs to improve planning decisions and prioritize	No climate risk communication products in active use by township authorities, NGOs and CBOs to improve planning decisions and prioritize	Climate hazard maps and risk scenarios are available in each township	<ul style="list-style-type: none"> Rapid risk/vulnerability assessment conducted in 146 village tracts Risk/vulnerability assessment conducted in 146 village tracts of 5 townships Hazard maps (earthquake, flood and drought) available for 5 townships 	<p>HS - The project prepared a risk assessment which included township-level climate-risk profiles and vulnerability maps (down to village tract level). They also prepared a shorter risk assessment guideline which indicated the methodology and tools to arrive</p>		

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investment actions	investment actions		Climate scenario and climate profiles developed for 5 project townships	at a risk assessment. These guidelines were then used at a community level by DDM to establish preparedness plans.
3.2.1 Number of local institutions that issue regular warning and forecasting communications to community-based organisations and vulnerable farmers	0	70 community-based disaster risk management (CBDRM) committee are formed to relay early warning information from the Township DPC	<ul style="list-style-type: none"> Climate scenario and climate profiles developed for 5 project townships Disaster Alert Notification (DAN) mobile application developed DMH-SESAME mobile application developed and upgraded agro-advisory. 75 CBDRM Committee are formed 5 Climate Risk Information sub-committees established in 5 project townships. Agro-met Early Warning (SESAME) mobile application developed and launched at 18th Monsoon Forum in Nay Pyi Taw. 2 CBDRM ToT trainings conducted for government stakeholders in 5 townships. CBDRM Inception Meetings conducted in 5 Project Townships 	<p>HS- The project created an institutional mechanism in the form of 75 community-based disaster risk committees which were linked to the DDM at township level. The project also developed an EWS disaster alert notification (DAN) application for mobile phones which was embedded within DDM as their new mobile system in tandem with the standard telephone call method.</p>
3.2.2 The number of climate related information materials produced to assist Dry Zone farmers to adjust their livelihood behavior	No such information is available except weekly/monthly weather forecasts broadcasted over TV/radio	<p>Six agro-meteorological bulletins;</p> <p>two early warning and disaster response bulletins;</p> <p>four guidance notes on resilient agricultural /livestock practices produced</p>	625 Agro-met bulletins developed (6 bulletins/month/township) and disseminated to relevant govt. staff at local level	<p>S- The project created a weather forecast mobile application called Sesame, through which a regional organisation posts a 10-day forecast, which is updated every five days (~six forecast bulletins per month). Another product is the 3-day forecast which is also on the application. Additionally, DMH produce seasonal weather bulletins twice a year which are based on the SE Asia and South Asia Climate Outlook Forums.</p> <p>DMH in conjunction with Rimes, have also been producing 'agro-climatic bulletins' (10-day weather advisory for each township). However, there isn't any further agri-advisory information, such as accumulated rainfall for the month / season, what crops to plant, what pests to control etc. etc. Thus, at present they remain as prototype bulletins. They are disseminated to government departments, but not farmers as yet.</p>

Annex 2: Delivery of Outputs

Comment here may be limited to stating 'on target', 'partially on target' or 'not on target'. Details are reported under section 3 'Findings'

Outputs	Achievements Reported by IP	TE Comment
Project Objective: To reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security		
Outcome 1: Water availability is ensured during the dry seasons in 280 villages		
1.1: Water capture & storage capacity in 280 villages enhanced to ensure sufficient water supply during dry periods	<ul style="list-style-type: none"> - 1 (Kin Tat) irrigation canal renovated (Shwebo township) - 44 water diversion canals constructed in 5 townships to enhance water availability in water retention ponds - 70 small scale water pumping systems installed - 56 communal water tanks (equivalent to total capacity 5000 gallon) incl. pipes installed - 20 Shallow tube wells constructed - 12 deep tube wells (3 # renovated and 9 # constructed) - 135 communal water retention ponds renovated and 1 # constructed in 5 project townships - 1629 hectare of land treated with soil conservation measures - 304 trainees received soil and water conservation training (280 beneficiaries and 24 Government staff) 	<ul style="list-style-type: none"> Complete The 'water diversion canals' are better named 'catchment channels' – they were not very well linked though to the catchments Soil & water conservation was also implemented at farm level
1.2: 4,200 hectares of micro-watersheds protected & rehabilitated through farmer-managed natural regeneration to increase natural water retention and reduce erosion	<ul style="list-style-type: none"> - 5468.9 ha of micro-watersheds protected & rehabilitated through farmer-managed natural regeneration to increase natural water retention and reduce erosion. 	<ul style="list-style-type: none"> Complete, but the extensive planting on vacant land lacks ownership
1.3: 5,100 hectares of community-based agro-forestry plots established on private & communal lands to conserve soil & water	<ul style="list-style-type: none"> - 2593.48 ha of community-based agro-forestry plots established on private & communal lands to conserve soil & water 	<ul style="list-style-type: none"> Complete, but the activity should have been linked better with the on-farm S&W conservation actions
Outcome 2: Climate-resilient agricultural & livestock practices enhanced in the dry zone		
2.1: Drought-resilient farming methods introduced to enhance the resilience of subsistence agriculture in the dry zone	<ul style="list-style-type: none"> - 17,680 households had been trained on climate-resilient farming methods. 	<ul style="list-style-type: none"> Complete – this figure includes indirect beneficiaries
2.2: Resilient post-harvest processing & storage systems introduced to reduce post-harvest losses (droughts & floods)	<ul style="list-style-type: none"> - 12,405 HH are introduced with resilient post-harvest processing and storage system. 	<ul style="list-style-type: none"> The figure also includes training numbers
2.3: Diversified livestock production systems introduced in 6,300 households to buffer the effects of drought	<ul style="list-style-type: none"> - 8,790 marginal and landless households (male - 5072, female - 3718) received training and skills on climate-resilient livestock production through project-trained TOT trainers at community level 	<ul style="list-style-type: none"> Includes training numbers

Terminal Evaluation Report
UNDP AF Addressing Climate Change Risks on Water Resources & Food Security in the Dry Zone of Myanmar

Outputs	Achievements Reported by IP	TE Comment
Outcome 3: Climate-risk information disseminated to dry zone households through use of short, medium and long-term weather forecasts		
3.1: Climate hazard maps & risk scenarios developed in each township to support community-based climate risk management & preparedness planning	<ul style="list-style-type: none"> Rapid risk/vulnerability assessment conducted in 146 village tracts Hazard maps (earthquake, flood and drought) available for 5 townships Climate scenario and climate profiles developed for 5 project townships Disaster Alert Notification (DAN) mobile application developed and upgraded to include additional features DMH-SESAME mobile application developed and upgraded agro-advisory. 	<ul style="list-style-type: none"> Assessments made on a tract level Planning then made by DDM in 75 selected villages
3.2: Local level climate & disaster risk management framework strengthened for effective communication of climate risk & early warning information	<ul style="list-style-type: none"> 75 CBDRM Committee are formed 5 Climate Risk Information sub-committees established in 5 project townships. Specialized Expert System for Agro-met Early Warning (SESAME) mobile application developed and launched at 18th Monsoon Forum in Nay Pyi Taw. 2 CBDRM ToT trainings conducted for government stakeholders in 5 townships. CBDRM Inception Meetings conducted in 5 Project Townships 625 Agro-met bulletins developed (6 bulletins/month/township) and disseminated to relevant govt. staff at local level 	<ul style="list-style-type: none"> 'Agri-met' – still at prototype stage with insufficient agriculture / farming based data at present – e.g. even cumulative rainfall information is missing

Annex 3: Co-financing Table

Sources of Cofinancing ¹	Name of Cofinancer	Description of Cofinancing	Type of Cofinancing ²	Confirmed at CEO Endorsement (US\$)	Amount Contributed at Stage of MTR (USD)	Expected Amount by Project Closure	Actual % of Expected Amount
GEF / AF Partner Agencies	GFF / AF	Programme and operations cost	Grant	\$7,289,425	\$4,492,613	\$7,289,425	100
	UNDP	Programme and operations cost	Grant	\$624,998	\$399,466	\$656,430	105
National Government	UNDP & Partner Sub-Total			\$7,914,423	\$4,892,079	\$7,945,855	100
		Staff costs	In-kind	\$0	\$118,448	\$186,971	-
		Programme and operations cost	In-kind	\$554,181	\$196,414	\$273,274	49
		Government Sub-Total			\$554,181	\$314,862	\$460,245
Total				\$8,468,604	\$5,206,941	\$8,406,100	99

- Sources of Co-financing may include: Bilateral Aid Agencies, Foundation, GEF / AF Partner Agency, Local Government, National Government, Civil Society Organization, Multi-lateral agencies, Private Sector, Other
- Type of Co-financing may include: Grant, Soft Loan, Hard Loan, Guarantee, In-Kind, Other
- Government funding was not audited by the project
- Excludes PPG

Note – Additional Co-financing by key Implementation Partners

CESVI's co-financing has been calculated for the project period at US\$73,011, including staffing and office rent (Livelihood & Food Security coordinator 20%; M&E Coordinator/Quality control 25%; Head of Mission 15%; Country Finance and Admin Coordinator 25%; Log/procurement Manager (YGN) 20%; Finance/admin Officer (YGN) 20% Office rent: share Yangon 17%)

RIMES' co-financing has been through local staff employment in Monywa to continue providing support to the townships and pilot communities. RIMES is also developing a Myanmar version of SESAME, and will continue to provide technical support to DMH and DOA in maintaining the system and in providing agro-advisories to farming communities in the Dry Zone. The on-going support is estimated at USD24,000 per year.

NAG did not provide figures, however in order to support the seedling requirement, they established at least one tree nursery as co-financing. The work of their GIS team also was in part co-financing.

Annex 4: Planned Budget and Expenditures at End-term

Outcome	2014 USD	2015 USD	2016 USD	2017 USD	2018 USD	Total USD
Indicative Breakdown of Project Budget in Project Document:						
Outcome 1	\$1,027,839	\$1,221,951	\$1,412,252	\$422,600		\$4,084,642
Outcome 2	\$567,566	\$788,544	\$602,440	\$358,210		\$2,316,760
Outcome 3	\$489,470	\$237,908	\$37,206	\$17,416		\$782,000
Project Management	\$16,800	\$36,300	\$15,800	\$37,123		\$106,023
Total	\$2,101,675	\$2,284,703	\$2,067,698	\$835,349	\$0	\$7,289,425
Outcome	2014 USD	2015 USD	2016 USD	2017 USD	2018 USD	Cumulative Totals to end 2018
Annual Work Plan Budgets and Actual Expenditures Incurred through to end 2018						
Outcome 1:						
Annual Work Plan		\$1,061,955	\$562,197	\$1,503,661	\$1,023,590	\$4,151,403
Disbursed	\$2,723	\$193,113	\$688,928	\$1,193,667	\$1,697,512	\$3,775,943
Balance (AWP-Disbursed)	-\$2,723	\$868,842	-\$126,731	\$309,994	-\$673,922	\$375,460
Outcome 2:						
Annual Work Plan		\$573,527	\$747,679	\$778,797	\$267,774	\$2,367,777
Disbursed	\$100	\$82,927	\$865,145	\$900,034	\$340,783	\$2,188,988
Balance (AWP-Disbursed)	-\$100	\$490,600	-\$117,466	-\$121,237	-\$73,009	\$178,789
Outcome 3:						
Annual Work Plan		\$411,710	\$47,279	\$282,251	\$119,440	\$860,680
Disbursed		\$33,638	\$116,820	\$335,302	\$184,113	\$669,873
Balance (AWP-Disbursed)	\$0	\$378,072	-\$69,541	-\$53,051	-\$64,673	\$190,807
Grand Totals:						
Annual Work Plan	\$0	\$2,047,192	\$1,357,155	\$2,564,709	\$1,410,804	\$7,379,860
Total Disbursed	\$2,823	\$309,678	\$1,670,893	\$2,429,002	\$2,222,408	\$6,634,804
Balance (AWP-Disbursed)	-\$2,823	\$1,737,514	-\$313,738	\$135,707	-\$811,604	\$745,056

Annex 5: Sectoral plans, Technical reports & Miscellaneous

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Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

National Planning and Policy Documents

Myanmar National Environmental Policy (MOECA, 1994),

Forest Policy (MOECA, 1995),

Community Forestry Instruction (MOECA, 1995), (MONREC, 2016)

Myanmar Reforestation and Rehabilitation Plan (2017/18 to 2026/27)

National Sustainable Development Strategy – NSDS (NCEA, 2009),

Myanmar Agenda 21 (NCEA, 1997)

30-Year National Forest Master Plan (MOECA, 2001),

Dry Zone Integrated Plan (MOECA, 1999), Myanmar

Myanmar Action Plan on Disaster Risk Reduction – MAPDRR (RRD, 2009, 2018)

National Adaptation Programme of Action (NAPA)

Myanmar's National Action Plan (NAP) under the UN Convention to Combat Desertification (UNCCD), 2005

Myanmar's National Land Use Policy -2016

Myanmar Climate Change Policy - 2017

Myanmar Climate Change Strategy and Action Plan – 2018

Myanmar's Intended Nationally Determined Contribution-INDC – 2015

National Strategy for Rural Water Supply, Sanitation and Hygiene (WASH) (2016)

REDD+ Strategy for Myanmar – 2017

State and Regional Governments in Myanmar – 2013

Rural Development Strategic Framework (2013)

Myanmar Sustainable Development Plan – 2018

The Farm Land Law 2012

The Law Amending the Vacant, Fallow and Virgin Lands Management Law (2018)

Myanmar Agriculture Development Strategy and Action Plan – (2018 – 2022)

Myanmar Climate Smart Agriculture Strategy – 2015

UNDP Documents

Myanmar-United Nations Development Assistance Framework 2018-22

Country programme document for Myanmar (2018-22)

Technical Reports

Soil & Water Manual (73pp)

Chapter 1 Background Knowledge of Soil: Soil, Soil types in Project Townships and their characters

Chapter 2 Soil and water Conservation: Soil Erosion, Soil and water conservation in cultivable land, Contour Soil Bund, Contour Vegetation Strip, Contour Hedge Rows, Percolation Stone Bund, Tied Ridges/Boxed Ridges, Gully Plug and check dam, Sediment storage bund, Farm boundary planting, Water Harvesting for agro-forestry and crops, Trench, Half-moon micro-catchment system, Construction of Small Earth Dam

Chapter 3 Sustainable Agriculture: Least or zero tillage, Mulching with Crops or crop residues, Crop rotation, Weeding, Crop Cultivation, Soil conservation practices in crop cultivation

Climate-resilient livestock practices through capacity development, provision of drought-resilient livestock species

& associated animal husbandry practices – Completion Report, Community Development Association, 2018, 94pp

- A completion report

Livestock Banking System (CDA, 2017) -pp10,

- concise, nice and straight forward

Livestock Banking System

LFG (Livestock Farmers Group) formation 1

Rules and regulations of the LFG 3

Role of CDA township team in management of LFGs 5

Annex 1, Sample contract between LFG committee and sub mutual guarantee group of direct and waiting beneficiary

End-line Impact Assessment Report - Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar – Key findings – edit from draft report (MSR, March 2018, pp58)

Endline conducted in Shwebo and Nyaung U – 1,200 persons interviewed spread across smallholders, landless and women-headed households

Drinking water

- From a baseline (September 2016) of 6% to 13% at endline (November 2018), villagers have access to public water taps; 36% of villagers rely on deep tube wells, especially during dry season, which is more than non-project villagers, (but 36% was also the baseline figure!); water use has increased from 87 to 134 gallons / hh / month; water supply sufficient / reliable from 82 to 91%

Irrigation water

- Irrigation water use up from 14 to 23% h/hs

Livestock water

- Livestock drinking water supply sufficient and reliable - from 78 to 95% of households said
- Resilience increased – dry season supply now more from deep tube wells (32% to 63% said usage of tube wells for livestock. Also from 14 to 23% for shallow wells.

Weather information

- 39% of smallholders, 19% of women-headed households and 16% of landless households convert weather information into response options. This appears a significant result, however the source of weather information, remains more standard – 67% TV, 42% radio, 25% friends, 12% internet, but not necessarily using Sesame.
- For the internet, Facebook is the most accessed source of weather, however other non-Smart mobile phone messages were not analyzed
- The quality of the weather forecasts and the relevance to farmers – e.g. with agri-advisory information was not assessed
- The number of those who regularly use the Sesame App as opposed to those who had downloaded it was significantly less according to the Endline survey, and confirmed by the TE during interviews / anecdotal evidence (show of hands at meetings etc)

Food security

- Households with insufficient food (often in July – Aug) decreased from 53% (baseline) to 33% (endline)
- Increase in the consumption of fresh vegetables, with 45% of respondents consuming it daily from 23% (baseline)

Food Security

The overall food security of respondents from treatment villages has improved considerably over the last 2 years. Less households faced food scarcity but the proportion is still high, 33%. As discussed in the report, female headed households are currently the group more likely to suffer from food scarcity. As seen in the baseline and end-line surveys, women earn less than men, putting an additional stress on these households which also have less adults, and higher dependency ratio.

This does not mean they have not benefited from the project as female households as they participate as much as the other groups from, for example, access to irrigation water and livestock trainings and provision (it is true, however, that they participated considerably less in farming methods and technologies trainings). What the data show is the need to further improve this group's ability to secure food throughout the year, particularly because female headed households are less likely to own land than small land-holding farmers.

July and August continue to be the months in which households are most vulnerable. Strategies to strengthen resilience in this period of heavy rain could be integrated to the project.

When faced with food scarcity, respondents tended to borrow money or food. This leads to debts that are on average two to three times the households' total monthly income. As for most groups farming is intrinsically linked to income, a bad season will force them to get new loans, falling in a debt cycle commonly observed in rural areas of Myanmar. A positive initiative that might at least partially counter act this is the availability of micro-credit with low interest, used by a far larger number of people currently.

It is important to highlight the positive diversification of products grown by respondents, a crucial aspect of food security.

Water

Water scarcity is considerably less common than food scarcity. The construction of deep tube well public system has increased access to water and is one of the most important short-term outcomes of the project, clearly reflected in the high number of respondents who find the

drinking water supply sufficient and reliable, 95%. There has not been an increase in the perception of the quality of drinking water.

The use of irrigation water has greatly increased among female headed households but not among small land-holding farmers. The FGDs will be used to understand the causes of such disparity. The main irrigation water source are irrigation channels and tube wells. Lack of drinking water for livestock is, however, one of the main obstacles for increasing the number of livestock.

The most concerning finding is the substantial increase in the expenditure and consumption of drinking water, which is probably related to the drought but nonetheless puts a strain on the households.

Households, Livelihoods and Income

The dependency ratio varied from 20% for female headed households to 48% for landless control households. The average was the same for control and treatment, 35%, which is similar to the baseline.

On average households had 4.16 members. Female headed households are smaller with 3.3 members. While female headed households are less likely to own land, when they do, their areas are usually larger than those of small land-holding farmers. The average holding was 3 acres, and for female headed households, 3.8 acres.

Households that sold animal products said their income increased compared to two years ago. More than half of all respondents have a total monthly income of less than 150,000 MMK.

The daily wages continue to be low for on farm labor, 4,556 MMK for males and 3,453 MMK for females. In total, 51% of treatment respondents earn income from off farm labor. On average, 178 days in the year are committed to off farm work, significantly higher than on farm labor, 92 days.

As mentioned, one of the most critical points is the constant need respondents have to borrow money as 95% of treatment sample households have no savings and 61% have taken on a loan during the same period.

Weather forecast

One of the most positive findings is that all respondents from all groups have access to and use frequently climate risk and weather forecast information. A high number analyze and incorporate the information in their plans, particularly daily weather forecast and cyclone warnings.

It is also very positive that respondents rely on a range of channels, such as television, radio and internet.

A point to be addressed is the near complete lack of awareness of weather forecasting methods and technologies trainings. Additionally, no respondent uses the DMH-SESAME weather forecasting mobile application introduced for the use of farmers in the area.

Livestock

The provision of livestock is one of the trainings most remembered and with highest number of participants but a considerably smaller proportion attended other trainings related to livestock, which would contribute for a better management livestock and associated outcomes. This is a point that could be addressed in the future, possibly requiring attendances to other livestock trainings. The main livestock received were pigs, with a much lower proportion of goats and chickens.

Two key points that could be addressed in future interventions are the improvement of water for livestock and fodder as well as strategies to increase fodder availability. There is a great interest from respondents to have more livestock but fodder and water availability deter them from doing so.

38% of respondents who attended or received training on activities related to livestock farming reported improvement in productivity over the previous 12 months as a result of adopting the farming methods and technologies provided. Several reasons might explain the relatively low perception of improvement: external factors influencing the

productivity, such as weather or livestock diseases, inability to implement the training, misapplication or incomplete application of the training, and unrealistic expectations. It is also important to keep in mind the time frame. A future follow-up survey could better inform the effectivity of livestock trainings.

Training

An important finding to be addressed is the very low rate of awareness of the provider of the trainings. Feedback from trainers could help clarify its reasons.

Livestock were one the most popular trainings and one of those with highest dissemination and application rate across all groups but even so only a small proportion of respondents knew they were being provided by UNDP.

When groups were compared, it was found that landless respondents were more likely to have adopted the training they received on activities on livestock farming methods and technologies. They are considerably more likely to disseminate the information of these activities.

Another training with immediate benefits were those related to accessing fresh water storage, which was known to most respondents. The clear increase in the number of respondents using deep tube wells and ponds illustrate this well and can be related to the overall reported improvement in access to water.

Equally important is that 70% of respondents were aware of activities on accessing fresh water storage implemented in their village attended training or participated in activities. However, once again most respondents could name the provider of such activities.

The most recalled interventions on crops farming was soil conservation training followed by participatory varietal selection. The least recalled form of intervention was drip irrigation system.

Provision of multi-crop threshers was the post-harvest methods training most remembered by treatment respondents. It was followed by operation and maintenance training, and provision of rice threshers.

The fact the three most mentioned trainings were related to the use and access of machinery highlights the needs and interests of farmers and can be used in the development of future trainings.

Type of training by Output

- 1.1 Soil and water conservation
- 1.1 Deep Tube Well-O&M
- 1.1 Shallow Tube Well -O&M
- 1.1 Water Pumping System-O&M
- 1.2 &1.3 Village level orientation meeting
- 1.2 &1.3 Social Mobilization
- 1.2 &1.3 Social Mobilization (for project staff)
- 1.2 &1.3 Community Forestry
- 1.2 &1.3 GIS and Mapping
- 1.2 &1.3 Study and Knowledge Exchange Visit
- 1.2 &1.3 Agroforestry Knowledge sharing visit
- 1.2 &1.3 Consultation Workshop
- 1.2 &1.3 Coordination Meetings
- 1.2 &1.3 Nursery and seedling handling
- 1.2 &1.3 Agroforestry Technology
- 1.2 &1.3 Agroforestry Consultation workshop
- 1.2 &1.3 Book keeping
- 1.2 &1.3 Evaluation Committee workshop
- 1.2 &1.3 Organizational Development
- 2.1 Climate Resilient Farming Method
- 2.1 Water Saving Technology (Alternate Wet and dry, AWD)
- 2.1 Perennial Tree (Thanaka) growing
- 2.1 Farmer-managed seed multiplication
- 2.1 Farmer Field School
- 2.1 Establishment of Participatory Demonstration
- 2.1 Participatory Varietal Selection
- 2.2 Operation and Maintenance
- 2.2 Post-harvest
- 2.3 TOT livestock rearing for LBVD Staff
- 2.3 Livestock Rearing

- 2.3 1st Refresher Training for Community Level
- 2.3 2nd Refresher Training for Community Level
- 2.3 Book Keeping for LFG committee members
- 3.1 Participatory Risk Assessment
- 3.1 National Forecast Translation and Application
- 3.1 Regional Forecast Translation and Application
- 3.1 Forecast Translation and Interpretation
- 3.1 SESAME Forecast Translation and Application
- 3.1 Training on SESAME Sustainability and Replication
- 3.1 Media Training on forecast translation and application
- 3.1 SESAME User Interface Forum
- 3.2 CBDRM for Village Disaster Management Teams
- 3.2 Climate Risk Information Subcommittee Training
- 3.2 Village-level Training

Profile of project villagers

Profile		Township					Total
		Shwebo	Monywa	Chauk	Myingyan	Nyaung U	
Total Tracts		72	54	51	65	74	
Total Villages		168	194	230	186	220	
Project Tracts		20	22	25	27	41	135
Project Villages		60	50	40	60	70	280
Project HHs		10,614	7,123	6,572	11,090	15,144	50,543
(M)		21,855	13,811	14,593	21,500	34,542	106,301
(F)		25,329	15,822	16,571	25,120	38,720	121,562
Project Population		47,184	29,633	31,164	46,620	73,262	227,863
Occupation	Landless	4,928	3,443	2,799	5,132	7,247	23,549
	Farmer	5,686	3,160	3,756	5,777	7,896	26,275
	Tot.	10,614	6,603	6,555	10,909	15,143	49,824
Family Labour		25,630	16,775	18,234	28,506	43,889	133,034
Paddy Land/Upland/ Orchard acres	upto 2	882	522	1,013	1,222	1,881	5,520
	> 2	4,804	2,638	2,743	4,555	6,015	20,755
	land less	4,928	3,443	2,799	5,132	7,247	23,549
Project target benef.	upto 2 ac.	882	522	1,013	1,220	1,881	5,518
	Tot.	5,810	3,965	3,812	6,352	9,128	29,067
Landless%		46.4	48.3	42.6	46.3	48	231
Women_headed HH		1,794	1,281	1,513	2,550	2,911	10,049
Cattle		18,838	7,136	8,028	11,967	18,997	64,966
Pig		1,734	1,178	503	1,654	2,707	7,776
Goat		2,454	5,109	5,919	10,536	13,369	37,387
Sheep		1,236	4,482	756	4,030	1,179	11,683
Fish Pond		53	-	15	175	258	501
RWCT		216	640	94	1,358	4,454	6,762
Well		399	237	36	548	142	1,362
Hand Pump		1,491	16	17	487	1	2,012
Shallow Tube Well		103	243	15	575	3	939
Deep Tube Well		176	169	14	552	146	1,057
Farm machinery		658	304	10	296	21	1,289

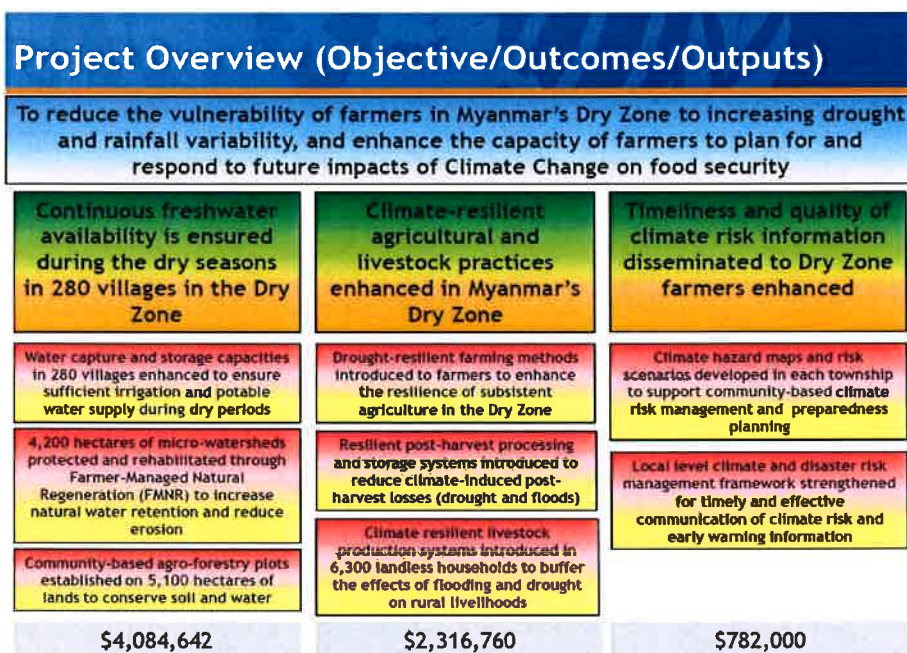
RWCT – Rainwater collection tank

Forestry seedlings and planting areas

Activity	# of Village	Total Ha/Seedling
❖ Total project implemented villages	210	6673 / 1276258
❖ Community Forestry establishment	18	1229/238600
❖ Natural Forest Conservation and Gap planting	13	3050/254109
❖ Watershed Plantation establishment	21	768/311378
❖ Gap planting and modify taungya plantation	4	593/179107
❖ Establishment of demonstration plot	11	26/12431
❖ Homestead gardening establishment	203	1007/280633
❖ Run-off station in demo plot for soil erosion rate measurement (Before and after planting)	4	7.5/3200

(Source NAG ppt for the TE)

Project Overview



Replication

Activity	Households and acres invested by the project				Technical Replication beyond the outputs (acres)				Total (project provided+ replication) (Acres)
	2017 HHs	2018 HHs	Total HHs	Project provided (Acres)	Male HHs	Female HHs	Total HHs	Technology Replication (Acres)	
1 Alternate wetting & drying technology (AWD)	60	200	260	260	31	8	39	74.5	334.5
2 Farmer-managed seed multiplication	200	160	360	360	341	70	411	1,032	1,393
3 Participatory Demonstration plots	180	147	327	327	243	65	308	712.7	1,039.7
4 Participatory Varietal Selection (YAU)	7 ¹	11 ²	18	18	4	0	4	4.0	22
5 Demonstration for perennial tree	210	150	360	270	40	49	89	3.2	273.2
6 Farmer Field School on dry land farming	110	340	450	112.5	182	30	212	1,089.1	1,201.6
7 127 no. of Rice and Multi-crop Threshers (Total 80,655 baskets)	5,000		5,000	5,000 ³	2,710	1,064	3,774	6,422	11422
8 Seed Storage Facilities (813.5 baskets provided)		456	456	456				2019 Year	456
Total	5,767	1,464	7,231	6803.5	3,551	1,286	4,837	9,337.5	16,141.0

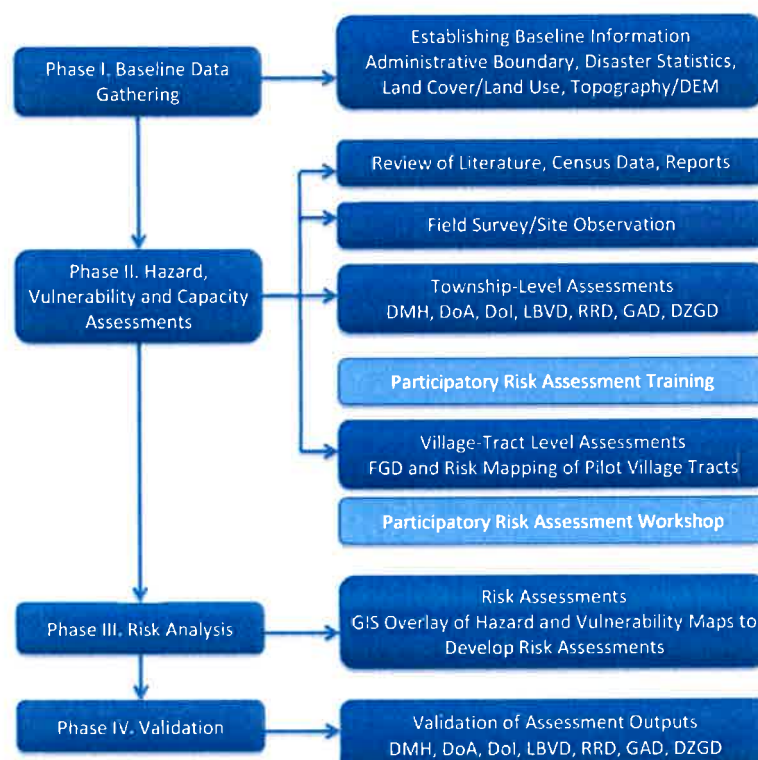
1/ 7 plots = Mother Trial 1 plots and Baby Trials 6 plots in Shwebo Township

2/ 11 plots = Mother Trial 1 plots and Baby Trial 10 plots in Myingyan Township

3/ 5000 acres = Minimum level of utilization by each member (one acre for each farmers)

Source CESVI, 2019

Risk Assessment Methodology - Risk assessment report (2018), p8



Example Climate Change Risk Matrix

In order to decide which climate risks to address (Output 3.1), it is useful to understand that risk levels are usually determined by the hazard level x the vulnerability (value) level in a matrix:

		Vulnerability / Sensitivity (or Value)			
		Very low	Low	Moderate	High
Hazard & Exposure (magnitude / extent, frequency, duration,	Very Low	Very low	Very low	Very low	Low
	Low	Very low	Low	Low / Moderate	Moderate
	Moderate	Very low	Low / Moderate	Moderate	High
	High	Low	Moderate	High	High

- (Source - adapted from a standard Risk Assessment methodology such as used by UN International Strategy for Disaster Reduction (UNISDR), and simplified into a 2-way matrix – Sobey, R, 2017)

Lessons Learned – Project Performance Review – 2017 - Prepared by the Project Team / PIT

	PIT (Lessons Learned (Edited))
Climate resilience Adaptation measures	<p>1/ The assumption that land would be available for reforestation / watershed treatments was over-estimated. A considerable amount of time was spent in identifying sites and seeking endorsements of concerned authorities. These issues could have been sorted at the design stage. Similarly, the identification of target villages could have been done during the design stage.</p> <p>2/ While there is general understanding of the negative impacts of climate change among farming communities, adaptation measures need to be simple, well-understood and inexpensive for demonstration and replication. Most marginal farmers are unable to replicate adaptation measures that involve costly interventions.</p> <p>3/ The multi-sectoral nature, as well as the large geographical coverage posed challenges, in terms of sequencing/planning a diverse range of activities being implemented by several IPs. This also limited the potential to show the combined effects of multiple measures on households, communities, and landscapes. A narrower focus (eg. agriculture) over a smaller area would also have produced stronger results.</p> <p>4/ The high targets resulted in spreading resources thinly. This led to the budget for reforestation being much lower than government norms and this affected quality of the plantation.</p> <p>5/ The effectiveness of weather forecasts and EWS should also consider the use of forecasts in farming, planting and maintenance decisions.</p> <p>6/ The expectation that women would be major participants was over-estimated.</p> <p>7/ In most project locations, the only practical way to ensure secure access to freshwater throughout the year is to retain water in communal ponds during the monsoon season. Ideally, to minimize the water loss by placing a lining under the water to reduce seepage and other ecosystem-based measures to improve collection / retention. However, the project design, decided on a greater population coverage as opposed to higher quality / greater resilience for smaller populations.</p> <p>8/ The seasonal nature of some measures (e.g. reforestation) posed challenges in terms of nursery planning for seedlings, agreed locations with permission for planting, and appropriate timing of planting</p> <p>9/ Due to the high coverage targets, the project had to resort to demonstration of agro-forestry practices in smaller farm areas. The agro-forestry interventions should focus on larger sites to model introducing trees into cropping and inter-cropping systems.</p> <p>10/ The return on livestock is within 4 - 8 months and this in turn provides additional income, as well as provides a buffer during extreme events. However, the community-managed livestock banking system needs to be backed by institutional strengthening / capacity building, and monitored to ensure sustainability</p> <p>The farmer field school (FFS) and exchange programme has been useful in disseminating climate resilient measures. The inter-cropping systems have high potential for replication but additional support to expand their use is needed in the form of information / advice, and the possible expansion of the FFS approach to disseminate new measures. For replication, upscaling, and dissemination, a robust strategy is needed.</p> <p>The introduction of new drought-resistant crops, more diversified cropping systems and the measures to reduce post-harvest losses, and livestock raising by marginal farmers are the most successful interventions. These involve approaches that have potential to be scaled up, both beyond village demo plots and to other areas of the dry zone.</p> <p>Communities have willingly contributed co-financing for interventions on water retention/capture. Any visible and effective measures to enhance water supply is likely to be replicated and up-scaled in the future.</p> <p>The advance tools in weather forecasting and early warning (weather forecasts, crop advisories and disaster alert notification) have been significant and may provide important extension assistance in future agriculture practices.</p>
Community / National Interest	
The most successful	- Provision of small-scale water infrastructure, which has ensured water availability during dry periods. The interventions that ensured additional water for irrigation have greatly benefitted communities in terms of increased production and generated additional income for marginal farmers.

aspects for the target communities?	<ul style="list-style-type: none"> - The introduction of new drought-resistant crops, more diversified cropping systems and the measures to reduce post-harvest losses are also very successful. These interventions involve simple technologies and approaches and the potential to be scaled up and replicated is high. - The provision of drought-resilient livestock species has also been very successful and well-received by communities. Livestock rearing has meant diversified income base, which provides a buffer during extreme events and disasters.
What measures are/have been put in place to ensure sustainability of the project/program results?	<p>The project ensured community participation and capacity building to manage new assets/systems (eg. seed storage facility, livestock banking, crop thresher user groups, water user groups), which will be a key to long term sustainability of interventions.</p> <p>The engagement of government counterparts in annual work planning and implementation is a key aspect of project management. This has ensured that project activities are implemented as per government plans and programmes and in accordance with government standards and norms.</p> <p>The CRI system has ensured leadership role by DMH and integrated project activities with DMH activities. The weather forecasts, and EWS generated through project assistance have been fully integrated into government systems/extension programs. The weather forecast and agro-advisory system is owned and operated by the DMH.</p> <p>The Disaster Alert Notification (application) is owned and operated by the DDM. The project has conducted risk/vulnerability mapping in a participatory manner engaging government staff so as to build local capacity.</p> <p>The project is also in the process of preparing a sustainability plan and exit strategy</p>
What measures are being/could have been put in place to improve project/program results?	<ol style="list-style-type: none"> 1/ The identification of project villages and identification of watershed planting areas could have been agreed with the government and stakeholders during the design. A considerable amount of implementation time was spent on managing these activities. 2/ The initial design specifications and cost estimates from 2012 should have been updated at inception phase. Doing this would have provided a more realistic basis for planning project interventions and processing procurement/contractual actions. 3/ The project could have exercised some flexibility in adjustment of targets, providing more focus on quality rather than on targets. This has been highlighted by the MTR and as such, targets for some indicators have been reduced to enhance quality of project deliverables. 4/ The project put in place a monitoring / reporting system whereby stakeholders & counterparts are informed of project progress on a regular basis. The quarterly TAG meetings are being held in the 5 project townships on a rotational basis, which provides an opportunity to jointly monitor activities 5/ A project database and a M&E framework has been put in place and project results are being monitored continuously as per the framework
Knowledge Management	
What kinds of knowledge were used to inform the project	<p>Lessons from project implementation are captured on a regular basis and recorded. Articles, press releases and photo stories and best practices from the field are compiled and published on UNDP internet site and facebook page, as well as on other online sites, thereby enhancing the visibility of the project. A record of photos from project implementation is maintained in the project photo library and shared during important events, such as World Environment Day, International Day for Disaster Risk Reduction.</p> <p>Project lessons are also shared with formulation missions, as well as in events organized by development partners. A case study on the mobile application for weather forecasting and EWS was submitted in response to a call from World Bank/GFDRR – to be featured as a global best practice on climate risk management at local level.</p>
If learning objectives have been established, have they been met?	<p>Having TAG meetings in the townships was with the objective of promoting learning and sharing experience among government counterparts, implementing partners and UNDP.</p> <p>The quarterly project review / coordination meetings with IPs provides a platform for cross-learning and exchange of ideas, including for integration of project activities in the different sectors/outputs of the project.</p> <p>The engagement of government counterparts in implementation, in monitoring activities, as well as in trainings / workshops has resulted in increased capacity of officials at the local level. The trainings have been mostly delivered with staff from government departments as resource persons.</p> <p>The engagement of local NGO/CSO partners have contributed to capacity development of the institutions. The engagement of community in management of important project assets has also led to increased knowledge and capacity of community groups, which in turn will ensure long-term sustainability of project activities.</p>

Difficulties in accessing information	Most of the resources necessary for the project are available within the UN system and the government. However, there were minor hiccups in accessing certain information from government due to the lengthy official procedures required for accessing data and information. The importance of close partnership and collaboration with concerned government agencies in project implementation cannot be underestimated
Has the identification of learning objectives contributed to the outcomes? In what ways?	<p>The key beneficiaries are the various community groups that have been established to manage project assets (eg. crop threshers, livestock banking system, water infrastructure, crop and seed storage facilities). The learning objectives have been fulfilled through trainings on operations, maintenance and use of project assets for the longer-term.</p> <p>Local government officials have benefitted from trainings that have been identified by the stakeholders in the initial stages of project implementation. These trainings are delivered through the IPs and where possible through engagement of specific subject-area experts in the relevant technical areas.</p> <p>The project has contributed to enhanced capacity of NGO/CSO implementing partners. This has been useful, considering the nascent NGO/CSO community and the limited experience and exposure of personnel of implementing partners</p>

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Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

	AF Indicator matching the project indicator
Objective	Physical infrastructure improved to withstand climate change and variability induced stress
	Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress
	Change in practices of targeted population
	Threat and hazard information generated and disseminated to stakeholders on a timely basis
	No. of targeted institutions with increased capacity to minimize exposure to climate variability risks
Outcome 1	No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change
	No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change
Outcome 2	No. and type of risk reduction actions or strategies introduced at local level
Outcome 3	Quality of relevant risk and vulnerability assessments
	Capacity increase of staff from targeted institutions trained to respond to and mitigate impacts of climate related events

Source Annex K, Prodoc

Annex 6: List of Persons Interviewed

Name	Position	Organization	Location
Mr. Peter Batchelor	Country Director	UNDP	Rose Garden
Ms. Dawn Del Rio	Deputy Country Director	UNDP	"
Mr. Biplove Choudhary	Chief of SIG Unit	UNDP	"
Ms. PemWangdi	Programme Specialist	UNDP	"
Carlyne Yu		RIMES	Skype
Itesh Dash		RIMES	Skype
Mr. Harald Kreuscher	Senior Programme Officer	UNOPS	UNOPS
U Ba Kaung	Deputy Director General	DZDG	DZDG Office, Mandalay
U Zaw Win	Director of Planning	DZDG	"
U Aung Myo Win	Staff Officer	DZDG	"
U Zang Swun Khaing	Staff Officer	DZDG	"
Dr. Thein Naing	Deputy Regional Officer	LVBD	LVBD Office, Mandalay
Dr. Phoe Say	Nyaung Oo District Officer	LVBD	"
Dr. Kaung Myat Hein	Myingyan District Officer	LVBD	"
Dr. Yin Yin Myint	Myingyan Township Officer	LVBD	"
U Toe Wai	Director of Mandalay Regional Office	DOA	DOA Office, Mandalay
Daw Moe Swe Yee	In Charge of INGO/NGO	DOA	"
DawKhin Htay Yee	Township Officer	Nyaung Oo, DOA	"
Daw Win Mar	Township Officer	Myingyan, DOA	"
Mr. Karma Lodey Raptan	Technical Specialist	PIT	Mandalay
Mr. Kyaw Zin Aung Soe	Project Manager	UNDP	"
U Kyaw Lwin Oo	Director	DMH	"
U Soe Than	Director	DRD	"
U Than Naing Oo	Deputy Director	DRD	"
U Zaw Min Thaik	Deputy Director	DRD	"
U Aye Min Paing	Assistant Director	DRD	"
Daw Khin Mon Kyaw	Staff Officer, Finance	DRD	"
Daw Kay Thi Aung	Staff Officer, Admin	DRD	"
U Win San	Deputy Director	IWUMD	"
U Khin Zaw	Deputy Director	IWUMD	"
U Thein Tun Aung		IWUMD	"
Mr. Patrick Meza	Research Director	MSR	Yangon
Daw Khin Cho Cho	Deputy Township Adminster	GAD	Shwe Bo
U Moe Hein	Staff Officer	DZDG	"
U Kyaw Zin Htun	Staff Officer	Forest Department	"
Dr. A Ni Tar	Assistant Director	LBVD	"
U Win Myat Thein	Assistant Director	DRD	"
Daw Aye Aye Nyein	Deputy Superintendent	DMH	"
Daw Zar Zar Min	Staff Officer	DOA	"
U Kyaw Swe Win	Township Administrator	GAD	Chauk
U Nay Lin Oo	Clerk	DDM	"
U Thein Ko	Staff Officer	DZDG	"
U Tin Shwe	Staff Officer	FD	"
U Ye Kyaw Thu	Junior Clerk	DRD	"
Daw Aye Myint Myat Thin	Staff Officer	DOA	"
Daw Swe Zin Phyo	Station Head	DMH	"
U Ye Hla Win	Deputy Supervisor	DALMS	"
U Tun Tun Lin	Township Administrator	GAD	Nyaung Oo
Daw San Mya Lwin	Assistant Director	DDM	"
U Aung Thiha Zaw	Staff Officer	DZDG	"
U Zaw Zaw Naing	Staff Officer	FD	"
U Aung Shein	Assistant Director	DRD	"
Daw Khin Htay Yee	Staff Officer	DOA	"
U Thien Aung	Station Head	DMH	"
U Tin San Oo	Assistant Director/District Officer	DALMS	"
U Win Tin	Team Leader	NAG	"
U Nyi Nyi Naing	Programme Associate	NAG	"
U Myo Min Aung	Project Manager	Cesvi	"
U Nyi Nyi Aung	Township Administrator	GAD	Myingyan

U Soe Maung	Supervisor	DZDG	"
U Saw Lin Aung	Staff Officer, Myingyan Township	DMH	"
U Myo Win	Township Officer	DRD	"
Dr. Yin Yin Myint	Township Officer	LBVD	"
Daw Win Mar	Township Officer	DOA	"
U Yin Maung Than	Deputy Officer	GAD	"
U Yan Lin Maung Maung Oo	Staff Officer	FD	"
U Zaw Myo Than	Staff Officer	IWUMD	"
Daw Hnin Sandar	Township Officer	DDM	"
Dr. Khin Myat New	Deputy Director	LBVD Head Office	Nay Pyi Taw
U Hla Maung Thein	Director General	ECD Head Office	"
Dr. Kyaw Moe Oo	Director General	DMH Head Office	"
Dr. Nyo Mar Htwe	Associate Professor	YAU	Yezin, Nay Pyi Taw
Daw Nan Pa Pa Win	Research Officer	DAR Head Office	"
U Chit Oo	Assistant Director	Forest Department	Regional, Mandalay
Daw Moe Theinge Oo	Staff Officer	Forest Department	"
Dr. Myint Wai	Project Manager	AF Project	Patheinge, Mandalay
U Kyaw Lwin Oo	Director	DMH, Mandalay	Sakura Princess Hotel
U Aye Min Thu	Director	DDM, Mandalay	"
U Zaw Win	Director	DZGD, Mandalay	"
U Zaw Min Theik	Deputy Director	DRD, Mandalay	"
Dr. Khin Myat Nwe	Deputy Director	LBVD, Mandalay	"
U Soe Kyaw Bo Thein	Assistant Director	IWUMD, Mandalay	"
Daw Khin Thandar Win	Assistant Director	DoA, Mandalay	"
Daw Moe Theingi Oo	Staff Officer	Forest Dept, Mandalay	"
U Aung Myo Win	Staff Officer	DZGD, Mandalay	"
Mr. Biplove Choudhary	Senior Advisor	UNDP	"
U Zaw Min Naung	Head of Mandalay Office	UNDP	"
Mr. Karma Lodey Raptan	Technical Specialist	PIT	"
U Yan Naing Tun	Soil and Water Conservation Specialist	UNDP	"
U Kyaw Zin Aung Soe	Interim Project Manager	UNDP	"
U Min Zaw	Project Manager, R2R	UNDP	"
Seng Mai	Project Assistant		"
Mr. Patrick Meza	Research Director	Myanmar Survey Research	"
Villagers	From listed villages below	n/a	Villages

Locations visited

- Nay Pyi Taw gov't meetings – Envir. Conservation Dept – DG; Livestock – DD; DMH – DG; + YAU, DAR
- Mandalay regional government meetings – DZGD, Livestock, DoA, DMH, Irrigation, FD
- TAG members today in seminar
- Met all township governments except Monywa
- DALMS offices in 1 district and 1 township
- DMH - AWS stations in 3 townships
- Yangon – UNDP (start and end), Rimes, UNOPS
- Project PIT – a number of meetings
- Field – CESVI, NAG, YAU

Field villages

- Shwebo villages - Gway Pin Gone; Ma Khauk; Min Bay; Ma Eu; Kyaung Pan Kan; Kin Tat Canal
- Mon Ywa villages – Daing; Auk Saint Taw; Nyaung Pin Ywar Thi; Kyawk Kwe
- Chauk villages - San Kan; Thit To Kan; Tha Lone Thwe
- Nyaung O - Tha Put Su; Da Hat Kan
- Myingyan - Htan Taw Gyi; Nyaung Won; Kyauk Kan; Tha Nyut Kan

Annex 7: List of Documents Reviewed

1. Project Identification Form (PIF) and AF FA strategic program objectives
2. UNDP Initiation Plan and Implementing/Executing partner arrangements / contract
3. UNDP Project Document and Logframe revisions
4. CEO Endorsement Request
5. UNDP Environmental and Social Screening results
6. Project Inception Report
7. AF – Project Performance Reviews (PPRs)
8. Annual Project Reports
9. Minutes of the Project Board Meetings and other meetings (i.e. Project Appraisal Committee meetings)
10. Atlas Risk Register
11. Quarterly progress reports and work plans of the various implementation task teams
12. Annual Work Plans
13. Mid Term Review (MTR) Report
14. MTR Management Response
15. M&E Data management system
16. Audit reports
17. Tracking Tools
18. Oversight mission reports by the project manager, RTA, and others
19. Monitoring reports prepared by the project
20. Financial and Administration guidelines used by Project Team
21. Co-financing realized, itemized according to template provided by TE team
22. Financial expenditures, itemized according to template provided by TE team
23. Project operational guidelines, manuals and systems
24. UNDP Development Assistance Framework (UNDAF) and Evaluation
25. UNDP Country Programme Document (CPD) and Country Programme Action Plan (CPAP)
26. Project site location maps
27. Project activity maps with management actions and intervention
28. Technical consultancy reports
29. Training materials (PPTs etc.)
30. News and Awareness materials / Photo library / Video films about the projects
31. Project Summary PowerPoint files for the TE

Annex 8: Risk Tables

The Atlas Risk table (edited) is taken from the UNDP management system. It identified 6 risks.

Risk Log

	Risk	Mitigation measures if risk occurs	TE Comment
1	Non-climate drivers undermine adaptation efforts under this project	The project will promote a view of vulnerability in which the mitigation of climate-related drivers can be coupled with economic benefits. This integrated, ecosystem-based view of resilience, which is based on community-based planning, will be able to hold non-climatic drivers such as over-grazing, deforestation and unsustainable agricultural practices in check. The adaptation actions are designed to address local community needs for economic and social empowerment.	No evidence as yet that over-grazing, forest degradation is being held in check. Farm soil conservation measures were limited in scale, and the burning of residues and the forest is in-grained and needs a new approach
2	Extreme weather events undermine confidence in adaptation measures	The project will integrate outputs which focus on disaster risk and early warning communication, which will enable basic preparedness planning. Component 3 will be implemented in earlier phase so that the impact of potential extreme weather can be minimized The project supported Relief and Resettlement Department to develop a mobile application - Disaster Alert Notification (DAN), which is a new method of disseminating early warning information The project supported the DMH in developing a mobile application - DMH-SESAME - which provides 3-day, 10-day, monthly and seasonal forecasts.	The project produced the DAN app which is part of an EWS. There were no extreme events
3	Adaptation measures increase inequity in communities	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, and expression of views from, vulnerable and marginalized groups.	The measures were fair
4	Technical capacity of township / village stakeholders restricts community engagement	The selection of project target villages was in consultation with the beneficiaries and based on a set of selection criteria, including - observed temperature extremes, frequency of drought per year, impacts of climatic parameters on food security and potential to access ground and surface water resources. The project collected baseline information on beneficiaries and developed a database to monitor and ensure that the project supports the most vulnerable and marginalized communities.	
5	Political and social instability and lack of government engagement	The project prioritizes interventions on mainly landless, marginal and women-headed households. For specific sectoral interventions, the project also conducts needs assessments and identifies beneficiaries based on the overall project criteria of prioritizing landless and marginal farmers. In addition, a monitoring and evaluation framework has been developed to ensure project delivers intended results and target intended beneficiaries.	
6	Delay in issuance of community forestry certificates	The project consulted local communities prior to rehabilitation/reforestation activities and ensured certificates were applied as per community forestry instructions of 2016 The project's inability to secure CF certificates was continuously referred to the TAG and PSC meetings. The PSC recommended that the issue be elevated to the MoNREC – who subsequently recommended to officially request Ministry of Home Affairs. The Home Ministry issued a blanket “no objection” letter for the project to go ahead with rehabilitation/reforestation programme. However, based on this “no objection” letter, the Forestry Department was not able to issue CF certificates due to lack of clarity in the applicable laws. The issue was notified to TAG and PSC members and updates on the project's inability to secure CF certificates was provided despite the issuance of “no objection” letter by MOHA. The project was instructed to have a dedicated	

		<p>discussion with related departments (FD, DZGD, DALMS, GAD, etc). The decision was to change the application process, in a way to make it possible for local authorities to issue CF certificates based on the laws,</p> <p>The Minister of MONREC was briefed on the issue in Nov 2018 and the project presented the steps it will take in line with the recommendations of the related departments held on 6 Nov 2018</p> <p>The project has submitted applications for CF certificates based on the recommendations made by related departments and updated both TAG and PSC</p>	
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Numbers 1-5 from Prodoc; 6 added in 2017

Issue Log Matrix

	Issue (& date)	Resolution measures recommended	Status (& date)	TE Comment
1	Competence of NGO/CSO to deliver project activities through NGO/CSO engagement process (Q4,2015)	IPs have been recruited through both NGO/CSO engagement modality as well as through a competitive procurement, depending on scope and complexity of tasks. There is a good mix of implementing partners in terms of capacity/expertise. Quarterly review meetings are held with implementing partners and this provides a platform for cross-learning and sharing of experience and coordination of field activities	Issue resolved to an extent. The project team is providing continuous support to IP in ensuring quality reporting and data mgt. The project team also organized a training to build their capacities. (Dec 2018)	
2	Problems in coordinating field activities among different IPs at township/district/r regional level (Q4,2016)	Regular monitoring of field activities by sector specialists. In addition, quarterly review meetings are held with implementing partners to resolve coordination issues, as well as for cross-learning and sharing of experience.	Issue resolved. In 2018, an integrated work plan has been developed through a joint meeting of all implementing partners. (March 2018)	
3	Delay in securing approval for land for reforestation/rehabilitation activities (Q2, 2017)	Except for Nyaung U and part of Shwebo township, the project could not secure land approval for plantation conducted in 2016 and 2017. The approval for 2018 is also pending. The issue was discussed - TAG meeting 23 Jan 2018 and PSC 5 Feb 2018. Based on the TAG, the PSC agreed that "No objection certificate" from Government/GAD will suffice instead of "approval". As a result, the PIT submitted application for reforestation activities to the government through DZGD's support.	Issues resolved. "No objection letter" has been received from Ministry of Home Affairs. (March 2018)	
4	Delay in securing CF certificates (Q2,2018)	The ambiguity in securing CF certificates was resolved through a meeting with the FD. The required process and supporting documentation was clarified during the meeting. The FD and DZGD have expressed full support to the project.	The issue may prolong because of the ambiguity/lack of clarity of the certification process. Issues related to land tenure and land use are sensitive in Myanmar (June 2018)	Not resolved

Risk Table (PPR 2018)

Critical Risk	Steps Taken to Mitigate Risk (me edit it down)	TE Comment
Lack of clarity in land acquisition for project interventions, in particular for forestry and watershed management activities	In consultation with the DZGD and FD, the Project has submitted application for use of land for rehabilitation/reforestation activities to the respective township GAD after securing endorsement from communities and local land management committees. UNDP CD met with the MoNREC 10 Nov 2017 to discuss issue of land availability for rehabilitation/reforestation activities & the Minister committed to support the project is securing permission from the Chief Ministers of the 3 regions. The issue of land availability was also discussed in the TAG meeting held on 8 Dec 2017 and PSC meeting held on 20 Dec 2017, where the initial findings of the MTR (which identified land availability for rehabilitation and reforestation activities as a critical risk). As agreed by the PSC, UNDP and DZGD approached the MoNREC on 29 Dec 2017 to seek support in securing approval for land to implement reforestation activities. The Permanent Secretary of the MoNREC committed to assist the project in securing land for reforestation activities by the end of Jan 2018. It is likely that the issue will be resolved in 2018.	

Annex 9: Stakeholder List

Stakeholder	Relevant roles
National (Government)	
DG of Environmental Conservation Department (ECD), Nay Pyi Taw	The DG of ECD is the Designated National Agency for Adaptation Fund in Myanmar. He is also the GEF OGP. Member of Project Steering Committee (PSC) Member of Technical Advisory Group (TAG) Provide technical inputs/suggestions for project implementation
DDG of Livestock Breeding and Veterinary Department (LVBD), Nay Pyi Taw	Member of Project Steering Committee (PSC) Member of Technical Advisory Group (TAG)
DG of Department of Metrology and Hydrology (DMH), Nay Pyi Taw	Member of Project Steering Committee (PSC) Member of Technical Advisory Group (TAG)
Local (Government)	
Dry Zone Greening Department (DZDG), Mandalay	Main government counterpart of the project. Letter of Agreement on the supply of forestry and agroforestry seedlings to the project
Livestock Breeding and Veterinary Department (LVBD), Mandalay	Provide technical inputs/suggestions for project implementation-Focal agency for the implementation of the component on climate resilient livestock practices
Department of Agriculture (DOA), Mandalay	Provide Technical inputs/suggestions for project implementation Principle counterpart for the implementation of the component on climate-resilient agriculture practices
Department of Meteorology and Hydrology, Mandalay	DMH is the primary contributor with regards to climate change protection data and provides technical expertise on enhancing climate risk information management Focal institutions for risk/ vulnerability assessment and hazard mapping Focal agency for the development and dissemination of agro advisories/bulletins (SESAME mobile application) RIMES governing institution in Myanmar
Department of Rural Development (DRD), Mandalay	Provide Technical inputs/suggestions for project implementation-mainly in water harvesting and soil conservation activities.
Irrigation and Water Utilization Department (IWUMD), Mandalay	Provide Technical inputs/suggestions for project implementation-mainly in the areas of water harvesting activities
Dry Zone Greening Department (DZDG), Nyaung Oo	Main government counterpart of the project. Letter of Agreement on the supply of forestry and agroforestry seedlings to the project
Livestock Breeding and Veterinary Department (LVBD), Nyaung Oo	Provide technical inputs/suggestions for project implementation-Focal agency for the implementation of the component on climate resilient livestock practices
Department of Rural Development (DRD), Nyaung Oo	Provide Technical inputs/suggestions for project implementation-mainly in water harvesting and soil conservation activities.
Local (IPs and Beneficiaries)	
CESVI (Nyaung Oo)	Provide services for Climate Resilient Agriculture Practices
NAG (Nyaung Oo)	Provide services for Reforestation/rehabilitation of degraded areas in the dry zone
RIMES (Nyaung Oo)	Provide services for Climate Risk Management and Climate Risk Information Management
Beneficiaries in villages of Shwe Bo Township	Project Beneficiaries
Beneficiaries in Villages of Monywa Township	Project Beneficiaries
Beneficiaries in Villages of Nyaung Oo Township	Project Beneficiaries
Beneficiaries in Villages of Chauk Township	Project Beneficiaries
Beneficiaries in Villages of Myingyan Township	Project Beneficiaries
UNDP	
Project Implementation Team, Patheingyi	Project Management and Implementation

Source: MTR and itinerary

Annex 10: Rating Scales

The following UNDP-GEF grading scales were applied in the evaluation

Evaluation Criteria

Criteria	Definition
Effectiveness - Objective	- The extent to which an objective has been achieved or how likely it is to be achieved.
Effectiveness - Outcomes	- Results include direct project outputs, short to medium-term outcomes
Relevance	<ul style="list-style-type: none"> - The extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time. - The extent to which the project is in line with the GEF Operational Programs or the strategic priorities under which the project was funded. <p>(Retrospectively, relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.)</p>
Efficiency	- The extent to which results have been delivered with the least costly resources possible; also called cost effectiveness or efficacy.
Sustainability	<ul style="list-style-type: none"> - The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion - Projects need to be environmentally, as well as financially and socially sustainable
Impact	<ul style="list-style-type: none"> - The positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention. - Longer term impact including global environmental benefits, replication effects and other local effects.

Rating Scale for Outcomes (Overall, Effectiveness & Efficiency)

Highly Satisfactory (HS)	<p>The project had no shortcomings in the achievement of its objectives in terms of effectiveness (outcomes), or efficiency.</p> <p>The project is expected or has achieved its global environmental objectives.</p> <p>The project can be presented as 'good practice'.</p>
Satisfactory (S)	<p>There were only minor shortcomings</p> <p>The project is expected or has achieved most of its global environmental objectives.</p>
Moderately Satisfactory (MS)	<p>There were moderate shortcomings</p> <p>The project is expected or has achieved most of its relevant objectives but with moderate / significant shortcomings or modest overall relevance.</p> <p>The project isn't going to achieve some of its key global environmental objectives</p>
Moderately Unsatisfactory (MU)	<p>The project had significant shortcomings</p> <p>The project is expected to achieve its global environmental objectives with major shortcomings or is expected to achieve only some of its major global environmental objectives.</p>
Unsatisfactory (U)	<p>There were major shortcomings in the achievement of project objectives in terms of effectiveness, or efficiency</p> <p>The project is not expected to achieve most of its global environment objectives</p>
Highly Unsatisfactory (U)	<p>The project had severe shortcomings</p> <p>The project has failed to achieve any of its major environment objectives</p>

Or Not Applicable (N/A); Unable to Assess (U/A)

Note

Overall Outcome: Achievement of the project objective will be rated HS to U.

Effectiveness: Each of the project's three outcomes will be rated HS to U. The colour coding of the individual indicator targets in **Annex 1** will partially help determine the grade. Each of the outcome indicators will also each be given a grade (in the justification column), however the final rating for each of the three outcomes will be due to appropriate weighting in terms of attaining project objectives. This means that professional judgement of the TE team will also be a key consideration.

Efficiency: An overall rating for cost-effectiveness will be provided

Rating Scale for Outcome (Relevance)

Relevant (R)	Not relevant (NR)
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Rating Scale for Implementing Agency (IA) and Executing Agency (EA) Execution

Highly Satisfactory (HS)	The agency had no shortcomings in the achievement of their objectives in terms of quality of implementation or execution. Implementation of all five given management categories – IA or EA coordination & operational matters, partnership arrangements & stakeholder engagement, finance & co-finance, M&E systems, and adaptive management (work planning, reporting & communications, including update to project design) – has led to an efficient and effective project implementation. The agency can be presented as providing ‘good practice’
Satisfactory (S)	The agency had only minor shortcomings in terms of the quality of implementation or execution. Implementation of most of the five management categories has led to an efficient and effective project implementation
Moderately Satisfactory (MS)	The agency had moderate shortcomings Implementation of some of the five management categories has led to a moderately efficient and effective project implementation
Moderately Unsatisfactory (MU)	The agency had significant shortcomings Implementation of some of the five management categories has not led to efficient and effective project implementation
Unsatisfactory (U)	There agency had major shortcomings in the quality of implementation or execution Implementation of most of the five management categories had not led to efficient and effective project implementation
Highly Unsatisfactory (U)	The agency had severe shortcomings with poor management leading to inefficient and ineffective project implementation

Rating Scale for Monitoring & Evaluation

Highly Satisfactory (HS)	The M&E system – its design and implementation had no shortcomings in the support of achieving project objectives. The M&E system was highly effective and efficient and supported the achievement of major global environmental benefits. The M&E system and its implementation can be presented as ‘good practice’.
Satisfactory (S)	The M&E system – its design and implementation had minor shortcomings in the support of achieving project objectives. The M&E system was effective and efficient and supported the achievement of most of the major global environmental benefits, with only minor shortcomings
Moderately Satisfactory (MS)	The M&E system – its design and implementation had moderate shortcomings in the support of achieving project objectives. The M&E system supported the achievement of most of the major relevant objectives, but had significant shortcomings or modest overall relevance
Moderately Unsatisfactory (MU)	The M&E system – its design and implementation had major shortcomings in the support of achieving project objectives. The M&E system supported the achievement of most of the major environmental objectives, but with modest relevance
Unsatisfactory (U)	The M&E system – its design and implementation had major shortcomings and did not support the achievement of most project objectives. The M&E system was not effective or efficient
Highly Unsatisfactory (HU)	The M&E system failed in its design and implementation in terms of being effective, efficient or supporting project environmental objectives or benefits.

Rating Scale for Sustainability

Likely (L)	Negligible risks to sustainability with key Outcomes achieved by the project closure and expected to continue into the foreseeable future
Moderately Likely (ML)	Moderate risks, but expectations that at least some Outcomes will be sustained
Moderately Unlikely (MU)	Significant risk that key Outcomes will not carry on after project closure, although some outputs should carry on
Unlikely (U)	Severe risks that project Outcomes as well as key outputs will not be sustained

According to UNDP-GEF evaluation guidelines, all risk dimensions of sustainability are critical: i.e., the overall rating for sustainability is not higher than the lowest-rated dimension.

Ratings should take into account both the probability of a risk materializing and the anticipated magnitude of its effect on the continuance of project benefits.

Risk definitions:

- Whether financial resources will be available to continue activities resulting in continued benefits
- Whether sufficient public stakeholder awareness and support is present for the continuation of activities providing benefit
- Whether required systems for accountability / transparency & technical know-how are in place
- Whether environmental risks are present that can undermine the future flow of the project benefits.

Rating Scale for Impact

Significant (S)	Minimal (M)	Negligible (N)
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Project Impact is rated as Significant; Minimal or Negligible, but also the positive or negative aspect of the impact will be stated.

Concerning impact, the TE will consider the extent of

- Verifiable improvement in ecological status; and/or
- Verifiable reductions in stress on ecological systems
- Regulatory and policy changes at regional, national and/or local levels

Process indicators will be specified to demonstrate achievement of stress reduction and/or ecological improvement.

Part of the impact assessment, will concern catalytic effect. The TE will consider if the project exhibited

- Scaling up (to regional and national levels)
- Replication (outside of the project),
- Demonstration, and/or
- Production of a public good, such as new technologies /approaches)

Annex 11: Mission Itinerary

Day/Date	Time	Activity	Participates / Contact	Remarks
Sat, 02 Mar	7:50 am	Depart UK		
Sun, 03 Mar	5:45 am	Arrive Yangon QR 918	Self transfer to hotel	
	PM	TE literature search & reading		
	Evening	Hotel Yangon		Sobey booked
Mon, 04 Mar	08:15 - 08:45	Briefing Meeting with RR in Yangon	With RR and Chief of SIG Unit - Rose Garden Hotel, Upper Pansodan Road, Yangon	UNDP pick-up hotel requested
	11:00 - 12:00	UNDP project briefing	UNDP Programme Unit in Yangon/other business units in UNDP (as necessary)	Meet the UNDP Task Manager for the Terminal Evaluation - Pem Wangdi
	13:30 - 14:30	Skype Call with Regional Integrated Multihazard Early Warning System (RIMES) based in Bangkok	Dr. Subbiah, Carlyne Yu, Itesh Das	
	15:30 - 16:15	Meeting with UNOPS	Mr. Harald KREUSCHER	UNOPs is part of the TAG and has been attending the TAG meeting regularly
	Evening	Hotel in Yangon		Sobey booked
Tue 05 Mar	07:30 - 08:25	Fly to Mandalay		UNDP will provide pick up in Mandalay
	10:00 - 11:30	Meeting with Dry Zone Greening Department (DZGD)	DG/DDG, Director of Planning & Staff of DZGD	MonREC
	14:00 - 15:00	Meeting with Livestock Breeding & Veterinary Dept.	Regional Director of LBVD, Mandalay	MoALI
	15:30 - 16:15	Meeting with Department of Agriculture (DOA)	Regional Director of DOA, Mandalay	
Wed 06 Mar	Evening	Hotel in Mandalay		Sobey booked
	09:00-11:00	Meeting at Project Office, Patheingyi, Mandalay	Project implementation Team	"
	11:30 - 12:30	Meeting with Department of Meteorology and Hydrology (DMH)	Director, Upper Myanmar, DMH	
	14:00 - 15:30	Meeting with Department of Rural Development	Regional Director of DRD	
	15:30 - 16:15	Irrigation Water Utilization & Management Dept.	Regional Director of IWUMD	"
	16:20-17:00	Meeting with Myanmar Survey Research (MSR)	Research Director	
Thur 07 Mar	Evening	Hotel in Mandalay		Sobey booked
	08:30 - 10:30	Travel to Shwebo		2 hrs drive
	11:00 - 12:00	Meeting the Township officials	local government officials (GAD, DZDG, FD, LBVD, DRD, DMH, DOA)	
	12:00-12:30	Visit to Shwe Bo Automatic Weather Station		
	13:30 - 17:30	Villages - Gway Pin Kone, Ma Khauk, Kin Tat canal, Kyaung Pan Kan, Min Bay	Implementing Partners and Project Beneficiaries	
	Evening	Hotel in Shwebo		to be booked by Project Team

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Fri 08 Mar	08:30 – 12:00	Field visit in Shwebo Township - Villages - Gway Pin Kone, Ma Khauk, Kin Tat canal, Kyaung Pan Kan, Min Bay	Implementing Partners and Project Beneficiaries	
	13:30 -15:30 Evening	Travel to Monywa		2 hrs drive
Sat 09 Mar		Hotel in Monywa		to be booked by Project Team
	AM	Field visit to project villages in Monywa (Nyaung Pin Ywar Thit, Kyauk Kwe)		Meeting with government officials not possible since it is a weekend
	PM	Field visit to project villages in Monywa (In Daing, Auk Saint Taw)	Implementing Partners and Project Beneficiaries	
	Evening	Hotel in Monywa		to be booked by Project Team
Sun 10 Mar	08:30 - 11:30 PM	Travel to Nyaung U		3 hrs drive
	Evening	Rest		
Mon 11 Mar	Evening	Hotel in Nyaung U		to be booked by Project Team
	08:30 - 09:30	Drive to Chauk		1 hr drive
	09:30 - 11:00	Meeting with government officials	local government officials (GAD, DZDG, FD, DDM, DRD, DMH, DOA)	
	11:00-11:30	Visit to Chauk Automatic Weather Station		
	11:30-12:30	Meeting with Township Department of Land Management and Statistics	Deputy Township Officer	
	11:30 - 16:00	Field visit to project villages in Chauk (Thalone Thwey, Thit To Kan, San Kan) and return to Nyaung U	Implementing Partners and Project Beneficiaries	early lunch and proceed to the field
	16:00 - 17:00	drive back to Nyaung U		No good hotel in Chauk
Tue 12 Mar	Evening	Hotel in Nyaung U		to be booked by Project Team
	09:00 – 11:30	Meeting with local government officials	local government officials(GAD, DDM,DZDG, FD,DRD,DOA,DMH)	
	11:30-12:00	Visit to Nyaung Oo Automatic Weather Station		
	12:00-13:00	Meeting with District Department of Land Management and Statistics	Nyaung Oo District Officer	
	PM	Field visit to project villages in Nyaung U Township (Tha Putsu, Dahat Kan, Mon Taing)	Implementing Partners and Project Beneficiaries	
Wed 13 Mar	Evening	Hotel in Nyaung U		to be booked by Project Team
	09:00 - 12:00	Meeting with Implementing Partners (CESVI/NAG)	Implementing Partners (CESVI and NAG)	
	13:30 - 14:30 PM	Travel to Myingyan		
	Evening	rest		
Thur 14 Mar	Evening	Hotel in Myingyan		to be booked by Project Team
	09:30 - 11:30	Meeting with local government officials	local government officials (GAD, DZDG,DMH, DRD, LBVD, DOA, FD,IWUMD, DDM)	

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PM	Project villages in Myingyan Township (Kyauk Kan, Htan Taw Gyi, Nyaung Won, Tha Nyut Kan)	Implementing Partners and Project Beneficiaries
15:00 –17:30	Travel to Mandalay	
Evening	Hotel in Mandalay	to be booked - Sobey requests Peacock Lodge
09:00-12:00	Meeting with Project Team	
PM	Document Read	Project implementation Team
Evening	Hotel in Mandalay	
AM	Team meeting - Team Leader and National Consultant	Team Leader & National Consultant
PM	Rest	
Evening	Hotel in Mandalay	
AM	Travel to Nay Pyi Taw	3.5 hrs drive
PM	Rest	
Evening	Hotel in Nay Pyi Taw	to be booked by Project Team
09:00 - 10:15	Meeting with Deputy Director, LBVD (TAG Member)	
10:30-11:30	Meeting with DG of Environment Conservation Dept / Designated National Authority for AF in Myanmar	DG of ECD, Ministry of Natural Resources & Envir. Conser.
13:30 - 14:00	Meeting with DG, DMH (PSC Member)	DG of DMH "
15:00-16:00	Meeting with Associate Professor, YAU	Yezin Agriculture University
16:00-17:00	Meeting with Department of Agriculture Research	Research Officer
Evening	Hotel in Nay Pyi Taw	to be booked by Project Team
08:30 - 12:00	Travel to Mandalay	3.5 hrs drive
13:00-14:00	Meeting with Regional Forest Department (Mandalay)	Regional Director
15:00-16:00	Meeting with Project Manager	(stayed 4 years)
Evening	Hotel in Mandalay	
AM	TE Preparation of presentation for TAG	Gov't holiday
PM	TE internal meeting	Team Leader & National Consultant
Evening	Hotel in Mandalay	
AM	Presentation of Evaluation Findings to TAG	TAG Members
16:50 hrs	Travel to Yangon	K7 227 at 16:50 hrs
Evening	Hotel in Yangon	to be booked by Project Team
09:00 - 10:00	De-briefing meeting with UNDP Senior Management	Sobey booked
15:30	Flight QR4468	location - UNDP office
6:15AM	Arrive UK	

[illegible]

Annex 13: Indicative TE Evaluation Matrix

This questionnaire was used as a general aid during the field visit with the results described in section 3. (Note there is no further information to be presented in the blank boxes.)

Evaluation Question	Response / Finding	Conclusion/ Recommend
Relevance: How does the project relate to the main objectives of the GEF (LDCF) FA, and to the environment and development priorities at the local, regional and national levels?		
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?		
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?		
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?		
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and / or improved ecological status		
Findings discussion – 3 areas - Project formulation, project implementation, and project results.		
Project Strategy		
Project Design Formulation		
To what extent is the project in line with national and local priorities?		
To what extent is the Project aligned to the main objectives of the GEF focal area?		
Have synergies with other projects and initiatives been incorporated in the design?		
Were lessons from other relevant projects properly incorporated into the project design?		
Decision-making processes: were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account during project design processes?		
Have issues materialized due to incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document?		
Were the project's objectives and components clear, practicable and feasible within its time frame?		
Were the capacities of the executing institution(s) and its counterparts properly considered when the project was designed?		
Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval?		
Were counterpart resources (funding, staff, and facilities), enabling legislation, and adequate project management arrangements in place at project entry?		
Were the project assumptions and risks articulated in the PIF and project document?		
Results Framework:		
Are the project objective / outcomes clear, practicable, & feasible within its time frame?		
Were the project's logframe indicators and targets appropriate?		
How "SMART" were the midterm and end-of-project targets (Specific, Measurable, Attainable, Relevant, Time-bound)? Any amendments?		
Progress towards Results		
Progress towards Outcomes Analysis:		
Review the logframe indicators against delivery at end-of-project targets using the Results Matrix (see Annex).		
Compare and analyse the GEF Tracking Tool at the Baseline, MTR and End.		
Which barriers hindered achievement of the project objective		
ASSUMPTIONS AND RISKS		
As per logframe - Logical and robust, and have helped to determine activities and planned outputs.		
Externalities (i.e. effects of climate change, global economics) which are relevant to the findings.		
Project Implementation & Adaptive Management		
GEF Partner Agency / Implementing Entity – UNDP		
Has there been an appropriate focus on results?		
Has the UNDP support to the Executing Agency/Implementing Partner and Project Team been adequate?		
Has the quality and timeliness of technical support to the Executing Agency/ Implementing Partner and Project Team been adequate?		
How has the responsiveness of the managing parties to significant implementation problems been?		
Has overall risk management been proactive, participatory, and effective?		
Are there salient issues regarding project duration, for instance to note project delays? And, how have they affected project outcomes and sustainability?		
Candor and realism in annual reporting		
Executing Agency/ Implementing Partner Execution		

Were the capacities of the executing institution(s) and its counterparts properly considered when the Project was designed?		
Were partnership arrangements properly identified and roles and responsibilities negotiated prior to Project approval?		
Were counterpart resources, enabling legislation, and adequate project management arrangements in place at Project entry?		
Have management inputs and processes, including budgeting and procurement been adequate?		
Has there been adequate mitigation and management of environmental and social risks as identified through the UNDP Environmental and Social screening procedure?		
Whether there was an appropriate focus on results and timeliness?		
Quality of risk management?		
Candor and realism in reporting?		
Government ownership (when NEX) or level of support if 'in cooperation with' the IP.		
Work Planning / PROJECT IMPLEMENTATION		
Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country/region, including the formation of a Project Board. Lessons from other relevant projects incorporated into project implementation.		
Feedback from M&E activities used for adaptive management.		
Has the project experienced delays in start-up and/or implementation? What were the causes of the delays? And, have the issues been resolved?		
Were work-planning processes results-based?		
Did the project team use the results framework/ logframe as an M&E and a management tool?		
Were there any changes to the logframe since project start, and have these changes been documented and approved by the project board?		
FINANCE & CO-FINANCE		
<u>Prodoc</u> Did the prodoc identify potential sources of co-financing as well as leveraged and associated financing? Prodoc include strong financial controls that allowed the project management to make informed decisions regarding the budget, allow for the timely flow of funds and for the payment of project deliverables Did the prodoc demonstrate due diligence in the management of funds, including periodic audits.		
Sufficient clarity in the reported co-financing to substantiate in-kind and cash co-financing from all listed sources. The reasons for differences in the level of expected and actual co-financing. The extent to which project components supported by external funders were integrated into the overall project. Effect on project outcomes and/or sustainability from the extent of materialization of co-financing. Evidence of additional, leveraged resources that have been committed as a result of the project. (Leveraged resources can be financial or in-kind and may be from other donors, NGOs, foundations, governments, communities or the private sector)		
<u>Cost-effective factors</u> Compliance with the incremental cost criteria and securing co-funding and associated funding. Project completed the planned activities and met or exceeded the expected outcomes in terms of achievement of Global Environmental and Development Objectives according to schedule, and as cost-effective as initially planned. The project used either a benchmark approach or a comparison approach (did not exceed the costs levels of similar projects in similar contexts)?		
<u>Standard Finance questions</u> Have strong financial controls been established allow the project management to make informed decisions regarding the budget at any time, and allow for the timely flow of funds and the payment of satisfactory project deliverables?		
Are there variances between planned and actual expenditures? If yes, what are the reasons behind these variances?		
Has the project demonstrated due diligence in the management of funds, including annual audits?		
Have there been any changes made to the fund allocations as a result of budget revisions? Assess the appropriateness and relevance of such revisions.		
Has pledged cofinancing materialized? If not, what are the reasons behind the cofinancing not materializing or falling short of targets?		
Project-level Monitoring and Evaluation Systems		
The quality of the Monitoring and Evaluation (M&E) plan's design and implementation: An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators and data analysis systems, MTR, TE, and adequate funding for M&E activities.		
M&E plan at project start up, considering whether baseline conditions, methodology and roles and		

responsibilities are well articulated. Is the M&E plan appreciated? Is it articulated sufficiently to monitor results and track progress toward achieving objectives?		
Were sufficient resources allocated effectively to M&E?		
Were there changes to project implementation / M&E as a result of the MTR recommendations?		
Are the M&E systems appropriate to the project's specific context? - effectiveness of monitoring indicators from the project document for measuring progress and performance		
Do the monitoring tools provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective?		
To what extent has the Project Team been using inclusive, innovative, and participatory monitoring systems?		
To what extent have follow-up actions, and/or adaptive management measures, been taken in response to the PIRs? Check to see whether APR/PIR self-evaluation ratings were consistent with the MTR and TE findings. If not, were these discrepancies identified by the project steering committee and addressed?		
Compliance with the progress and financial reporting requirements/ schedule, including quality and timeliness of reports		
The value and effectiveness of the monitoring reports and evidence that these were discussed with stakeholders and project staff		
The extent to which development objectives are built into monitoring systems: How are perspectives of women and men involved and affected by the project monitored and assessed?		
How are relevant groups' (including women, indigenous peoples, children, elderly, disabled, and poor) involvement with the project and the impact on them monitored?		
Has there been adequate mitigation and management of environmental and social risks as identified through the UNDP Environmental and Social screening procedure?		
STAKEHOLDER ENGAGEMENT		
Are the interactions as per the prodoc? Stakeholder interactions include information dissemination, consultation, and active participation in the project.		
Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?		
Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?		
Participation and public awareness: How has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?		
Are there any limitations to stakeholder awareness of project outcomes or to stakeholder participation in project activities? Is there invested interest of stakeholders in the project's long-term success and sustainability?		
Reporting:		
How have adaptive management changes been reported by the Project Team and shared with the Project Board?		
How well have the Project Team and partners undertaken and fulfil GEF reporting requirements (i.e. how have they addressed poorly-rated PIRs?), and suggest trainings etc. if needed?		
How have PIRs been shared with the Project Board and other key stakeholders?		
How have lessons derived from the adaptive management process been documented, shared with key partners and internalized by partners, and incorporated into project implementation?		
Communication:		
Internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and long-term investment in the sustainability of project results?		
External project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)		
Are there possibilities for expansion of educational or awareness aspects of the project to solidify a communications program, with mention of proper funding for education and awareness activities? What aspects of the project might yield excellent communications material, if applicable?		
ADAPTIVE MANAGEMENT		
Changes in the environmental and development objectives of the project during implementation, why these changes were made and what was the approval process. Causes for adaptive management: a) original objectives were not sufficiently articulated; b) exogenous conditions changed, due to which a change in objectives was needed;		

c) project was restructured because original objectives were overambitious; d) project was restructured because of a lack of progress; e) Other (specify).		
How these changes were instigated and how these changes affected project results: - Did the project undergo significant changes as a result of recommendations from the MTR? Or as a result of other review procedures? Explain the process and implications. - If the changes were extensive, did they materially change the expected project outcomes? - Were the project changes articulated in writing and then considered and approved by the project steering committee?		
PROJECT RESULTS		
A 'result' is defined as a describable or measurable development change resulting from a cause-and-effect relationship. In GEF terms, results include direct project outputs, short- to medium-term outcomes, and longer-term impact including global environmental benefits, replication effects, and other local effects. Assess the results based management (RBM) chain, from inputs to activities, to outputs, outcomes and impacts.		
Assess the project results using indicators and relevant tracking tools		
BROADER ASPECTS OF PROJECT OUTCOMES		
Country Ownership		
Project concept had its origin within the national sectoral and development plans?		
Have Outcomes (or potential outcomes) from the project have been incorporated into the national sectoral and development plans? Has the government enacted legislation and/or developed policies and regulations in line with the project's objectives?		
Relevant country representatives (e.g., governmental official, civil society, etc.) were actively involved in project identification, planning and/or implementation, part of steering committee?		
Was an intergovernmental committee given responsibility to liaise with the project team, recognizing that more than one ministry should be involved?		
The recipient government has maintained financial commitment to the project?		
Mainstreaming (Broader Development and Gender)		
Whether broader development and gender issues had been taken into account in project design and implementation?		
In what way has the project contributed to greater consideration of gender aspects, (i.e. project team composition, gender-related aspects of environmental impacts, stakeholder outreach to women's groups, etc). If so, indicate how.		
Did the MTR recommend improvements to the logframe with SMART 'development' indicators, including sex-disaggregated indicators and indicators that capture development benefits? - Were these taken up?		
1. Whether it is possible to identify and define positive or negative effects of the project on local populations (e.g. income generation/ job creation, improved natural resource management arrangements with local groups, improvement in policy frameworks for resource allocation and distribution, regeneration of natural resources for long term sustainability).		
2. If the project objectives conform to agreed priorities in the UNDP country programme document (CPD) and country programme action plan (CPAP).		
3. Whether there is evidence that the project outcomes have contributed to better preparations to cope with natural disasters.		
The mainstreaming assessment should take note of the points of convergence between UNDP environment-related and other development programming.		
Sustainability		
Risk Management		
Are the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module the most important? And, are the risk ratings applied appropriate and up to date? If not, explain why.		
Financial Risks to Sustainability (of the project outcomes)		
What is the likelihood of financial and economic resources not being available once the GEF assistance ends? (This might include funding through government - in the form of direct subsidies, or tax incentives, it may involve support from other donors, and also the private sector. The analysis could also point to macroeconomic factors.)		
What opportunities for financial sustainability exist?		
What additional factors are needed to create an enabling environment for continued financing?		
Has there been the establishment of financial and economic instruments and mechanisms to ensure the ongoing flow of benefits once the GEF assistance ends (i.e. from the public and private sectors, income generating activities, and market transformations to promote the project's objectives)?		

Socio-Economic Risks to Sustainability:		
Are there social or political risks that may threaten the sustainability of project outcomes?		
What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow?		
Is there sufficient public/ stakeholder awareness in support of the project's long-term objectives?		
Have lessons learned been documented by the Project Team on a continual basis?		
Are the project's successful aspects being transferred to appropriate parties, potential future beneficiaries, and others who could learn from the project and potentially replicate and/or scale it in the future?		
Institutional Framework and Governance Risks to Sustainability:		
Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize project benefits?		
Has the project put in place frameworks, policies, governance structures and processes that will create mechanisms for accountability, transparency, and technical knowledge transfer after the project's closure?		
How has the project developed appropriate institutional capacity (systems, structures, staff, expertise, etc.) that will be self-sufficient after the project closure date?		
How has the project identified and involved champions (i.e. individuals in government and civil society) who can promote sustainability of project outcomes?		
Has the project achieved stakeholders' (including government stakeholders') consensus regarding courses of action on project activities after the project's closure date?		
Does the project leadership have the ability to respond to future institutional and governance changes (i.e. foreseeable changes to local or national political leadership)? Can the project strategies effectively be incorporated/mainstreamed into future planning?		
Environmental Risks to Sustainability:		
Are there environmental factors that could undermine and reverse the project's outcomes and results, including factors that have been identified by project stakeholders? E.g. climate change risk to biodiversity		
Impact - Progress towards the achievement of impacts		
Verifiable improvements in ecological status (or via process indicators to show it is likely in the future)? Verifiable reductions in stress on ecological systems (via process indicators)? E.g. as a result of the project, there have been regulatory and policy changes at regional, national and/or local levels? (Use tracking tools and indications from baseline to target)		
Identify the mechanisms at work (i.e. the causal links to project outputs and outcomes);		
Assess the extent to which changes are taking place at scales commensurate to natural system boundaries; and		
Assess the likely permanence (long lasting nature) of the impacts.		
On the basis of the outcome and sustainability analyses, identify key missing elements as that are likely to obstruct further progress.		
Theory of Change – Identify project intended impacts – verify logic – analyse project outcome to impact pathway		
Based on the theory of change (building blocks, catalysts etc), has the progress towards impact has been significant, minimal or negligible.		
Catalytic role		
Scaling up - Approaches developed through the project are taken up on a regional / national scale, becoming widely accepted, and perhaps legally required		
Replication - Activities, demonstrations, and/or techniques are repeated within or outside the project, nationally or internationally		
Demonstration - Steps have been taken to catalyze the public good, for instance through the development of demonstration sites, successful information dissemination and training		
Producing a public good – (a) Development of new technologies and approaches. (b) No significant actions were taken to build on this achievement, so the catalytic effect is left to 'market forces'		

Annex 14: Signed UNDP Code of Conduct Agreement Form

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and: respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/ or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultants: May Nwe Soe, Richard Sobey

We confirm that we have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed February 2019

Signed February 2019



May Nwe Soe



National Consultant / Team Specialist



Richard Sobey

International Consultant, Team Leader

Annex 15: Signed TE Final Report Clearance Form

Terminal Evaluation Report Reviewed and Cleared By:	
Commissioning Unit	
Name: PETER BATCHelor	
Signature: 	Date: 5/7/19
UNDP-GEF Regional Technical Advisor	
Name: Yusuke Taishi	
Signature: 	Date: 9/7/19

Annex 16: Terms of Reference

TERMS OF REFERENCE FOR TERMINAL EVALUATION

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

BASIC INFORMATION	Location:	Yangon, Nay Pyi Taw and Patheingyi, Mandalay
Application Deadline:		21 Jan 2019
Type of Contract:		Individual Contract
Post Level:		International Evaluation Consultant (Team Leader)
Languages Required:		English
Starting Date: (date when the selected candidate is expected to start)		01 Mar 2019
Duration of Initial Contract:		01 Mar 2019 – 30 April 2019
Expected Duration of Assignment:		40 Days

BACKGROUND

In accordance with UNDP and Adaptation Fund (AF) M&E policies and procedures, all regular UNDP supported AF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the *Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar* (PIMS# 4703)

UNDP Myanmar, with funding from Adaptation Fund is currently implementing a Climate Change Adaptation project - "Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar." The project aims to reduce the increasing impacts of climate change on agricultural and livestock production cycles in the dry zone of Myanmar - the impacts of increasing temperature and evaporation, declining water availability, and intensifying weather events especially flash floods and cyclones.

The Dry Zone is one of the most climate sensitive and natural resource poor regions in Myanmar. The dry zone covers approximately 54,390 square kilometers and represents about 10% of the country's total land area. The present population in the Dry Zone is estimated at 18 million people. It constitutes 34% of the country's total population of about 53 million. The population density is 123 people per square kilometer, making it the third most densely populated region in Myanmar.

Across the Dry Zone, water is scarce, vegetation cover is thin, and soil is degraded due to severe erosion. The region is characterized by low annual rainfall that ranges between 508 and 1,016 mm per annum with high variability and uneven distribution. The monsoon rain is bimodal with a dry period during July when dry desiccating winds blow from the south. The undulating land, composed mainly of sandy loam with low fertility, is subjected to severe erosion under rain and strong winds. The average mean temperature in the Dry Zone is about 27° C and the temperature often rises to about 43° C in the summer period. This dry environment with its other natural limiting factors has led to conditions of growing food insecurity and severe environmental degradation.

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

The project operates 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. The townships were selected on the basis of observed temperature extremes, frequency of drought per year, and the impacts of climatic parameters on food security. An additional criterion for township selection was the potential to access ground and surface water resources – vital prerequisites for small irrigation and water management schemes. The direct beneficiaries of the project are marginal farmers in rain-fed areas and landless workers whose access to arable land is severely threatened by erosion and land degradation. Special emphasis is placed on women and female-headed households within this vulnerable group.

The project targets approximately 50,000 households from 280 villages. The target populations are largely categorized into the following three types of beneficiaries: First group is landless farmers, who make up about 60% of target population; second group is marginal/small farmers whose landholding is less than 2.5 hectares and they make up about 25% of target population; and the third group is farmers who have landholding larger than 2.5 hectares. Absence of community water infrastructure for both domestic and agricultural purposes is a critical constraint in

building the resilience of these communities to future climate change impact. This project aims to deliver the following key outputs to build community resilience to climate change:

1. Enhancing water capture and storage capacities in 280 villages to augment irrigation and domestic water supply during the dry periods
2. Protecting and rehabilitating 6,141 hectares of micro-watersheds through Farmer-Managed Natural Regeneration (FMNR) to increase natural water retention and reduce erosion
3. Establishing 3,983 hectares of community-based agro-forestry plots in private and communal lands to conserve soil and water
4. Introducing drought-resilient farming methods
5. Introducing resilient post-harvest processing and storage systems
6. Introducing diversified livestock production systems targeting landless households
7. Develop climate hazard maps and risk scenarios in each township to support community-based climate risk management and preparedness planning
8. Strengthen local level climate and disaster risk management framework for timely and effective communication of climate risk and early warning information.

At the national level, the Project is supported by a Project Steering Committee (PSC). The PSC oversees and keep abreast of project progress and facilitate the implementation of the project in partnership with co-financing institutions. Implementation of the project and allocation of resources is the responsibility of UNDP - as the executing agency under the overall direction of the PSC. The PSC is chaired by the Country Director of UNDP and the Director General of Dry Zone Greening Department (DZGD). The DZGD is also the principle counterpart agency for the project. Other members of the PSC include representatives from Environmental Conservation Department, Irrigation and Water Utilization Management Department, Department of Meteorology and Hydrology, Department of Agriculture, Relief and Resettlement Department, Livestock Breeding and Veterinary Department, Watershed Management Section, Forest Department, Department of Rural Development and Foreign Economic Relations Department. To assist the Project Team on technical questions, a Technical Advisory Group (TAG) has been constituted. The TAG provides guidance and advice on technical questions related to water management, agriculture, forestry, food security and risk information/communication. The main objective of the TAG is to identify technical strengths and weaknesses of the project, take stock of available and required technical know-how under different project components, and provide technical backstopping and quality control throughout the project period. The TAG includes representatives from Dry Zone Greening Department, Environmental Conservation Department, Irrigation and Water Utilization Management Department, Department of Meteorology and Hydrology, Department of Agriculture, Relief and Resettlement Department, Livestock Breeding and Veterinary Department, Watershed Management Section of Forest Department and Department of Rural Development.

A project team, which is housed in the Dry Zone Greening Department offices in Patheingyi and Nyaung U, comprises of the following personnel – National Project Manager, Technical Specialist (International), Soil Conservation and Water Harvesting Specialist (Nyaung U-based), Agricultural Specialist, Environmental Conservation and Forestry Specialist (Nyaung U-based), Livestock Specialist, Monitoring and Evaluation Officer, Project Assistant and a Project Driver.

Under the overall guidance of PSC and TAG, the Project Team is responsible for the day-to-day management and implementation, oversight, reporting and monitoring of project activities.

The essentials of the project to be evaluated are as follows:

Project Title: *Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar*

AF Project ID: 4703

UNDP Project ID: 00089618

Executing Agency: UNDP

Other Partners involved: *Government of Myanmar, INGO, NGO/CSO, FAO, UNOPS, UNHABITAT*

AF financing at endorsement (Million US\$): 7,289,425

Total co-financing financing at endorsement (Million US\$): *UNDP (624,998), Government of Myanmar- In Kind (554,181)*

ProDoc Signature (date project began): 17 February 2015

(Operational) Closing Date (proposed): 30 June 2019

OBJECTIVE AND SCOPE:

The project was designed to reduce the vulnerability of households in Myanmar's Dry Zone to increasing drought and rainfall variability and enhance the capacity of households 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 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 the increasingly recurring incidents of drought through an improved water management, crop and livestock adaptation programme in five of the most vulnerable townships of Myanmar’s Dry Zone. The programme is based on principles of local empowerment and implemented by community-based organizations (CBOs) such as Village Development Committees, Water User Committees, farmer groups, communal forest user groups, and local Non-Governmental Organizations (NGOs). Programme components relate to three main Outcomes and composed of lower-level Outputs to achieve them. The three main Outcomes are as follows:

- Continuous fresh water availability is ensured during the dry seasons in 280 villages in the Dry Zone
- Climate Resilient agricultural and livestock practices enhanced in Myanmar’s Dry Zone
- Timeliness and quality of climate risk information disseminated to Dry Zone households enhanced through use of short-term weather forecasts, medium-term seasonal forecasts, and longer-term climate scenario planning

The Terminal evaluation will be conducted in the Dry Zone of Myanmar – covering the 5 project townships of Shwebo and Monywa under Sagaing Region; Myingyan and Nyaung U under Mandalay Region and Chauk under Magwe Region.

The Terminal evaluation (TE) will be conducted according to the guidance, rules and procedures reflected in the ‘UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects’ (2012), henceforth referred to as ‘TE Guidance’. This is a mandatory evaluation as per initial agreement in the project document. The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming. The primary audience of the evaluation will be the Government of Myanmar, Adaptation Fund and UNDP. The secondary audience of the evaluation will be project beneficiaries, implementing partners and other development partners active in the Dry Zone of Myanmar. This independent Terminal Evaluation will take place three months prior to the final PSC meeting and 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); will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals; and will also include an independent review of project implementation arrangements and their efficacy.

EVALUATION APPROACH AND METHOD:

The evaluator is expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact**, as defined and explained in the TE Guidance. A set of questions covering each of these criteria will be provided to the selected evaluator (see Annex E). The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report. The evaluation must provide evidence-based information that is credible, reliable and useful, as well as provide a complete, fair and unbiased assessment through analysis of available data and information and facts on the ground. This should be done through application of various methods, including collection of additional qualitative and quantitative data and information. The evaluation will also consider the recommendations of the Mid-Term evaluation and assess progress made in addressing the management responses and the final outcome of the recommendations. In addition, the evaluation will also review the results of the project impact assessment survey, which is currently underway. The Impact Assessment Survey will provide evidence-based qualitative and quantitative data and information and inform the terminal evaluation in a significant manner – especially in terms of achievements of overall targets of the project.

The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the AF operational focal point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders.

DUTIES AND RESPONSIBILITIES

The evaluator is expected to conduct a field mission to Patheingyi Mandalay, including the following project sites – Shwebo, Monywa under Sagaing Region, Myingyan and Nyaung U under Mandalay Region and Chauk under Magwe Region. The evaluator will observe project activities in the field and interview project beneficiaries and implementing partners on the ground - to assess the extent of project impacts/results and identify remaining gaps and challenges and recommend actions for future programming, as appropriate. Interviews will be held with the following stakeholders and individuals at a minimum: Dry Zone Greening Department, Environmental Conservation Department, Forest Department, Department of Rural Development, Irrigation and Water Utilization Management Department, Department of Agriculture, Livestock Breeding and Veterinary Department, Department of Meteorology and Hydrology, Department of Disaster Management, and Foreign Economic Relations Department; Implementing

partners, key experts and consultants in the subject area, Project Steering Committee members, project stakeholders, academia, local government and CSOs, etc. The evaluator will review all relevant sources of information, such as the project document, project reports – including Annual PPRs, project budget revisions, midterm evaluation, progress reports, AF tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluator for review is included in **Annex A** of this Terms of Reference.

