

ANNEX 12C: PROFILE OF MA SEIN CLIMATE SMART VILLAGE

International Institute of Rural Reconstruction;

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RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



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CLIMATE SMART VILLAGE PROFILE

Ma Sein Village

Bogale Township, Ayeyarwaddy Region



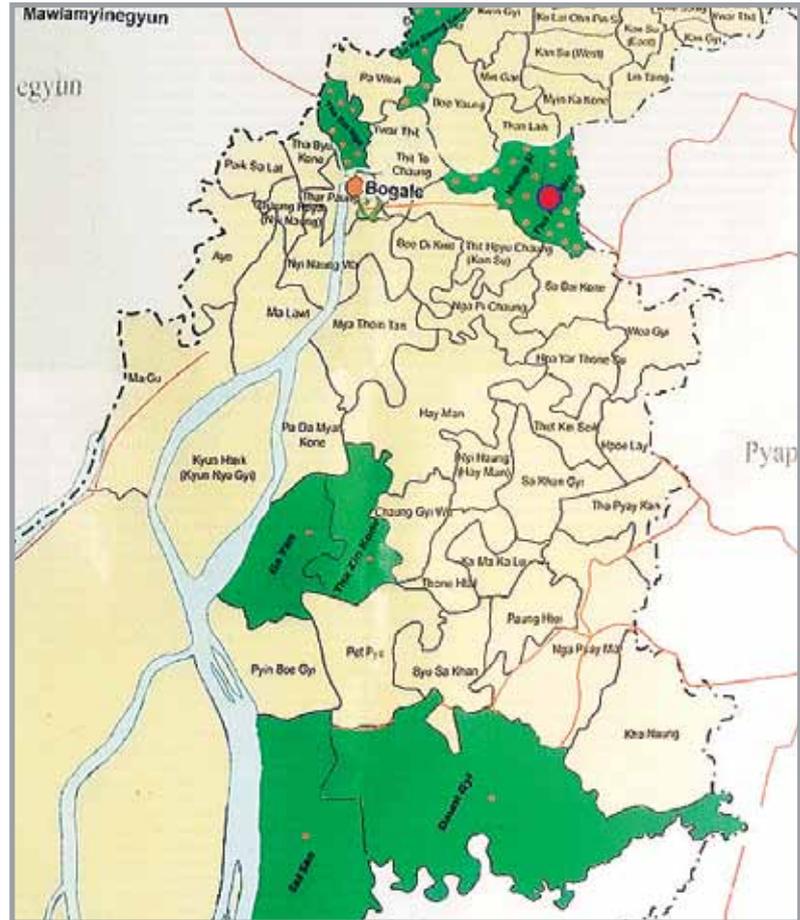
Introduction

Myanmar is the second largest country in Southeast Asia bordering Bangladesh, Thailand, China, India, and Laos. It has rich natural resources – arable land, forestry, minerals, natural gas, freshwater and marine resources, and is a leading source of gems and jade. A third of the country's total perimeter of 1,930 km (1,200 mi) is coastline that faces the Bay of Bengal and the Andaman Sea. The country's population is estimated to be at 60 million.

Agriculture is important to the economy of Myanmar, accounting for 36% of its economic output (UNDP 2011a), a majority of the country's employment (ADB 2011b), and 25%–30% of exports by value (WB–WDI 2012). With abundant land, water, and cheap labor, agriculture is a major driver of the Myanmar economy. However, only about 18% of the country's total land area of 68 million hectares is used for crop production and only 18.5% of this is irrigated. This leaves significant room for expansion in this sector.

Climate change is an established phenomenon in Myanmar, evidence shows an increasing temperature over time. Based on the country's experience, adverse impacts of climate change are increasing incidence of drought, flooding due to heavy rains, stronger cyclones, and salinization of farms in the delta region. As an agricultural country with a large percentage of smallholder farmers, Myanmar's food security, nutrition, and livelihoods are bound to be greatly affected by the threat of climate change. In 2016, the Myanmar government launched the Myanmar Climate Smart Agriculture Strategy to serve as the country's directions towards building resilience in agriculture. A key component of the strategy is the promotion and practice of community-based approaches achieving climate resilience in agriculture.

With support from IDRC and CGIAR global research program climate change, agriculture and food security (CAAFS), IIRR and its local NGO partners is implementing climate smart villages (CSV) to demonstrate community-based adaptation in agriculture in different agro-ecological zones in Myanmar. This document is the result of a desk research that IIRR commissioned to develop profiles of each CSV in the project. The purpose of this document is to provide the reader background information as to the agriculture, livelihoods, nutrition, gender and climate change context of each CSV.



Basic Village Profile of Ma Sein Village

Name of Village	Ma Sein
Name of Township	Bogale
Total Population in Ma Sein village	453 persons
Female in Ma Sein village	249
Male in Ma Sein village	214
Distance from Bogale town to Ma Sein village	7 miles
Ethnic Group	Bamar (100%)

Source: RadanarAyarDevelopment Association

Poverty

Ayeyarwaddy division is located at the Southern end of the central plains of Myanmar. In North East of it there is Bago Division and in the East is Yangon Division. It is contiguous with the Rakhine State in the North West. On the Southern and Western sides there are Andaman Sea and Bay of Bengal. Moreover Ayeyarwaddy Division is mostly in Delta region and cross by many rivers as the Ayeyarwaddy River which constitute the most important river system in Myanmar.

(ACF, 2008)

This area, as a low-lying region, is a flood-prone area and was recently affected by severe floods. As a result tens of thousands people have been made homeless as 10,000 houses were destroyed and 40,000 acres of rice paddies were flooded. It was also the major zone in Myanmar that was affected by the 2004 Tsunami. Additionally, Ayeyarwaddy Division is strongly and frequently affected by storms and other climatic hazards. (ACF, 2008) In Ayeyarwaddy, 53 % of the households have Dhani/Theke/ Leaf roof and less than 2% have Earth floor (IFC, 2017). Poverty Incidence of Ayeyarwaddy is found as 32.2 % with 33.9 % rural poverty incidence and 23.1% urban poverty incidence (ADB, 2012). The rate of landless was higher among poor than non-poor households at 50.4 % and 24.2% respectively (IFC, 2017).

Climate Profile

Bogale, township in Delta has the high temperature ranging around 35 Degree Celsius at maximum. The minimum temperature is found to be around 23 Degree Celsius. There is slight variation of temperature over 8 year-period both in maximum and minimum temperature (Figure.1).

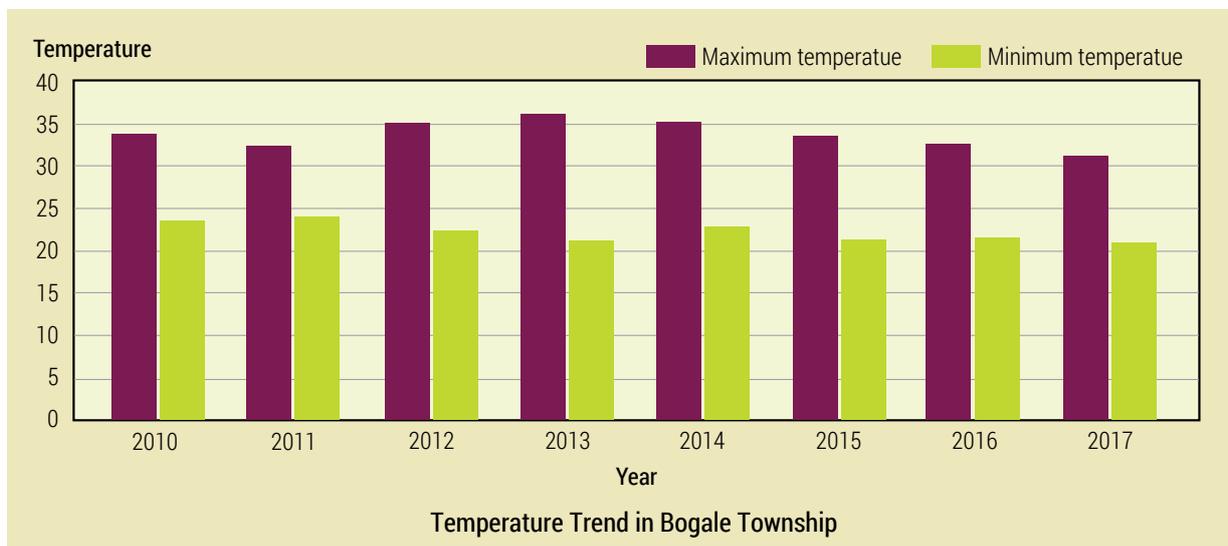
Being located in Delta, the precipitation is high in Bogale ranges about within 100 inches and 150 inches. The pattern of rainfall is erratic with the differences (20 inches to 30 inches) between the years. In 2010, rainfall intensity is reduced to 100 inches which is 50 inches lower than 2009 (151 inches) (Figure.2)

Ecology of Delta

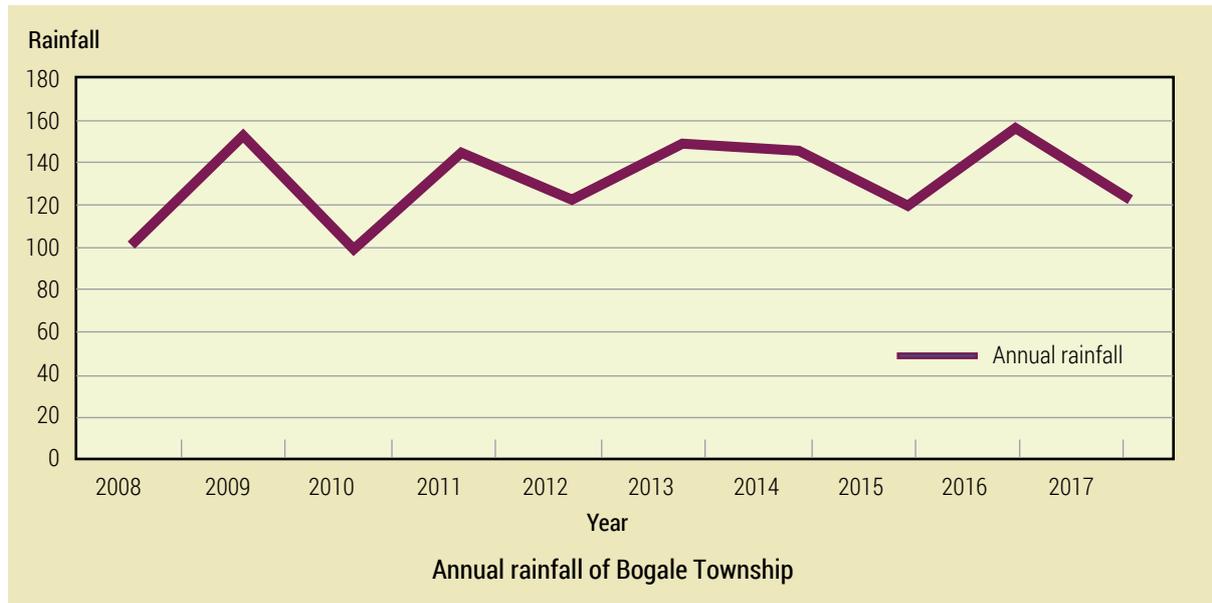
The delta sustains the habitat and ecosystem that range from fully marine, to brackish to entirely freshwater. Much of the Delta area is influenced by tides. The productive soils and abundance of water create conditions for a highly productive and diverse fauna, although large parts of the Delta are now a simplified agroecosystem of rice fields, plantations and degraded mangrove areas linked by rivers and canals (Delta Alliance, 2015).

The Ayeyarwaddy Delta of southern Myanmar is a fragile and an intricate ecosystem of mangrove

Figure.1: Temperature Trend in Bogale Township from 2010 to 2017.



Source: Department of Agriculture, Bogale Township

Figure.2: Rainfall Trend in Bogale Township from 2008 to 2017.

Source: Department of Agriculture, Bogale Township

swamps and tidal estuaries. Non saline arable areas are limited and becoming scarce due to the erosion of riverbanks, saltwater intrusion, and increasing soil salinity. Poor water control and drainage works contribute to periodic flooding and crop losses (Boutry et al., 2017).

Livelihood Profile of Ma Sein Village

According to the initial livelihood assessment of RadanarAyar Association, the main livelihood activity of Ma Sein is agriculture – primarily rice cultivation the entire year. For households without access to land, they are engaged in the following non-agriculture based livelihoods

- Trading
- Backyard animal husbandry
- Small scale fishing and aquaculture
- Daily wages
- Motorcycle taxi
- Betel nut and coconut trading

In terms of agriculture land, there is a total of 178.41 acres (397 ha) of cultivated land in Ma Sein. These are planted with paddy rice, coconut and betel nut trees. (RadanarAyar Development Association)

The soils are described as Heavy Clay Soil with a pH level of around around 4.5 and 5.2 (Department of Agriculture, Bogale Township)

In the Delta/Coastal Zone only 59 (26%) owned five or less acres while the remaining nearly three quarters of the land owning households held more than 5 acres. Similarly, average and median land holdings in the Delta/Coastal Zone were 16.8and 10 acres respectively (LIFT, 2012). In Ma Sein village, almost all households have have land ownership documents – even though it may be either form 7 or Tax receipt or Form 105 (Table.1).

Casual labour was the most important source of income in the Delta with 60.6 % of the households. Agriculture (any types – crops+ livestock) was the second most important source of the income for over 60 % of the households (LIFT, 2012).

Table 1: Land Tenure Status of Ma Sein Village.

No	Document Type	No of the farmers who has land document
1	Form 7	30
2	Tax receipt	34
3	Form 105	30
	Total	94

Source: Land Settlement and Record Department, Bogale Township.

For poorest household, about almost 70% of these households reveal that causal labor was the most important source of the income (LIFT Baseline Survey) .Among poorest households, 45.2 % express that the causal labor (agriculture) was the most importance source of income (LIFT, 2012).

In Ma Sein village, paddy is grown in 2 growing seasons: monsoon (rain-fed) and summer with irrigation. The varieties grown in Moonsoon season are traditional varieties with long duration (145-150 days). Paw San (Bay Kyar) is the most commonly grown traditional variety in moon soon season. Improved varieties/ High Yielding Variety (HYV) which have short duration (110 days) are grown in summer season. ThiHtet Yin, Thai Bay Gyar are the most commonly grown HYV varieties in summer season (Figure.3).

Figure.3: Cropping Calendar of Ma Sein Village.

Crops	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Summer Paddy												
Monsoon Paddy												

Source: Department of Agriculture, Bogale Township.

Food Security and Nutrition in Delta

According to all three standard measures of malnutrition (underweight, stunting and wasting), children in Ayeyarwaddy region are almost likely to be malnourished as the average Myanmar child. The prevalence of stunting is alarming high with 37 percent of children being stunted. (UNICEF).

According to Multiple Indicator Cluster Survey (MICS), about 21 percent of households in Ayeyarwaddy region are not using improved water resources. Lack of access to safe drinking water is a major contributor to diarrhea prevalence with 80 percent of child deaths due to diarrheal disease globally being attributed to poor drinking water, lack of sanitation and poor hygiene. Prevalence of diarrhea among children aged 0-59 months in Ayeyarwaddy has increased from almost 5 percent in 2003 to about 9 percent in 2009-2010 (UNICEF).

Poor fishery households of the Ayeyarwady Delta are struggling to meet their daily food and essential household needs). Report on Socio-economy Analysis of the Delta Fishery villages and small Scale Fishery Livelihood", only 48% of the poor households were able to meet their food needs on a daily basis. Families are adopting diverse coping strategies ranging from changing to less expensive or unusual foods to more severe measures i.e. skipping a meal (8%). (13.5%) of the

fishery households in the Delta rely for 100% on food from their fish catch and hence as much as 54% of fishery households consume half of the fish catch. They depend on fish traders and/or fall into debt to provide food for their families. This majority – the landless poor – small scale fishers must have access to income earning opportunity to enable them to derive cash income to meet their food and essential non-food budget requirement. Clearly 'Cash' is a critical need in the delta, as most of the poor households mentioned that access to finance is the biggest challenge to establish subsistence and sustainable livelihoods (Delta Alliance, 2015).

In almost all of the nutrition indicators, Bogale has higher percentage than national average. It was exception in the indicator of % of children aged 0-59 months who never received Vitamin A, in which percentage of national average is higher than bogale (Table 2) (UNICEF).

Climate Change Impacts, Risks and Vulnerabilities

Water scarcity has become a daily challenge in Myanmar's Ayeyarwady Delta in the dry season, especially in the Lower and Middle Delta. Thousands are still struggling after the damage to water sources caused by Cyclone Nargis in May, 2008. Since most villages do not have access to piped water and nearby tidal rivers are

Table 2 : Nutrition Indicators for Ayeyarwaddy Region.

Indicator	Ayeyarwaddy	National Average
Underweight: % of children aged 0-59 months who measured below 2-SD international reference weight for age	26.5	22.6
Stunting: % of children aged 0-59 months who measured below 2-SD international reference weight for age	37	35.1
Wasting: % of children aged 0-59 months who measured below 2-SD international reference weight for age	9.8	7.9
Exclusively breastfed: % of children aged 0-59 months who are exclusively breastfed	25	23.6
% of children aged 0-59 months who never received vitamin A	8	10.6

Source: A Snapshot of Child Wellbeing, UNICEF.

often saline, the delta's inhabitants traditionally source drinking water from rainwater harvesting, communal water ponds and tube and open wells. The ponds help villagers during the dry season, which stretches from November to May, but can be insufficient. Many ponds and wells were heavily salinized when a 3m tidal surge inundated much of the low-lying area when the Nargis cyclone struck the Lower Delta (Delta Alliance, 2015).

People in the delta had observed in the past years a reduction in the diversity of catches and in biomass; the main species characterized by a strong reduction are snakeheads and catfishes. It seemed that the fish species composition looks richer in the floodplain zone than further downstream, which is surprising (the biodiversity of estuarine zones is generally much higher than that of rivers since they combine representatives of the freshwater, brackish and estuarine faunas (Delta Alliance, 2015). Agricultural production is facing challenges due to increasing risks of flooding and salinity intrusion (Delta Alliance, 2015).

Due to upstream developments, climate change and sea level rise, critical low flow conditions of the Ayeyarwady River tributaries are likely to increase. Increase of salinity intrusion in the coastal areas is making existing water supply sources (domestic and agricultural) and freshwater ecosystem vulnerable (Delta Alliance, 2015).

Increasing temperatures and erratic precipitation patterns will create favourable conditions for the spread of infectious diseases. Additional effects of increasing temperatures on human health, including inter alia heat stress, heat exhaustion and dehydration. The greatest concern at present

regarding climate change impacts on human health is related to freshwater resources. Increases in intense rain events and tropical storms will lead to increases in flooding events and storm surges. This will affect freshwater sources as they become contaminated by rising flood water levels. Furthermore, rising sea-levels will result in fresh groundwater resources being displaced with salt water (Delta Alliance, 2015).

Farm households in Bogale Township are the most vulnerable to Climate Change in Pya Pone District. This study confirms that farm households who fail to adopt any strategies for adaptation to the impacts of climate change are more vulnerable than adapted households. Both assessments arrive at the same conclusion that lack of farm households' access to basic infrastructure, opportunities for additional income from farm or non-farm sources, and sole reliance on agriculture make households highly sensitive to the adverse effects of climate change (Oo, 2018).

Most of the delta is still active with unstable river branches and the delta is prone to tropical cyclones with high storm surges. Many people are yearly affected by bank and coastal erosion and also floods are a permanent threat. Floods can be of different nature: floods from the rivers (mainly in the Upper Delta), floods caused by storm surges (mainly in the Lower Delta) and flash floods from the surrounding hilly and mountainous regions (Delta Alliance, 2015).

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Table 3 . Implementing INGOs and NGOs in Ma Sein Village.

Name of NGO/ INGO	Implementation Activity
YadanarAyeyar local NGO	<ul style="list-style-type: none"> • Registered seed distribution • Provision of Agricultural Extension knowledge
GNI	<ul style="list-style-type: none"> • Seed distribution. (Farmer groups are formed and distribute registered seeds) • Child Protection • Infrastructure Development
PECT Myanmar	Micro finance

is no regulation on spatial planning nor law enforcement to avoid that people are living in areas that are prone to flooding and erosion. Floods can be of different nature: floods from the rivers (mainly in the Upper Delta), floods caused by storm surges (mainly in the Lower Delta) and flash floods from the surrounding hilly and mountainous regions. The risks of flooding: floods are expected to increase due to the probability of more extreme events, sea level rise and increasing rainfall quantities and intensities. For further details on flooding (hazard) see also description is the Base Layer (Delta Alliance, 2015).

The highly productive deltaic and low-lying coastal rice/local crop cultivation areas in Myanmar will not only be exposed to increased temperatures, erratic rainfall, droughts, floods and intense rains, but will also be exposed to increased salinity, coastal erosion, and inundation as a result of sea-level rise. The extensive, low-lying Ayeyarwady/Yangon Deltaic regions are particularly vulnerable to sea-level rise. Increasing risks of flooding and salinity intrusion will put a stress on agricultural production. The risk of increasing salinity intrusion is largest in the Middle Delta: the area for and time period during which fresh water is available will likely decrease. More extreme floods with saline water (mainly in Lower Delta) have direct impact on agricultural production. Inflow of saline water into paddy fields by Nargis decreased agricultural production instantly. According to farmers in Labutta North Polder, cropping yield of paddy of immediate crop after Nargis attack was decreased to 10-20 baskets/acre equivalent to minus 50-75 percent from 40-50 baskets of cropping yield before Nargis (local variety). Increased river and flash floods (mainly in the Middle and Upper Delta) will damage the crops and therefore the income of the farmers. During an increase of the discharges

and water levels in the water level, in combination with the increase in development of the area along the rivers and coastal areas, the probability of flooding increases if no proper flood control and protection measures in place (Delta Alliance, 2015).

Agricultural impacts will particularly affect low-income rural populations that depend on traditional agricultural systems or on marginal lands. In the current situation the fishery (and aquaculture) sector in the Ayeyarwady Delta encounters the following pressures: a decline catch of natural fish, smaller individual fish sizes, uncontrolled fishing, lack of empowerment in preventing illegal fishing (using smaller mesh in fish nets, less awareness on fisheries closure season and increase using of fishing methods that may destroy natural habitat and environment) which has been impacting the livelihood of rural poor (Delta Alliance, 2015).

Gender Role

Like any communities in Myanmar, in Ma Sein village, women participation in village development activities are limited. According to the profile of RadanarAyar, only 17 out of 249 women and girls are actively engaged in village development, social welfare, and other development committee related to GNI, RDA and Women Affairs.

In the study by LIFT, it noted that men undertake over twice more average days of causal works than women in Delta in all sectors – Agriculture, Fishery and Forestry and other (LIFT, 2012). This means that women also lacks the opportunity to be active economically even in non-agriculture based works.

Support Programs in Ma Sein Village

The Department of Agriculture (DoA) has been working with NGOs in delivering agricultural extension activities delivered by RadanarAyar and seed distribution activities by GNI. DOA itself provides the agricultural knowledge when farmers come to the office and ask the suggestion and comments to solve their farm problems and distribute the seeds to the farmers as per upon request of farmers. (Department of Agriculture, Bogale Township)

There is no agricultural research center present in Bogale and sometimes, local NGOs, and INGOs have to coordinate together with seed inspection section of department of agriculture (DOA) for varietal selection to support the improved seeds (registered or certified seeds) to the key farmers, there is some connections between NGOs, INGOs and DOA. At that time, DOA contributes technical support to local NGOs and INGOs. Regarding with Department of Agricultural Research, local NGOs and INGOs take the registered seed and foundation seeds from Nay Pyi Taw main research center and multiply the seeds at Bogale with key farmers at key farmers' farms and produce the certified seeds. These are the organizations that are working in Ma Sein village.

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