



Root and Tuber Crops: Untapped Potential for Food and Nutrition Security and Rural Livelihood Development in Myanmar

Results of a Scoping Study

Myanmar is an agriculture-based country with 61.2% of the labor force engaged in agriculture or depends on it for their income to a significant extent (MOAI, 2012). Although the country's root and tuber crop (RTC) production has gradually increased since the late 1990s, they still lag behind other major crops like rice. In fact, RTCs are not included in the country's list of primary important crops, even though potatoes are regularly consumed in daily meals. At the same time, demand for other RTCs like cassava, elephant foot yam (EFY), and sweetpotato are growing in both local and export markets.

This RTC scoping study done in Myanmar, although not directly related to target IFAD investment projects, allows FoodSTART+ to explore prospects for future partnerships in an important country of the region. It utilized data and information from literature reviews, as well as key field visits and stakeholder validation workshops in major RTC producing areas (Table 1) including the South Shan and Chin States and Magway, Ayeyarwaddy, Yangon, and Bago Regions. The study was conducted from October 2016 to February 2017.

Research Site Description

Myanmar's broad range of elevation, latitude, temperature and rainfall result to wide climatic diversity. The maximum daily temperature ranges from an average of 32°C in the Delta to 21°C in the hill region. The average rainfall ranges from 5,000 mm along the coast to 2,500 mm in the Delta and about 600 mm in the Dry Zone. This diversity gives rise to an enormous variety of microclimates, which, along with topography, land use, crops,

Research Highlights:

- RTCs are not a priority crop in Myanmar, but there is still significant growth in production and demand, particularly potato and cassava.
- Information from farmers and other stakeholders in the RTC sector revealed various concerns and issues affecting RTC development in the study sites in terms of input supply, production, processing, and marketing.
- Initiatives for RTC development should focus on the accessibility of quality planting material, improved cultivation practice, small-scale mechanization, postharvest and processing facilities, and value chain development.

and administrative regions; divides the country into four agricultural zones: hilly and mountainous zone, central dry zone (CDZ), delta area, and coastal area.

Since there is a mix of agro-ecological zones throughout Myanmar, cultivation of RTCs can be found in most parts of the country. As seen in Table 1, potato and cassava are the most common RTC with almost equal cultivation areas at about 90,000 acres. The Shan South is the main potato production area, while cassava is mostly found in Kachin in the north and Ayeyarwaddy in the southern delta region. Sweetpotato and EFY are produced in a smaller scale mainly in Ayeyarwaddy and Chin state, respectively.

Table 1. Root and tuber crops cultivated area in Myanmar 2014-2015.

State & Region	RTC Cultivated Area (in acres)			
	Potato	Cassava	Sweetpotato	EFY
Nay Pyi Taw	1,668			
Kachin	4,869	44,877	1,477	543
Kayin	1,620		274	112
Kayah		2,129	1,748	2,325
Chin	4,131	219	1,815	6,788
Sagaing	7,852	4,630	3,853	470
Tanintharyi		1,678	1,061	
Bago	635	140	1,010	134
Magway	5,298		3,357	580
Mandalay	2,018	100	932	
Mon		735	2,082	459
Rakhine	8,074	791	2,351	94
Yangon		1,378	1,729	
Shan South	43,217		908	
Shan North	7,283	461	2,245	451
Shan East	3,492	568	771	
Ayeyarwaddy	25	31,830	4,820	
Total:	90,032	89,536	30,433	11,956

Source: Myanmar's Department of Agriculture

About FoodSTART+

Food Resilience Through Root and Tuber Crops in Upland and Coastal Communities of the Asia-Pacific (FoodSTART+) is a three-year project (2015-2018) that builds on and expands the scope of the concluded IFAD-supported Food Security Through Asian Root and Tuber Crops (FoodSTART) project. It is coordinated by the International Potato Center (CIP) and implemented in collaboration with the International Center for Tropical Agriculture (CIAT) in Asia. The project is also working closely with the CGIAR Research Program on Roots, Tubers and Bananas (RTB), and the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). It is funded by the International Fund for Agricultural Development (IFAD) and the European Union (EU).

The project aims to enhance food resilience among poor households in upland and coastal communities of the Asia-Pacific region through introducing root and tuber crops (RTCs) innovations. To achieve this goal at scale, the project develops, validates and implements effective partnership strategies with IFAD investment projects to promote RTCs for food security.

The project's key components are:

1. Project start-up and scoping studies including mapping on food vulnerability of RTC production and use;
2. Research for development (R4D) partnership development;
3. Needs and opportunities analysis on gender sensitive RTC innovations;
4. R4D action planning and launching; and
5. Documentation and knowledge products development.

The first series of FoodSTART+ Research Briefs features the results of the country scoping studies under Component 1. They present an in-depth look at the RTC production trends, vulnerabilities and opportunities in the target countries. The scoping studies were conducted during the first year of project implementation.



Overview of RTCs

Potato is a popular vegetable crop used daily in Myanmar's dishes. With different agro-ecological zones, potato in Myanmar is cultivated year round in four seasons as summer, pre monsoon, post/late monsoon, and winter crops. In terms of seed potato, there is no existing industry in Myanmar and small tubers are traded by and between farmers as seed. This brings about several quality issues in potato including bacterial wilt, root knot, and mixture of varieties and old and new seeds.

The main potato variety produced in Myanmar is "Up-to-Date", locally known as *Sitbo*. Data gathered from the Shan State revealed that the average yield of potato is about 19 MT/ha, higher than the national average of 15 MT/ha. Average prices have gone up since 2011 at 255 USD/MT, garnering a profit of about 2,500 USD/ha.

Despite the large profit margin from potatoes being attractive to farmers, some farmers cannot begin or expand production due to the high initial capital needed. Moreover, potato production in Myanmar is labor intensive and majority of farmers still use traditional practices, leading to lower yields.

Many farmers, about 10-20%, are part of regional Potato Clusters which are formed under the Myanmar Fruit, Flower, and Vegetable Producers and Exporters Association. Potato Clusters work with government and private institutions for potato sector development, including farm trials of new varieties from the Netherlands and China.

Cassava is mainly processed to dry chips and starch which are used as an ingredient in snack foods, flavoring agents (MSG), or animal feed. Planting begins in July and harvesting is done from January to February. Majority of cassava is produced in the Kachin State (50%) and much of this is owned by one company, while 35% is produced in the Ayeyarwaddy Region by smallholder farmers. Data from Ayeyarwaddy showed cassava yield and profit ranging from 12-16 MT/ha and 100 - 460 USD/ha, respectively.

In the study sites, almost all cassava farms practice mono-cropping. Many cassava farmers, similar with potato, rely only on planting material from their own or nearby farms. The outlook for cassava production remain positive though, with foreign interest in processed cassava, both dry chip and starch, growing in recent years.

The Cassava Growers, Millers and Traders Association, an association of large scale stakeholders in the cassava sector, is currently working with the government and CIAT on farm trials of new varieties and new areas for cassava production.

Elephant foot yam (EFY) thrives in natural forests and is identified as a non-timber forest product. However, over-extraction

from forests resulted in production declines between late 2000 and early 2010. As a consequence, production of EFY from natural forests has gradually declined in terms of quality (i.e. tuber size) and quantity (i.e. total volume).

Today, EFY is largely cultivated as a cash crop to avoid over-extraction from forests and to meet higher market demand. The biggest area of EFY cultivation is in the Chin State, the sole producer of the most in demand red/pink EFY variety. Farmers here report a net profit of 2,515 USD/ha from tubers and an average yield of about 20 MT/ha. The demand for EFY is dominated by the Chinese and Japanese export markets for dried chips.

Sweetpotato is widely consumed as a traditional snack in Myanmar and almost all production is backyard home gardening by small farmers. According to wholesalers in the Thiyimingalar Market in Yangon, sweetpotato is available all year round and comes from different locations depending on the season. Sweetpotato planting material are often vine cuttings from farmers' own backyards, while some buy cuttings from other areas to use in their farms.

The yield of sweetpotato varies, with farmers in Bago Region reporting an average of 10-12 MT/ha, higher than those in Yangon at 4-8 MT/ha.

Constraints and Opportunities

Potato, cassava, and sweetpotato production is negatively affected by poor quality seeds and the lack of improved varieties. The reach of new varieties are quite limited and are too expensive, especially for smaller producers. While there are a few, more research on appropriate varieties is needed. Many RTC farmers also face diseases and pests but do not practice or are not aware of proper pest and disease management. They are also still using traditional practices and manual labor for land preparation and plant treatment. These, coupled with excessive or low input use and compounded by climate change impacts, results in lower productivity and higher production costs, therefore less income for farmers.

Moreover, due to low income, the seasonal nature of agricultural jobs, and the lack of economic opportunities; many young rural people are migrating to urban areas, leading to labor shortages.

The lack of appropriate and modern postharvest knowledge and facilities for potato, such as cold storage, often cause damage to ware and seed potato, while improper grading cause farmers to face further economic losses. At the same time, majority of potato processing such as fried potato chips is done at the household level using traditional practices and for local markets.

For cassava, the current practice of sun-drying for starch production limits the processing period, thus leaving farmers no choice but to harvest even before they reach optimum yields. Furthermore, the lack of modern starch processing techniques, particularly the use of inefficient equipment with traditional processing methods, limit the potential to increase the scale of operations. Traditional processing also lack adequate treatment of waste water generated from starch extraction and processors are not concerned about the effects of their effluents on the environment.

Likewise, RTC farmers are affected by price drops at peak harvest and processing times, while cassava prices are dictated by the near monopoly held by one large starch trader in the region. The value chain development of RTCs can benefit from improving farmers' access to market information and financing, as well as product and market diversification.

RTCs, especially potato, cassava, and EFY primarily contribute to food security and livelihoods through the income generated from their sale, rather than directly through consumption. Sweetpotato, on the other hand, may have a greater role in addressing nutrition issues in Myanmar in the future with plans to replicate the successful use of sweetpotato in mitigating vitamin A deficiency among vulnerable women and children in Bangladesh.

Conclusions and Recommendations

Increased economic productivity of RTCs in Myanmar can benefit not just farmers, but also other actors along the RTC value chain. Key focus areas for developing the RTC sector include research and dissemination of quality seeds and new varieties, improved cultivation technology, access to small-scale agriculture mechanization, access to postharvest technology and equipment, market diversification, and the availability of financing and pricing information.

Literature Cited:

MOAI [Ministry of Agriculture and Irrigation]. 2012. Myanmar Agriculture in Brief 2012. Department of Agricultural Planning, MOAI. Myanmar.

Authors:

Moe Aung - Lead author and study coordinator
Credit also goes to Dr. Gordon Prain and Dr. Chris Wheatley for their contribution to the study.

For more information, contact:

CIP Philippines, PCAARRD, Los Baños, Laguna
4030 Philippines
Tel +63 49 536 8185 | Fax +63 49 536 1662
E-mail: cip-manila@cgiar.org | Website: cipotato.org

DISCLAIMER:

This document was produced with the financial assistance of the International Fund for Agricultural Development (IFAD) and European Union (EU). The views expressed herein can in no way be taken to reflect the official opinion of IFAD and EU.