Climate Smart Rice Project

Baseline Study

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Executive Summary

The Climate Smart Rice (CSR) Project aims to support the Government of Myanmar, the agri-business sector and smallholder rice farmers to stimulate sustainable transformation of the rice sector. The primary approach used is known as "Push-Pull-Policy" with the following specific objectives: **Outcome A:** Rice based resilient farming systems widely adopted, leading to improved farmers livelihoods (Pull); **Outcome B:** Certified export and sustainable domestic rice value chains established and functioning (Push); and **Outcome C:** Policy and regulatory framework strengthened to support the national rice sector development strategy (Policy).

A consortium of partners is implementing the project in three diverse locations: Dry zone (Mandalay Region); Uplands (Southern Shan State); and the Coastal area (Mon State and Bago Region) and commissioned EMPOWER Consultancy Limited to undertake a baseline study with the following specific objectives.

1. To identify the current status of rice production and marketing in project areas (representing the Push and Pull components) as per the project log-frame indicators;
2. To collect and analyze quantitative data through household surveys and interviews as guided in the baseline manual provided by the project (quality of rice, water usage etc.);
3. To point out the challenging factors faced by the rice value chain actors; and
4. To analyze existing policy dialogues relevant to project's focus

A cross sectional study design was applied to guide the entire baseline study and correspondingly, a sequential mixed method was employed. A structured survey using a face-to-face interview method by trained interviewees collected quantitative data from 151 rice farmers in 9 intervention villages and 151 rice farmers from 9 control villages in 9 townships. Qualitative data collection using Focus Group Discussions (FGD) and Key Informant Interviews (KII) were employed. A total of four FGDs with 24 rice farmers and a total of 24 KIIs with 10 rice millers (7 also traders), 3 rice traders, 3 Village General Administrative Officers (VGAD) and 5 officials from Township Department of Agriculture (DoA) and Township Departments of Irrigation (DOI) from Kawa, Belin and Nyaungshwe and Kyaukse Townships were organized. In addition, one KII each with 2 professors from Advanced Centre for Agriculture Research and Education (ACARE) of Yezin Agriculture University (YAU), one staff from Department of Agricultural Research (DAR), one staff from Myanmar Rice and Paddy Traders Association (MRPTA) and one staff from Myanmar Paddy Producers' Association (MPPA) were undertaken.

The key findings of the baseline survey regarding the project's log-frame indicators are summarized in the table below.

Overall objective - Improve rice value chains through climate smart and resource-efficient practices for rural economic development	
Indicator 1.1: Gross margin of rice production increased by 20%	
Intervention Villages	Control Villages
• Average Gross Margin (GM) is 334,127 MMK per hectare and Mean Gross Margin percentage (GMP) is 12. • Average GM for monsoon season rice is 419,595 MMK per hectare and average GMP is 16. • Average GM for dry season rice is 227,291 MMK per hectare and average GMP is 6.	• Average GM is 218,773 MMK per hectare and average GMP is 6. • Average GM for monsoon season rice is 424,096 MMK per hectare and average GMP is 17. • Average GM for dry season rice is minus 37,880 MMK and average GMP is minus 7.
Indicator 1.2: Water use efficiency increased by 20%	
DAR conducted a research in 2012-13 dry season and 2013-14 monsoon season to identify the rice variety that gives better yield with minimal use of water. 41 varieties were tested using Continuous Flooding (CF) and Alternate Wetting and Drying (AWD) irrigation methods. Average Water Use Efficiency (WUE) of AWD was 0.61 g/l and CF were 0.51 g/l (DAR, 2014).	
Indicator 1.3: GHG emissions reduced by 15%	
Methane (CH4) emission from rice cultivation in 2000 was estimated at 507.23 Gg CH4 per Year, of which irrigated rice contributed to 220.46 Gg CH4 per Year (43.46 %). Total NO2 emission from agricultural land in 2000 was estimated at 8.2 Gg NO2 per year, of which direct NO2 emissions and indirect NO2 emissions were 7.45 and 0.75 Gg NO2 per year respectively (MOECAF, 2012).	
Indicator 1.4: Establishment of 3 sustainable high value rice value chains	
No sustainable high value rice value chain has been established.	No sustainable high value rice value chain has been established.
Outcome A (Push): Resilient rice-based cropping systems widely adopted, leading to improved farmer	
Output A1: Agronomic practices of farmers improved through implementation of SRP and GLOBALGAP Standards **Indicator A1: Yields increase by 20% for participating farmers; 2,000 farmers SRP certified**	
Intervention Villages	Control Villages
• Average yield of monsoon paddy is 63 baskets per acre (3.1 MT/ha) and dry season paddy is 83 baskets per acre (4.1 MT/ha). • No rice farm is SRP certified between December 2016 and November 2019.	• Average yield of monsoon paddy is 69 baskets per acre (3.4 MT/ha) and dry season paddy is 80 baskets per acre (4.0 MT/ha). • No rice farm is SRP certified between December 2016 and November 2019.
Output A2: Farmers and farmer groups certified as SRP compliant **Indicator A2: 5'000 MT certified rice produced**	
Intervention Villages	Control Villages
No SRP Certified rice produced.	No SRP Certified rice produced.
Output A3: Water efficiency improved **Indicator A3: Water productivity increased by 20%**	
Intervention Villages	Control Villages
DAR conducted a research in 2012-13 dry season and 2013-14 monsoon season to identify the rice variety that gives better yield with minimal use of water. 41 varieties were tested using Continuous Flooding (CF) and Alternate Wetting and Drying (AWD) irrigation methods. Average Water Use Efficiency (WUE) of AWD was 0.61 g/l and CF were 0.51 g/l (DAR,	

2014).

Output A4: Access to finance and services improved
Indicator A4: 25% of participants take up crop financing and/or services

Intervention Villages	Control Villages
• 94.6 percent of farmers take cash credit. • 50.4 percent of farmers take credit for fertilizer. 5.4 percent farmers take credit for seeds and 1.6 percent of farmers take credit for insecticides, fungicides or herbicides. • 72.8 percent of farmers take service of combined harvester and 5.3 percent of farmers take service of threshing machine.	• 95.7 percent of farmers take cash credit. • 64.5 percent of farmers take credit for fertilizer. 5.1 percent of farmers take credit for seeds and 11.6 percent of farmers take credit for insecticides, fungicides or herbicides. • 76.2 percent of farmers take service of combined harvester and 1.3 percent of farmers take service of drying machines.

Output A5: Quality locally adapted seeds used by farmers
Indicator A5: 80% of participating farmers use improved varieties

Intervention Villages	Control Villages
76.8 % of farmers use certified seeds.	57.6 % of farmers use certified seeds.

Outcome B (Pull): Certified sustainable export and domestic rice value chains established and functioning

Output B1: Partnerships established between both domestic and international value chain actors to supply rice produced under the SRP Standard
Indicator B1: 5,000 MT rice produced in compliance with the SRP Standard; 2 contract farming schemes developed and operational

Intervention Villages	Control Villages
• A contract farming system has been operated by rice mills with support from the CSR project in Coastal region since the monsoon season of 2019, in which 35.8 percent of interviewed farmers participate.	• None of the farmers participates in contract farming system.

Output B2: Post-harvest processing (drying, storage, cleaning, transport, milling, varietal purity) upgraded through technical assistance, business planning and facilitated access to finance
Indicator B2: 10 mills upgrade their facilities or processes; individual entrepreneurs invest in new service provision

Baseline Status of Intervention Villages (There is no data for control villages)

Coastal region: In Kawa Township, there are two rice mills with capacity of 60 MT per day, two rice mills with capacity of 40 MT per day, five rice mills with capacity of 30 MT per day and 20 smaller rice mills (huller rice mills) with a capacity of 200 to 300 baskets (4 to 6 MT) per day. Two rice mills participating in the baseline study are currently upgrading some facilities such as installing color sorter machine and stoners.

In Belin Township, there are two rice mills with capacity of 60 MT per day, five rice mills with capacity of 40 MT per day and two rice mills with capacity of 25 MT per day. Two rice mills already assembled one color sorter and one stoner. 8 of 9 rice mills have a color sorter and all of 9 rice mills have a stoner.

Uplands: There are 19 large rice mills (one of 30 MT, twelve of 20 MT and six of 15 MT per day capacity) in Nyaungshwe Township. Only one rice mill with the capacity of 30 MT has a color sorter while all of 19 large rice mills have stoners and driers. The rice mill with 30 MT capacity has a larger capacity dryer whereas the remaining rice mills have a smaller capacity dryer.

Dry Zone: There are approximately 150 rice mills with capacity ranging from 100 to 18 MT

per day in Kyaukse Township. (1 to 2 percent has capacity higher than 50 MT; 25 percent has capacity of 20 to 50 MT and the remaining have the capacity lower than 20 MT). 10 rice mills have color sorter and 1 rice mill has a dryer. Three rice mills with the capacity of 20 MT that are interviewed have a stoner. These rice mills do not have color sorter, dryer, temperature-regulated silo for paddy, wet double polisher, packaging machine and need upgrading of electricity transformer.

Output B3: Options for crowding-in of new institutional partners created to leverage and de-risk commercial investment
Indicator B3: 5 international buyers interested to join and invest in the project.

Baseline Status of Intervention Villages (There is no data for control villages)

The study did not find the presence of international buyers, that purchase paddy, rice or other rice products directly from farmers or traders in the target villages of nine townships.

Outcome C (Policy): Policy and regulatory framework strengthened to incentivize wide-scale adoption of sustainable best practice packages

Output C1: Evidence-based policy recommendations developed to support wide-scale adoption of best practices throughout rice value chains
Indicator C1: At least 2 evidence-based policy amendments based on project recommendations

Baseline Status of Intervention Villages (There is no data for control villages)

A. Challenges faced by rice millers
A.1 Unable to export (licensing) rice and rice products directly
A.2 Lack of land title for rice millers to access credit from banks
A.3 Unable to access to large loan which require collaterals

B. Challenges faced by traders and rice millers
B.1 Inadequate access to finance for working capital (buy paddy from farmers on cash but selling milled rice on credit)

C. Challenges faced by traders and farmers
C.1 Higher cost of production due to poorer infrastructure
C.2 Limited access to dryer that reduces the quality of rice and income
C.3 Unreliable rainfall pattern and climatic conditions

Output C2: Water stewardship plans developed for defined geographical areas
Indicator C2: Water stewardship plans to cover at least 4'000 ha (2'000 smallholders

Baseline Status of Intervention Villages	Baseline Status of Control Villages
• 5.3 percent of farmers participate in water user group during December 2016 and November 2019.	• 3.3 percent of farmers participate in water user group during December 2016 and November 2019.

In light of the key findings from the study, the following recommendations are made.

1. The situation of each township is unique, and a detailed implementation plan should be drawn for each township to ensure that activities are tailored to the needs of rice value chain stakeholders in each township.

2. A Behavior Change Communication system (BCC) consisting of strategy, messages and channels to facilitate adoption of key behaviors following SPR Standard by farmers should be developed and implemented. Tailored BCC messages should be discussed with farmers repeatedly via mutually complementary channels such as Inter Personnel Communication (IPC) comprising peer and non-peer educators, resource persons and staff members, and

other channels such as videos, social media and on-site demonstration at model farms. Regular, consistent supervision and support should be rendered by staff members, resource persons and peer and non-peer educators to farmers to assess progresses against plans/targets, obstacles and solutions to enhance effectiveness. This system should set the target of adoption of intended behaviors by a critical mass of target populations, which is 70 percent of the target population. Obtaining this target will raise quality and yield of paddy, which will lead to increase in profit of all actors involved in a contract farming system.

3. A contract farming system should be set up and operated through organizing a series of consultation and negotiation meetings among farmers and rice millers to examine needs and challenges of all parties and formulate action plans accordingly. It is foreseen from the existing situation that this system should entail the following elements but not limited to: a. provision of quality seeds and quality fertilizers to farmers at an affordable price; b. technical support to farmers on cultivation, harvest and post-harvest methods; c. purchase of rice at a stable price based on quality; and d. redistribution of profit from value addition to production based on profit to participating farmers – offering certain percent of profit to farmers as add-ons for one unit of production. This system should be mutually beneficial in such a way that farmers can reduce cost of production and increase yield while earning stable, consistent income and profit over the long run. On the other hand, rice millers will get adequate supply of quality rice to ensure delivery of value-added products required by the domestic and international buyers.

4. Farmers should apply plant nutrients based on test results of soil tests. Clusters or zones should be defined for rice farms that are located in similar geographical areas. Samples of soil of each cluster should be tested and findings should be used to determine types and amount of plant nutrients for each rice farm in each cluster.

5. Farmers who have rice farms in one geographical area of each of target village should be mobilized to participate in land levelling initiative to make it more effective. Construction of bunds and water ways to take in and out water and roads should also be part of this plan. It will take considerable amount of time and efforts to reach agreements among farmers to contribute part of their rice farms for building bunds, water way and roads.

6. Drying paddy with an appropriate dryer within the defined period from harvesting in accord with the SRP guidelines should be undertaken to enhance quality of polished rice and minimize loss of polished rice. First, equipping rice mills with a dryer and improving transportation to carry paddy to rice mills as quickly as possible should be done. Capacity of dryers should be large enough to dry paddy at a peak period of harvest. Second, a hand-made dryer should be made available to farmers who cannot carry paddy to rice mills on time through implementing a pilot test and further scaling it up.

7. The national level data regarding Greenhouse Gas (GHG) emission indicator may not reflect the baseline status of each of nine target townships. Therefore, the project should carry out measurement of GHG emission in each target township. Each measurement should compare rice farms cultivated under SRP and traditional rice farms. Other variables that should be taken into consideration in computing sample size are soil type, rice variety,

water source and application of urea and animal dung. If variables are similar across each of 9 target townships, two plots of samples, one for traditional cultivation method and another for SRP, are needed. If farmers grow more than one variety of rice in one location, one or two varieties that majority of farmers grow should be selected for measuring GHG. GHG emissions should be measured for rainy season rice and dry season rice separately.