

## Coping strategies with drought and agricultural development in dryzone, Myanmar

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**Abstract:** Myanmar is an agro-based country and its economy relies on agricultural production. Myanmar has a wide range of climatic conditions favoring the domestication of numerous crop species. The climate is mainly tropical but is sub-tropical in hilly regions. Rice occupies the majority of the crop sown areas (about 40%) and it is followed by pulses, oil seed crops, sugarcane, rubber and vegetables. Precipitation under monsoonal influence is becoming more and more erratic than ever before, and thus annual precipitation is very fluctuating. Under many uncertainties of climate change scenarios, farmers in dry zone areas have been traditionally practicing adaptation technologies to combat the harsh climate for several decades. To reduce the risk of crop failure, farmers follow the various cropping patterns, such as mix cropping, inter-cropping, double cropping, crop rotation, zero tillage, incomplete tillage, etc. In central dry zone, the rain-fed agricultural production highly relies on water supply from the large and small dams and tank irrigation for centuries. During the last decade, the onset of monsoon was later than usual and precipitation pattern changed, causing extreme weather phenomenon. The Ministry of Agriculture and Irrigation pays great attention on improving existing irrigation networks, construction and renovation of dams and reservoirs, establishing water pumping irrigation schemes from major rivers and exploring groundwater for increased irrigation. Meiktila plain electric-powered water pumping project and Meiktila-Thazi Groundwater Irrigation Project have recently been implemented. Some INGOs and NGOs are cooperating to provide facilities such as treadle pumps and water pumping engines for drinking water and irrigation in rural areas.

**Key words:** Coping strategies, drought, dryzone, Myanmar

### Introduction

Myanmar is an agro-based country and its economy mainly relies on agricultural production. The population was estimated at 57.5 million in 2007-08, with a growth rate of 1.75 percent. About 70 percent of the total populations who reside in rural areas are principally engaged in agriculture, livestock and fishery sector for their livelihoods. Agricultural sector employs 61.2 percent of the total labor force and accounts for 35.6% of GDP and 13.3% of total export earnings. The major objective of the agriculture sector set up by the Ministry of Agriculture and Irrigation is 'to ensure national food security and generate surplus in rice and pulses production'. The goal of national food policy is the attainment of food security through self-sufficiency, price stabilization and the improvement of nutritional status. Since Myanmar has a wide range of climatic conditions, it favors the domestication of numerous crop species. Most regions of the country fall under the tropical climate, but hilly regions and plateaus are sub-tropical. Rice occupies the majority of the crop sown area (about 40%) and it is followed by pulses, oil seed crops, sugarcane, rubber and vegetables.

### Agricultural impacts of climate change

Myanmar is geographically exposed to various hydro-meteorological hazards (Fig. 1). Its coastal regions are exposed to cyclones, tropical storms/storm surges, and tsunamis. Rainfall-induced flooding is a recurring phenomenon across the country. The country's hilly regions are also exposed to landslide risks. The whole country is at risk from earthquakes, droughts, and fires. Myanmar was severely hit by Cyclone Nargis in 2008 and Cyclone Giri in 2010, which highlighted the country's most vulnerability to natural disasters and urgent needs for the protection and adaption to the impacts of the natural hazards. Despite great technological advances in the second half of the 20th century, weather and climate are still key factors in determining agricultural productivity in most areas of the world. Agriculture is one of the most vulnerable sectors affected by climate change. Climate change related phenomena include unusual fluctuations in

temperatures and rainfall patterns, as well as their associated impacts on water availability, pests, disease, and extreme weather events. They will substantially affect the potential of agricultural production.

### Traditional adaptation strategies for climate change

Precipitation under monsoonal influence is becoming more and more erratic than ever before, and thus annual precipitation is very fluctuating. Under many uncertainties of climate change scenarios, farmers in Dry Zone areas have been traditionally practicing the adaptation technologies to combat the harsh climate for several decades. To reduce the risk of crop failure, farmers follow the mix cropping patterns under the single or double cropping (Fig. 2). The seeds of two or more crops are broadcast together in the same plot and harvested separately according to their duration. The risk-averse farmers' concept is that they invest the least and they will collect whatever left in the field after the stresses.

Traditional water harvesting technologies in Central Myanmar, Dry Zone

- Frequent ploughing and harrowing while waiting for the sufficient rain
- Crop rotation
- Zero tillage or incomplete tillage for conservation of residual soil moisture: Post monsoon season black gram / chickpea after rice harvest
- Traditional water harvesting practice (e.g Land preparation is done at the pre-dawn darkness for timely seeding of peanut and sesame in Magwe Division)
- Broadcasting of sesame seeds before the rain comes (e.g in Kyaukpadaung Township)

### National Adaptation Programs of Action (NAPA) in Agricultural Sector:

Since the agricultural sector is the backbone of Myanmar economy, the government has been exerting efforts on the agricultural development while trying to develop other sectors proportionally. To boost the agricultural production, new reservoirs and dams have been



Fig. 1. (a) Rice plants harvested for cattle feed in Yamethin Township and (b) peanut plants suffering drought in Kyaukpantaung Township(b) in central Myanmar (Nov. 2009)



Fig. 2. (a) Intercropping of peanut and sesame in Nyaung-u Township and (b) Crop rotation of black gram after rice in Pyinmana Township (harvested rice are sun-dried on the bund)

constructed throughout the country. At the same time, the existing reservoirs and dams are renovated. The life spans or usefulness of these reservoirs and dams totally depend on the forests growing in the watershed areas. Therefore, the effective watershed management is very essential in the country. Since watershed management is based on multi-disciplinary approach many line ministries and departments are cooperating to fulfill the various projects. Existing adaptation measures / coping options to drought are as follows:

- improved irrigation efficiency
- crop diversification
- drought resistant crops
- improved agronomic practices
- improvement in agricultural extension services
- effective pest and diseases control programs
- better storage facilities

- research and development on new drought-resistant crops (Agricultural University and Department of Agricultural Research)

#### **Irrigation Facilities:**

The dry zone has the characteristics of very low fertile soil, erratic rain fall and high land degradation. In central dry zone, the agricultural production highly relies on water supply from the large and small dams and tank irrigation for centuries (Fig. 3). During the last decade, the onset of monsoon was later than usual and precipitation pattern changed, causing extreme weather phenomenon. The Ministry of Agriculture and Irrigation (MOAI) pays great attention on improving existing irrigation networks, construction and renovation of dams and reservoirs, establishing water pumping irrigation schemes from major rivers and exploring groundwater for the increased irrigation (Fig. 4). Meiktila plain electric-powered water pumping project and Meiktila-Thazi Groundwater

Irrigation Project have recently been implemented. Some INGOs and NGOs are cooperating to provide facilities, such as treadle pumps and water-pumping engines for

drinking water and irrigation in rural areas. The areas under irrigation have reached to approximately 30% of the total crop sown areas in 2009.

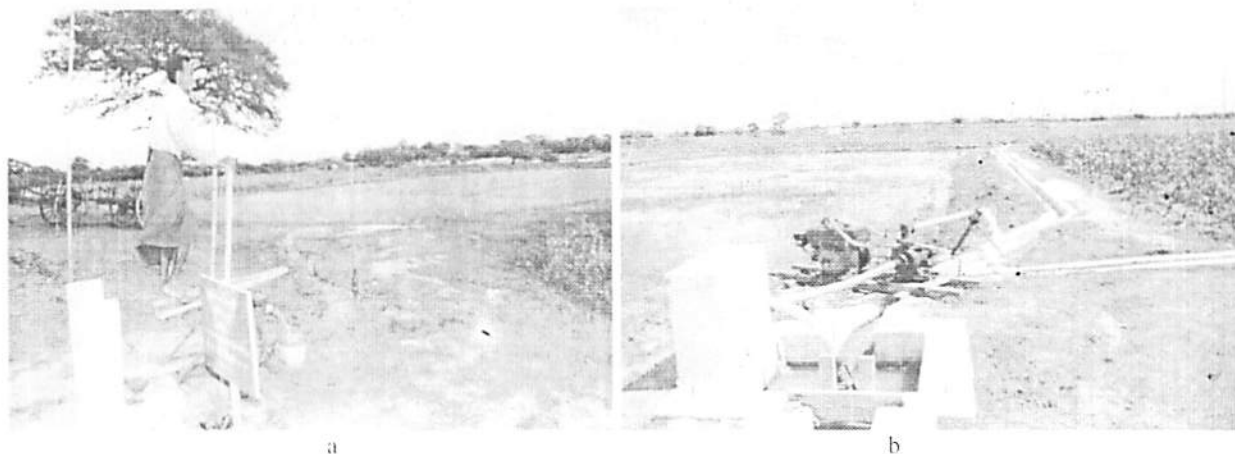


Fig. 3. (a) Treadle-pumps and (b) shallow tube wells for ground water pumping in Thazi Township, Central Dry Zone, Myanmar



Fig. 4. (a) Newly constructed dams, reservoirs and (b) water pumping projects from Ayeyarwady River

Climate change adaptation measures by the Water Resource Utilization Department, MOAI: Irrigation facilities installed in the last two decades were

- 228 dams
- 322 river water pumping stations
- 7974 underground water tapping stations
- 658 small rural dams

#### Regional and Rural Development Programs

The following Programs have been laid down by the government to uplift the living standard of the people.

- (1) Border Area and National Races Development
- (2) Development of 24 Special Zones (Greening Project)
- (3) Rural Development (Agriculture-based)

#### Five Tasks for Rural Development Program

- To ensure smooth transport

- To supply sufficient irrigation water and safe water
- To promote education standard
- To provide better health care
- To expand agriculture and livestock breeding

#### Construction of Rural Roads and Bridges

- The Department of Development Affairs constructed the rural road (about 32,590 miles) and bridges (total 9,504) during the last 20 years. The Ministry of Construction also constructed 5,678 miles of rural road and 3,066 bridges.

#### Provision of Safe Drinking Water

The Department of Development Affairs prepared the 10 years plan (starting from 2000-01) for provision of safe

drinking water in the rural areas especially in Sagaing, Magway and Mandalay Division of the Dry Zone region. Moreover, the essential farmer support services should be provided for increasing crop production which will lead to the food security, poverty alleviation and rural development. In this regard, the following items are needed to be taken into account.

- Exploring the development opportunity for sustainable farm credit and financing system through public-private partnership.
- Development of sustainable agricultural production systems (which focus on the environmentally friendly farming systems).
- Strengthening existing technology generation, dissemination, and innovation system; opening

channels for broader participation of private sectors, NGOs and INGO.

- Upgrading the role of various institutions, such as Agricultural University, and Department of Agricultural Research for research and development concerning with climate change.

#### References

- Myanmar Agriculture in Brief, 2009: Department of Agricultural Planning, Ministry of Agriculture and Irrigation, Union of Myanmar
- Myanmar Agriculture at a Glance 2009: Department of Agricultural Planning, Ministry of Agriculture and Irrigation, Union of Myanmar.