FOLLOW UP SURVEY REPORT OF PONDS RENOVATED IN 2017

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

PREPARED IN MAY 2018

INTRODUCTION

Dry Zone farmers have limited access to physical water infrastructure that is required to maintain resilient rural livelihoods in a changing climate. Increasing the water storage capacity of soils, improving the management of potable water, and introducing more efficient/alternative irrigation techniques and practices are recognized as key measures to increase the adaptive capacity and resilience of rural farming systems (Goedhart, 2010): Rainwater storage systems can reduce water extraction of over-stretched groundwater aquifers during dry periods, and thereby provide buffer capacities in times of extreme need. Communal ponds can be established or re-dredged to remove sand and silt and prepare for forthcoming rains and those ponds are multipurpose conservation structures which store water for livestock and recharge the groundwater. They are constructed by excavating a depression, forming a small reservoir or by constructing an embankment in a natural ravine or gully to form an impounded type of reservoir.

UNDP Myanmar, with funding from Adaptation Fund, is implementing the climate change adaptation project "**Addressing Climate Change Risks on Water Resources and Food Security in the Dry Zone of Myanmar**" in 5 townships of the Dry Zone. The objective of the project is **"to reduce the vulnerability of farmers in Myanmar's Dry Zone to increasing drought and rainfall variability, and enhance the capacity of farmers to plan for and respond to future impacts of Climate Change on food security". The** Project has 3 components with relevant outcomes where Outcome 1 is **"Continuous freshwater availability is ensured during the dry seasons in 280 villages in the Dry Zone".** One of the outputs under outcome 1 is **"Water capture and storage capacities in 280 villages enhanced to increase availability of irrigation and potable water supply during dry periods."** One of the outputs under outcome 1 deals with renovation of water retention ponds (output1.1). The costing and number of ponds rehabilitation were undertaken during the project formulation stage and adjusting the number of ponds from 150 to 100 have been proposed prior to implementation but the project team was suggested to stick to the original targets where project assistance per pond could afford of no more than earthwork excavation 10,000 cubic feet by volume of silt removal.

BACKGROUND

In order to implement pond renovation activities, a local Non-Governmental Organizations - Farm Business Development technical group was recruited to promote and disseminate appropriate technologies and practices on soil and water conservation along with practical demonstration and capacity building to counter the negative effects of climate change within 24 months, Aug 2016 – Aug 2018. As part of the services, the institution has accomplished renovation and rehabilitation of 75 pounds in 2017 as per the terms of reference.

During the last quarter of 2017, an independent mid-term evaluation was undertaken to assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document, and assess early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. After that, the evaluation had provided some recommendations to guide the second half of the project implementation as per following:

- More flexibility should be permitted to adjust locations, targets and methods for afforestation, agroforestry, soil and water conservation and pond renovation where appropriate to achieve specific objectives at project sites and ensure cost-effective, sustainable investments, even if overall project output targets need to be reduced.
- The project should review the pond restoration projects completed to date to identify lessons from the current 75 projects that can improve results for the next phase of projects, and where feasible, to expand the approach from community ponds to rehabilitation of community water supply catchment areas.
- Where opportunities exist, the project should concentrate afforestation, agroforestry, soil and water conservation and related micro-watershed rehabilitation activities in common areas, preferably in conjunction with community pond rehabilitation, to provide examples of the combined effects of these climate change adaptation measures on a landscape and community level.

- There are three possible strategies for extending pond water storage: expand pond capacity, expand catchment area inputs through diversions, and increase water yield and groundwater infiltration through intensive watershed soil and water conservation measures.
- Many of the ponds have limited catchment areas and storage capacity expansion does not often ensure much or any water availability during the dry season. Some of the ponds visited did not have water in early December. It was also noted that watershed management improvements, which can significantly improve water yield and conservation from the catchment area, are not a direct part of most of the pond renovation projects due to budget and land constraints.
- Some of the ponds seem to have high rates of seepage, and some local people have moved water from the pond to concrete tanks at their homes before the pond dries up in October.
- Planting around pond boundaries is proposed but was not observed, although this is now being emphasized with the IPs.
- There are some good examples in the project villages of effective water user groups that can be used to model best practices for other communities. While many such groups have been established at the 75 ponds constructed, their operational status and effectiveness are not well known.
- A follow-up survey of the results of a representative sample of the completed pond renovations in terms of increased water availability in the dry season would assist in refining the approach for the next phase. This brief review of the current projects could also identify opportunities for additional watershed interventions to increase water yield from the community water supply catchment areas.
- Many of the expanded ponds do not provide water to last through to the Feb-June dry period. The pond renovation activities have small budgets spread across 150 sites which limits catchment area improvements.
- The technical standards and cost norms for physical work such as tree plantation and community ponds are much lower than for similar government work because the budget is stretched to reach prescribed targets. The result is some physical works have slightly lower quality or incomplete results (plantation, pond rehabilitation) in the face of budget pressures and targets.

OBJECTIVES

To review the pond restoration/renovation works completed to date so as to identify lessons from the current 75 renovated ponds that can improve results for the next phase of pond renovation works and to assess changes in water availability during the dry season.

METHODOLOGY

Referring to the project result framework, a questionnaire for field survey was developed by the Soil Conservation and Water Harvesting Specialist and M&E Officer *(Annex1).* After that follow up survey was conducted by the project staff together with IP (FBD) staff and township level government staff from Department of Rural Development.

The field survey took place from 24 January 2018 to 2 March 2018 and the staff visited all 75 renovated ponds which were completed in 2017. There are 15 ponds renovated in each of the 5 project townships and the survey team took 10 days in total to conduct the assessment and interview villagers and visit the ponds (8 ponds in a day). In addition, observations and comments from the IP (FBD) staff and DRD staff were taken on-board at the end of the assessment in order to verify the responses. The findings were discussed and presented at the 10th TAG meeting.

FINDINGS

Water Availability

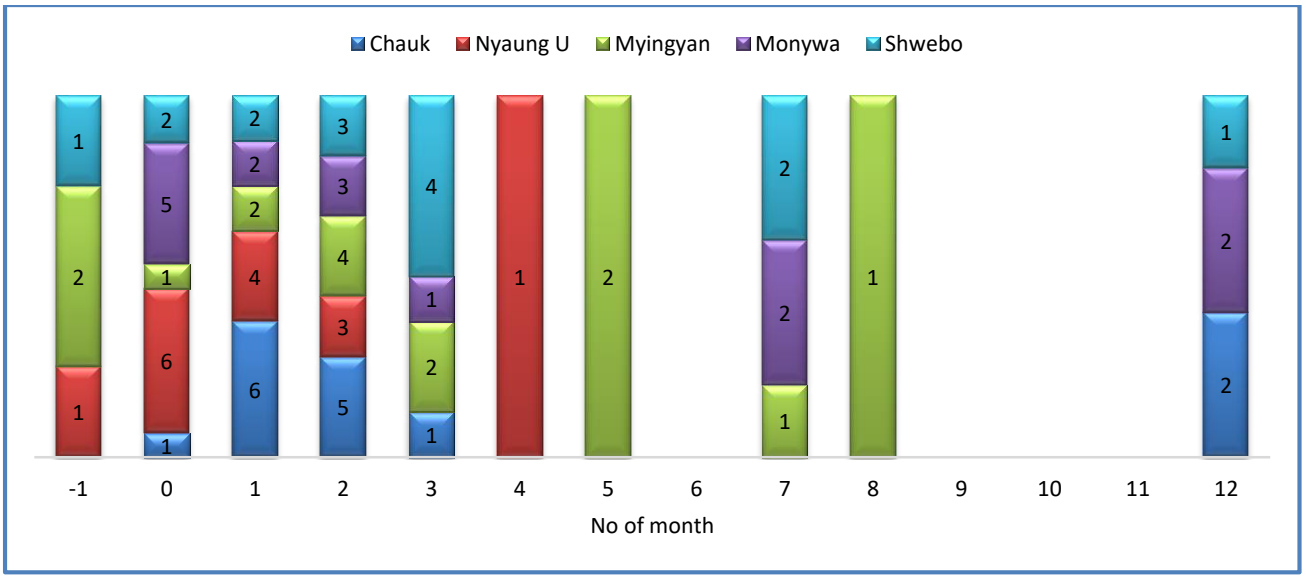
64% of renovated ponds (48 out of 75 ponds) still have water on the day the team assessed, which was between late January and early March. In Monywa, all renovated ponds still had water during the visit, followed by Shwebo, where 12 ponds had water. Most of the ponds in Nyaung U and Myingyan had no water, which is over 60% of renovated ponds. (Table-1)

Table – 1: Water Availability on the day of assessment

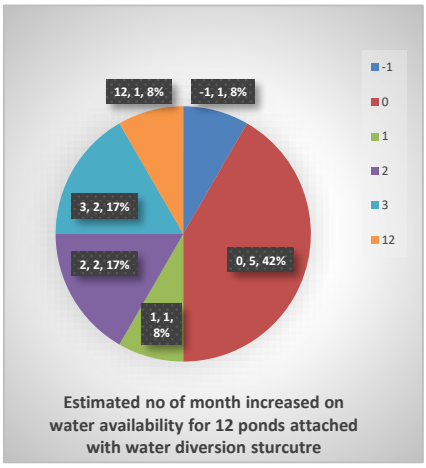
Water availability	No of Villages					
	Chauk	Nyaung U	Myingyan	Monywa	Shwebo	Total
Yes	67%	33%	40%	100%	80%	64%
	10	5	6	15	12	48
No	33%	67%	60%	0%	20%	36%
	5	10	9	0	3	27
Total	100%	100%	100%	100%	100%	100%
	15	15	15	15	15	75

Water storage capacity of each of the 75 ponds had been enhanced by 100 cft through the renovation process. However, to estimate whether the renovated ponds had increased availability of water, the villages which still had water on the day of assessment were asked how much longer water would last in the pond, and for the villages which had no water left during the assessment were asked when they had last seen water in the ponds. Then the number of additional month(s) during which water was available were compared with the latest month of water availability in the previous years. Figure-1 describe how many months renovated ponds had increased water availability (before and after renovation works): 4 ponds had exhausted water earlier than previous year but it was observed that the community were able to use more volume of water than before; there is no differences for 15 ponds where 6 ponds already had water for the whole year mostly in Nyaung U and Monywa; 16 ponds had increased water availability by one more month than before and 18 ponds had increased water availability by 2 more months; there were no water in 5 ponds in the previous year but those are now estimated to receive water for 7 more months; 5 ponds had usually exhausted water by the first quarter in previous year, but those are now expected to receive water throughout the year. Apart from that, uneven distribution of rain in the Dry Zone is also a major factor that affect water storage in the ponds.

Figure – 1: Estimated no of month increased on water availability (based on before and after renovation works)



The project also constructed/renovated 44 run off/flush water diversion structures where runoff water from upper catchment or existing natural waterway is collected and diverted into the ponds. Out of the 75 renovated ponds, 12 ponds had water diversion structures renovated by the project and 11 ponds had water on the day of assessment - except for one pond in Gway Cho village, Myingyan Township where the water had been used for the new pond constructed by Department of Rural Development which is next to the existing pond. Based on the interview results on ponds attached with water diversion canal, one pond will get water for the whole year, 5 ponds will have increased usage of water for 1 to 3 months and another 5 ponds will store water similarly as previous year as most of those ponds had already access to water for the whole year. In addition, it was observed that more water had been harvested through the water diversion system to the ponds.



Estimated no of month increased on water availability for 12 ponds attached with water diversion sturcutre

Gway Cho village, Myingyan Township
Water diversion system leading to new pond

Nyaung Pin Thar village, Monywa Township
Water diversion system leading to renovated pond

Utility of Water

Most of the ponds were for multi-purpose use. Chauk and Nyaung U had ponds with the maximum multi-purpose use. 34 pond (45%) were used for livestock, especially in Myingyan and Shwebo. Water use for agriculture purpose were found mostly in Monywa and Shwebo (Table-2)

Table – 2: Utility of the Water Retention Pond

Utility of the Water Retention Pond	No. of villages					
	Chauk	Nyaung U	Myingyan	Monywa	Shwebo	Total
Drinking	3	3	0	3	0	9
Drinking + Domestic use	0	2	0	1	1	4
Livestock	1	1	4	1	2	9
Livestock + Domestic use	1	0	8	0	4	13
Livestock + Agriculture	0	0	1	5	6	12
Multi-purpose	10	9	2	5	2	28
Total	15	15	15	15	15	75

On an average, 20% of renovated pond are situated where catchment areas are available, but several ponds are surrounded by farm land - which means there is no catchment area for water capture. In addition, most ponds do not have enough area available for watershed interventions. For some ponds where watershed management principle could have been applied, the ponds are far from villages and are mainly used for livestock. As shown in figure 1, 4 ponds had already exhausted water faster than previous years (shown by -1) even though there was more water available than the previous years. Most of these villages (except for Gway Cho village, Myingyan Township) did not have proper management and usage of water, and therefore water had been exhausted faster compared to the previous years.

Management and Maintenance

As pond renovation works are executed on existing ponds and as afforestation and watershed management activities are implemented based on availability of land, there is limitation in adjusting location of ponds to benefit from the watershed and afforestation activities under the project.

Some pond embankments were not stabilized enough and therefore the possibility of banks collapsing. For instance, the pond at Seik Kone Village, Myingyan Township was destroyed by a recent flood – despite it having withstood flood for the last 50 years. The mouth of few ponds had silted and therefore were not able to retain water. Some ponds could not retain water longer as the subsoil had coarse structure and lacked impermeable layer to prevent seepage. Only one pond in Kan Gyi Taw Village, Shwebo Township had become salty because of the salinity of the soil. A few ponds had been filled with rapidly growing water hyacinth and these are mostly in ponds where water is available for the whole year.

Seik Kone Village, Myingyan Township
Renovated pond destroyed by a recent flood

Kan Gyi Taw Village, Shwebo Township
High salinity and sediments in the renovated pond

Almost 15% of the villages had responded that they have no regular maintenance system but most of them are planning to do this in future. 66% of villages were maintaining the ponds regularly and voluntary for spillway improvement and siltation prevention. The villages who used water by installing piping system had collected user fees based on water usage and was used for operations and maintenance. It is observed that the more villages rely on pond water, the more effort for maintenance. If villages have other options for accessing water, attention to maintain was not noticed.

Many villages still need to address demand for water for livestock use. If there was only one water source they had to share water for livestock use, and as a result consumption per day was significantly higher.

RECOMMENDATIONS

- Assistance for water diversion structure, if needed and wherever feasible, should be considered along with assistance for renovation of village ponds.
- If the subsoil has coarse structure, and lacks impermeable layer, the water retention capacity of the pond is minimum. The ability of ponds to retain water should be an important factor in prioritizing ponds for renovation. However, if there is strong willingness from community to cover cost of concreting and masonry works for walling and flooring, then renovation of such ponds is recommended. However, a huge amount of budget would be required for this.
- Pond embankments filled by excavated earth should be stabilized properly to avoid collapse.
- Budget allocation of remaining ponds to renovated in 2018 should be increased by adjusting budget for other ponds as much as possible.
- Wherever feasible, pond boundary plantation should be done by cooperating with forestry sector under the project through consultation with the community.
- Project staff should place more emphasis on monitoring of pond renovation implementation and relevant department should also be consulted, in this regard. Specification and check list should be used *(Annex 3)*.
- Before and after photo evidence of renovation works should be maintained and if possible, a GIS map showing locations of renovated points should be recorded.
- Maintenance and prevention system such as spillway improvement, siltation prevention and expansion of catchment areas if possible should be put in place through community contribution. In addition, water user groups should be strengthened to ensure sustainability.
- Proper assessment and designs should be considered based on the context and locations before implementation for the future work.

Annexes: -

Annex 1

Questionnaires for monitoring on effectiveness: post implementation of pond renovation

Township				Date of visit	
Village Tract				Interviewer	
Village				Interviewees	Contact
Completed in M/Y					
Village's	HH	M	F		
				Other earth pond of this village	
General Information					
Village Adm./Leader					
Name					
Ph. No.					
Utility of this pond (renovated in 2017 by UNDP/FBD)				**Utility** (Drink/ Cook/ Wash/ Livestock consu.)	
Other villages' names;-					
				Agriculture use?	
				# of Farmers	
				# of acres	
				Crop	
Is water available now in the pond?					Field Survey
Yes		No		Yes	No
Soil _ Floor, Side (water holding/ retention)					
If "No", water availability till which month (in this year)?					
If "Yes", water availability till which month (expected)?					
Water availability till which month: Last year and before this year?					
Where is water **catchment area**?				Estimated acre	
Land utility of catchment (house, farm, forest, waste, fallow, …)?					
Water diversion structure					
Is there any water diversion structure implemented by UNDP/FBD?					
Is there any water diversion structure implemented by the village?					
Is there any opportunity to do water diversion (landscape availability)?					
Maintenance Mechanism					
Is there any maintenance practices? (by labor or cash)					

Annex 2

Notes on pond renovation

Annex 3

Specification for Pond Rehabilitation (for # 60 in 2018)

Criteria	Specifications
Earthwork excavation/ stonework	• 14,000 cu. feet earth work excavation OR stone work by double price of earthwork i.e. if need/feasible to improve spillway under budget OR earth/stone work for solving of piping problem of existing embankment OR earth/stone work for siltation prevention OR any other applied measures to repair as required
Pond Bank stability OR Utility of earthwork filling	• Embankment strengthen enough to hold stored water OR excavated earthwork filling at required place if need more for community benefit

Check List (meant for monitoring of input, process, and output);-

Sr.	What to check	How	How to check
1	Earthwork volume excavated and/or stone work built	Whether it is 140 sud. volume of earthwork excavated (if there is not included stone work) or not. (If applied all by stone work, its volume will be half.)	Measure the dimensions (Length, Width, and Depth) of excavated places, calculate the volume for each place & sum those volumes
2	Embankment or earthwork filled or stone work built	- Is the filled embankment possible to collapse back into the pond or not OR - Is the pond bank stabilized enough to hold stored water OR - Is the earthwork excavated filled at required place if need more for community benefit	See where the excavated earth is thrown and filled and/or stone work built
3	Spillway Level	If there is enough height of freeboard above the floor of spillway or not	Consider catchment, run-on area, freeboard height, effective cross-sectional area of spillway (to see with by trained person SWC activist or resource person from DRD)
4	Maintenance	If there is a plan to maintain by relevant committee or not	Yes/No
5	Community contribution	Labor or other	Yes/No. If yes, how much by what?
6	Record of evidence	Photo images	Take photos _ Before/ During/ After