



# *Demand Analysis Report- Republic of the Union of Myanmar*



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## Demand Analysis of Myanmar

### 1. Overview of the country

Myanmar is a large country, with a land area of 676,577 square kilometres located between Bangladesh and Thailand, with India and China to the north. The strategic geographic location provides Myanmar the potential to become a land bridge between South and Southeast Asia and to link the People's Republic of China (PRC) to these markets. Myanmar shares borders with Bangladesh, the PRC, India, the Lao People's Democratic Republic (Lao PDR), and Thailand; it also has a 2,800-kilometer (km) coastline along the eastern side of the Bay of Bengal.

The country is divided into two regions- Lower Myanmar and Upper Myanmar. Lower Myanmar is comprised of coastal areas with thick tropical forests that have valuable trees (teak forests, oil-bearing and timber trees) with Upper Myanmar making up the interior parts of the country. The capital and largest city is Yangon, an important trade centre is Mandalay located in central Myanmar.

A major topographical feature of Myanmar is the Irrawaddy River system. Since its deltaic plains are very fertile, it is considered to be the most important part of the country covering about 18,000 sq m (47,000 sq km). Hkakabo Razi, the highest peak in Southeast Asia at 19,295 ft (5,881 m), is located in Myanmar. A barrier between India and Myanmar, the Arakan Yoma range has peaks that range between 915 m (3,000 ft) and 1,525 m (5,000 ft).

The population is estimated to be approximately 60 million and growing at about 1.5% annually, but the lack of a census for the past two decades has meant there is **little reliable data on Myanmar's demographics and land use pressures**. From a strategic development and poverty reduction point of view, the agriculture sector is of central importance. In addition to being the core means of livelihood for the great majority of the population, improvements in agricultural productivity and marketing are critical to raising the livelihoods of the rural population—some 36% of which lives below the poverty line. The government places the highest priority on development of the sector and views it as the basis for food security, increased employment, and export promotion.

Almost half of Myanmar is covered with forests comprised of teak, rubber, cinchona, acacia, bamboo, ironwood, mangrove, coconut, betel palm with northern highlands comprised of oak, pine and many varieties of rhododendron. There are many tropical fruits grown such as citrus, banana, mangoes and guavas in the coastal region.

The climate of Myanmar is roughly divided into three seasons: Summer, Rainy Season, and Winter Season. From the end of February to the beginning of May are Summer months, with highest temperatures during March and April in Central Myanmar up to above 110F (43.3C) while in Northern Myanmar it is about 97F (36.1C) and on the Shan Plateau between 85F (29.4C) and 95F (35C). Rainy Season from mid May to the end of October, with annual rain fall of less than 40 inches in Central Myanmar while the coastal regions of Rakhine and Tanintharyi get about 200 inches. Winter starts from November and lasts to the end of February with temperature in hilly areas of over 3000 feet drops below 32F (0C).

## **2. Overview of Agriculture sector**

Agriculture is the backbone and is a key sector of the Myanmar's economy. The agricultural sector, including livestock and fisheries, represents 32.8% of GDP, with industry accounting for 21.0% and services 46.2%. The sector accounts for over 50% of total employment and approximately 20% of exports. A significant proportion of industry is also related directly or indirectly to agriculture. The largest agri-businesses are rice, bean and oil mills. Cultivated land, covering 12.8 million hectares, has the potential to be increased by nearly 50%. For decades, the agricultural productivity has faced extensive government controls and underinvestment in the sector. The government has now recognized the importance of the agricultural sector to economic development by kicking off a comprehensive reform programme in 2011.

About 75% of the total population reside in rural areas and are principally employed in the agriculture, livestock and fishery sectors for their livelihood. Rice is the most important dominating crop and is grown in saline area mostly found in lower Myanmar especially in Ayeyarwady, Yangon, Taninthayi Divisions and also in Yakhine and Mon States. Deep-water rice is usually grown in areas of some restricted belts in Ayeyarwady, Bago, Taninthayi Divisions and Rakhine, Mon and Kayin States. Out of the total crop sown area of 10 million hectares, about 13% is under irrigation. The rest of the land has to rely on the rain for crop production.

The Government of Myanmar considers agriculture "*as the base for all-round development of other economic sectors*". The three major objectives of the agriculture sector are: (i) to achieve surplus in paddy production; (ii) to achieve self-sufficiency in edible oil; and (iii) to step up the production and export of pulses and industrial crops. At the same time, within the context of market-oriented economic system, freedom in agricultural production and participation of private sector has become the major policies in the agriculture sector.

The prevalence of different agro-ecological zones within the country has enabled the growing of over more than 60 different crops. In Myanmar's agriculture, cereal crops remains the most important group with its area constituting more than 52% of the total crop sown area of 12276 thousand hectares. Among cereal crops, rice grown widely throughout the country claims a share of about 47 percent of the total crop sown area. It is followed by oilseed crops as the second most important next to cereals and with pulses and industrial crops ranking third and fourth respectively.

Agricultural production takes place on only about 12.4 million hectares or 18% of Myanmar's total land area of about 68 million ha. 5.7 million ha is considered cultivable, but is currently unused. The principal crops include

- (i) Cereals- Here rice covers about two-thirds of the total area under cultivation. Wheat, maize and sorghum are other cereals.
- (ii) Beans and pulses, which have recently become major export crops and are grown on about 4.2 million ha
- (iii) Oilseeds (especially in the Central Dry Zone), grown on 3.3 million ha; production is insufficient to meet national demand and about 200,000 tons of palm oil are imported annually. The important crops grown are groundnut, sesamum, sunflower, oil palm and mustard.
- (iv) Food crops- Potato, onion, vegetables and chillies are grown on about 0.8 million ha, principally in highland areas
- (v) Industrial crops, including cotton, rubber, sugarcane and jute; and
- vi) Plantation crops- tea and coffee

The crops are also classified as:

- Export crops (rice and pulses)
- Crops for import competition (oilseeds and beans)
- Crops for the domestic market (vegetables, fruits)
- Crops for state owned enterprises (sugarcane, cotton)

Based on the size of holdings, the distribution of farmers and total acreage is furnished in Table1.

Table1- Distribution of farmers based on holding size

<b>Holding size</b>	<b>Number of farmers (000)</b>	<b>Total acreage (000)</b>
Below 5 acres	3005	7544
5-10 acres	1180	8506
10-20 acres	499	6916
20-50 acres	109	3124
50-100 acres	3	196
>100 acres	2	913
<b>Total</b>	<b>4540</b>	<b>25209</b>

Area under different crop groups is presented in Table 2

Table 2- Area under different crop groups (000ha)

<b>Year</b>	<b>Cereal</b>	<b>Oilseed</b>	<b>Pulses</b>	<b>Industrial crops</b>	<b>Culinary crops</b>
2009-10	9126	3860	4383	1002	346
2010-11	9138	3814	4501	1025	347
2011-12	8686	3487	4417	1037	343
2012-13	8360	3070	4449	1018	341
2013-14	8414	3479	4534	1228	333

Smallholder paddy production dominates Myanmar's agricultural economy: paddy production accounts for roughly half of all cropped area. Pulses and oilseeds account for a further 20% each, whereas horticulture crops, root crops and other cereals account for the remaining part. Farmers generally grow staple crops such as paddy, pulses and oilseeds on relatively large areas, while high-value horticulture and fruit crops take place on much smaller plots. Paddy, pulse and oilseed farmers cultivate an average of 1.5 – 2.0 ha per holding. In contrast, onions, garlic and potato fields average about 0.6 ha each, while vegetables and cut flowers are grown on plots ranging between 0.25 and 0.3 ha in size.

Maize production has grown far more rapidly than rice, on the heels of rapidly growing demand for poultry feed and emerging regional export markets. Pulse production has grown more rapidly than any other agricultural commodity group since liberalization in 1988, at a compound annual rate of 9% per year. Horticulture and poultry output have grown at 6% to

7% annually over the past two and a half decades, driven by growing urban demand and growing incomes.

## **2.1 Situation of Rice**

Myanmar was ranked as a principal rice exporter during the pre-war era, with an annual export of around 3 million tons and attaining a level of 3.4 million tons in 1934. However, the post war period witnessed rising domestic demands as a result of population increase and had led to a gradual decline in surplus from existing areas and yields. The Special High Yielding Programme introduced in 1977-78 generated considerable increase in paddy production, but yet the prevailing levels of population indicate that there is a need for further continued efforts for the promotion of increasing paddy production. Under the circumstances to achieve greater momentum to higher paddy production, rice was recently designated as the Principal National Crop and all efforts have been focused towards the generation of a surplus in paddy production.

Concerted efforts are being made by the Ministry of Agriculture and Irrigation to meet the 14 million acre target of rainy season paddy, and at the same time attain a yield of 100 baskets. Farmers are being urged to grow rain paddy as early as possible, while inputs such as agricultural machinery, quality seeds, irrigation water, chemical fertilizer and pesticides are being made available adequately.

## **2.2 Summer Paddy Production Programme**

One of the major achievements in promoting higher rice production in recent years has been the introduction of summer paddy on a large scale. The paddy grown between October and April can be generally defined as summer paddy. It has been a significant endeavour not only for increasing paddy production but also served as an accumulation of additional income for farmers. The essence of summer paddy cultivation is to increase crop intensity by utilizing irrigation water. Weather and environmental conditions during the period favour growers to obtain higher yields, if packages of inputs such as effective cultivation methods, irrigation water, machinery, fuel for pumps and fertilizer can be fully utilized.

A critical factor in the programme, however, is availability of adequate water, as in the rainy season. The limitation has been overcome in all ways and means possible, in making water available from rivers, streams and tube wells. Further, mechanized farm power is being brought into use, to avoid over taxing farm labour.

### **2.3 Paddy - Fish Integrated Farming**

The Ministry of Agriculture and Irrigation, at the same time, remains engaged in capital investment projects for the development of inundated areas in lower Myanmar. And in turn, measures are being taken for reclamation of abandoned land and necessary assistance rendered for appropriate crop production.

In order to generate increased paddy production, paddy-fish farming in inundated areas form part of the changing technologies in Myanmar. Paddy- fish farming is being introduced in deep water areas where the cultivation of deep water paddy as a single crop even was an uncertainty. Paddy - fish farming has enabled the double cropping of paddy or paddy followed by other crops, while additionally permitting fish and prawn culture in the pond and breeding of animals on the bunds. The cultivation of paddy in functional paddy-fish farming ponds is found in Ayeyarwady, Bago and Yangon Division and Mon State with the total area of (4182 hectares).

### **2.4 Cropping System**

Area under multiple cropping expanded significantly during the decades from 1960 to 1980. It was due to an intensive recourse to farm mechanization and increasing availability of irrigation water, with the completion of large scale dams. Increases, however, were slight during the 1980's, and 1990's, and the shortage of fuel for mechanization during those periods, may have been the main cause of hindrance. But with the inception of favourable price incentives for some crops, multiple cropping once again increased remarkably, from 1992-93 and onwards- and in particular second cropping of pulses registered sharp rises

Among the 17 types of pulses produced in Myanmar, three types of black gram, green gram and pigeon pea are important. These three pulses account for 80 to 90 percent of total exports by value. The main export destination is India. The emergence of the large Indian market was a key factor underlying the development of pulse cultivation in Myanmar.

The present trend of multiple cropping could be summarized as follows:

- (a) Growing a pre-monsoon crop before the main crop in rice growing area (jute, cotton, sesame)
- (b) Growing of some suitable crops after rice (summer paddy, groundnut, sunflower, peas and beans)



(c) Growing of two suitable crops in succession on dry land with or without irrigation (sesame, peas and beans, maize, etc.)

(d) Mixed cropping of two crops with different life periods in the same field (sesame and pigeon pea, groundnut and maize, etc )

### **3. Overview of Horticulture, Livestock and Fisheries**

#### **i. Horticulture**

Horticulture products, including fresh fruits, vegetables and flowers, provide earnings for about 15% of rural households in Myanmar. Grown widely throughout Myanmar, horticultural products assume particular prominence in the hilly zones of Shan State and other border regions.

The horticulture sector in Myanmar, with over 100 million consumers at a close distance, has the potential to become one of the most important agricultural sectors in terms of economic growth, rural employment and income generation. Its products – including fresh fruits, vegetables and flowers – provide earnings for about 15% of rural households in Myanmar. The domestic market demand for fresh products will grow and there are plenty possibilities for yield and quality improvements. With a good strategy and a comprehensive plan, Myanmar could become the vegetable garden for Southwest China and for parts of Southeast Asia.

#### **ii. Livestock**

Another significant component of the agriculture sector is livestock, which includes cattle, buffalo, swine, and poultry. Most rural households raise livestock, thereby contributing significantly to household protein (meat, eggs, and milk) and to farm economy through draft power and by-products (hides and leather). Livestock represents a considerable portion of household income and capital; livestock production accounts for about 7.5% of overall GDP. Almost all livestock is raised in household backyards although there is some commercial production near major cities. Livestock numbers have little changed for the past decade, except for the poultry population, which has tripled, possibly due to the spread of commercial production techniques in peri-urban areas. The shortage of livestock for draft power is one of the constraints to increased agricultural production in Myanmar.

Myanmar's dairy sector is still underdeveloped. Dairy imports were valued at about USD\$ 75 million in 2012 and Myanmar has at present only around 400,000 heads of dairy cattle. There are only six large dairy farms around Yangon and the majority of dairy farms have 20 or less heads of cattle. In Myanmar, the demand for fresh milk is much higher than the production and it is expected to continue to grow considerable in the coming years.

Livestock and fisheries account for about 20% of total agricultural incomes in Myanmar, though these estimates may understate the economic and nutritional importance of these non-crop sectors. As with high value horticulture products, small stock and poultry attract considerable interest among landless and near landless households because of their high value and low land requirements.

Commercial livestock production in Myanmar centres on poultry (broiler and layers) and to lesser extent on dairy cattle and is found near major cities. Alongside the growth of incomes and population, the demand for livestock products will rise sharply: for poultry meat the market is expected to grow annually with 15%. The market growth for dairy products is expected to be even higher: 30 – 100% in the upcoming 10 years.

### **iii. Poultry**

Consuming 6 kg poultry meat and 40 eggs per head per year, Myanmar people's consumption levels are still low compared to other countries in the region. At the same time, the growth of the production is around 15% a year. Herd or flock sizes remain typically small. Charoen Phokphand Company (CP) has been active in Myanmar for more than 10 years and is the major vertically integrated player in the market. Japfa Comfeed Myanmar started in 2014 vertically integrated poultry business ranging with feed mills, poultry breeding farms and hatcheries and with commercial and contract farms. Besides, there are a number of local players.

### **iv. Fishery and Aquaculture**

With a coastline of 3.000 km and inland water areas covering 3.3 million ha, the Myanmar fish sector provides an enormous potential for economic growth and development. About 8% of total fishery production is exported to 29 countries, at a value of USD 650 million (2011). Only marine fish is exported to the EU at the moment, but export will also be possible for fish produced inland in the near future. For the marine sector, there is a serious issue of overfishing, due to gear that fails to discriminate between mature fish and small fry. The Government of Myanmar takes the issue of diminishing stocks seriously and is currently developing policies to address this issue.

## **4. Status of Agricultural Education, Research and Extension**

### **i. Agricultural Education**

The agricultural education system in Myanmar includes three universities, all under different ministries and focused on different segments of the agricultural sector. The Yezin Agricultural University (YAU), under the Ministry of Agriculture and Irrigation (MOAI),

covers crop sciences and in addition offers some courses in animal sciences and fisheries. YAU also operates seven regional research stations where it deploys students to conduct research during their final year. The University of Veterinary Science (UVS), also in Yezin but under Ministry of Livestock and Fisheries (MOLF) - covers veterinary sciences and fisheries but not crop agriculture. The University of Forestry (UOF) under Ministry of Environmental Conservation (MOEC) specializes in issues of land management, environment and forestry. In addition to these degree-conferring institutions, seven State Agricultural Institutes (SAI) under the MOAI offer the agricultural education diploma program for high school graduates.

## **ii. Agricultural Research**

Given the importance of agriculture in Myanmar, agricultural research and development is an important priority. Agricultural research in Myanmar is overseen by three separate entities: the Ministry of Agriculture and Irrigation (MOAI), the Ministry of Forestry (MOF), and the Ministry of Livestock and Fisheries (MOLF). The Department of Agricultural Research (DAR), under MOAI, is the principal government agency involved in agricultural R&D. In 2003, DAR accounted for about 40 percent of the country's agricultural research staff and 30 percent of its expenditures.

## **iii. Agricultural Extension**

The Department of Agriculture (DOA), headed by a Director General, is the sole government institution responsible for providing public extension services to the farmers. The DOA performs functions including extension towards the following objectives:

- increased production of major crops;
- development of improved production technology through proper research on management of soil crop and pest control;
- development of suitable high-yielding crop varieties;
- transfer of appropriate crop production technology through agricultural extension programme;
- distribution of certified seeds through the seed programme;
- provision of agricultural inputs;
- classification of soils and advising on soil conservation techniques;
- exploration of export markets on some agricultural produce.

The Department of Agriculture is one of the many institutions of the Ministry of Agriculture and Irrigation. It has eight divisions, the Agricultural Extension Division (AED) being the biggest. Recently, the AED has been undertaking the following extension activities:

- Training and capacity building of extension agents
- Training of farmers in transfer of technology through Farmers Field Schools (FFS); Farmer to farmer discussions, training and education
- Farmer-based participatory demonstration trials and field visits by local authorities and extension agents
- Delivery of educational materials, pamphlets, newsletters and books on new crops
- Education of farmers on the utilization of quality seed, drum seeder, combine harvester, dryers, etc.
- Explanation of post-production losses in rice production to the farmers
- Cooperation among government, non-government and other relevant institutions for the dissemination of advanced technology at village level.

#### **iv. Other Institutions**

- The other institutions under the Ministry of Agriculture and Irrigation are:
- Department of Agricultural Planning (DAP);
- Irrigation Department (ID);
- Agricultural Mechanization Department (AMD);
- Settlement and Land Records Department (SLRD);
- Water Resources Utilization Department (WRUD);
- Myanma Agricultural Development Bank (MADB);
- Department of Agricultural Research (DAR);
- Yezin Agricultural University (YAU); and
- Department of Industrial Crops Development (DICD)

#### **Livestock Breeding and Veterinary Department (LBVD)**

The major role of the Livestock Breeding and Veterinary Department under the Ministry of Livestock and Fisheries is to collect, compile and disseminate the livestock production statistics of Myanmar. Furthermore, LBVD also has a responsibility for animal health and livestock development activities of Myanmar. LBVD also conducts the field surveys for the collection of livestock production statistics. LBVD produces livestock

statistics, such as livestock population, production of livestock and livestock products, annually.

### **Department of Fisheries (DOF)**

Department of Fisheries is one of the departments under the Ministry of Livestock and Fisheries and it is taking responsibility for the management of fisheries, conservation of fishery resources, providing extension services, conducting research and compilation of fishery statistics of the Union of Myanmar. Major statistics disseminating in DOF are production from freshwater and marine fisheries and volume and value of exports.

### **Other Agricultural Related Government Agencies**

Department of Population under the Ministry of Immigration and population has highest responsibility for conducting population censuses and demographic surveys, estimating and publishing national, states/divisions population figures and urban/rural population figures of Myanmar. Another important department for preparing agricultural statistics is Department of Labour under the Ministry of Labour. Department of Labour also conducts labor force surveys and disseminates agricultural labor force statistics through the various statistics reports.

## **5. Status and challenges in related areas of agricultural development**

Although Myanmar is a country rich in land, water and human resources for agricultural development, it still has to face challenges in macroeconomic policy such as credit, market and land policy, as well as technology and infrastructure.

### **i. Land**

Conflict around ownership of land is a growing problem in Myanmar. In 2012, the government introduced two new land laws in an attempt to address the flaws in existing land legislation. But, despite some improvements, these land laws still leave people in Myanmar open to abuses of their social and environmental rights. They fail to protect those without cast iron legal rights over land by omitting to cover customary tenure or including internationally recognized protection standards, such Free, Prior and Informed Consent (FPIC) (a right for indigenous peoples under international law). This can be particularly damaging for women who have less formal ownership of assets including land.

The Government has enacted the new Land Law, which is expected to enhance investment in the agricultural sector. The objective of the new Land Law is to ensure the

rights of farmers who are participating in agricultural production in terms of legal setting, and land registration and issuing certificate are important and basic legal task of the government. The Government of Myanmar must close the loopholes in the current laws to ensure that people living and working on the land are protected, and must guarantee that new deals are negotiated and implemented transparently, with full consultation with affected communities.

**ii. Water resources**

With an annual average rainfall of about 2,300 mm and five major rivers, Myanmar has abundant water resources. The country also has ample groundwater resources. When reviewed more closely, however, the situation is somewhat more complex, both from a seasonal and geographic point of view. About 80% of rainfall occurs during the 5 to 6-month monsoon season (from mid-May to October). For the remaining 6–7 months of the year when droughts are common, rice cannot be grown without irrigation. Drinking water shortages occur in many parts of the country. During the dry season, the country’s water resources are not nearly as abundant as might initially be assumed. Further, there is potential for conflicts among water users.

The amount of rainfall varies considerably from one region to another—from high of 4,000–6,000 mm annually along the coastal reaches and in the mountains of Rakhine and Tanintharyi, to as low as 500–1,000 mm in the Central Dry Zone. With such low levels of rainfall, there is insufficient precipitation to produce a rice crop. Rice cultivation in the relatively heavily populated Central Dry Zone depends therefore on irrigation, even during the monsoon season.

In contrast, excessive rainfall in other regions of Myanmar, notably in the Delta Region, often results in flooding, the loss of standing crops, and the displacement of significant portions of the population. Therefore, while Myanmar undoubtedly benefits from its water resources, these resources are neither unlimited nor always beneficial. Serious drought conditions may occur in some regions and, at other times, excessive rainfall and flood damage the production base and community livelihoods.

By March 2014, 240 dams, 327 river pumping stations and 12258 groundwater irrigation projects have been completed. Total current water use in Myanmar accounts for less than 10% of total water resource availability. Since 2003, irrigated agriculture being the most important activity, the irrigation area grew substantially, from 1.02 million ha in 1988 (12.6 % of the net sown area) to 2.17 million ha in 2013-2014 (16.3% of the net sown area), in particular due to the expansion of river pumping and the construction of dams.

Only a small portion (3%–10%) of the country’s water resources is used. Agriculture accounts for about 90% of total water use. Despite irrigation being the main use of water, most rice is produced as a rain-fed crop during the monsoon season. Water control infrastructure is needed in the highly productive Delta Region to prevent salinity intrusion and flooding and to improve drainage. Gravity irrigation systems and tanks have been developed over many years in the Central Dry Zone, and it is there that most irrigation infrastructure is located.

Five major rivers flow through the country, providing the basis for increased irrigation and hydropower generation. Myanmar’s water resources are greatly underutilized: less than 20% of croplands are irrigated, and the hydropower potential has barely been tapped. Water availability, however, is highly seasonal—80% of rainfall occurs during the monsoon—and significant parts of the country experience serious drought during the dry season.

Current irrigated land is mostly owned by larger farmers, so improving water availability, access and management could greatly contribute to reduction in food insecurity and poverty among small-scale farmers. Unless local level capacity to deliver such inputs is addressed, the potential production levels of small-scale farms will continue to be stunted.

Associated with the country’s abundant water resources are substantial fisheries in the major rivers, the 1,900 km of coastline, and the 500,000 ha of mangrove swamps. There is also considerable potential for aquaculture development in the low-lying river delta areas in the south and centre of the country. Between 1998 and 2009, fisheries production almost tripled, mainly due to aquaculture development. Fish and shrimp have become major export items.

### **iii. Credit**

For most farmers, credit is scarce and expensive. A major finding of Harvard study was that, for most farmers, credit was scarce and expensive. In 2009, the Myanmar Agricultural Development Bank (MADB) provided only 8000 kyat per acre, less than a tenth of the amount needed to cover the average cost of inputs in the cultivation of rice. In that year, there were no other formal-sector lenders for farmers. Informal credit cost 6% to 10% a month, and it was not always available. These circumstances depressed input use, held down production, reduced farmers’ incomes, and ultimately increased their indebtedness.

In an effort to improve farm input credit, the Government instituted a system of Rice Specialization Companies (RSC) in 2008 under which registered firms were encouraged to provide paddy inputs on credit under contract farming schemes in return for rice export

permits. Although 57 RSC's have been registered, many face difficulties in running viable contract farming schemes for paddy. Heavy cost of input financing coupled with poor repayment due to crop losses, flooding and low paddy prices, only a handful of RSCs continued contract farming in Monsoon crop of 2012 (Wong and Wai 2013).

Wealthy landowners can easily access credit, as they can provide collateral which results in lower interest rates, but credit for small-scale farmers is extremely limited. The Myanmar Agricultural Development Bank provides loans to small-scale farmers, but these cover a limited proportion of farmers' costs and are difficult for women farmers to obtain, leaving many farmers to rely on the informal money-lending sector. Widespread demand for more credit and a lack of options has led to a thriving informal market and little protection against indebtedness.

#### **iv. Seed sector**

Myanmar's seeds sector is far behind most other Asian countries. Although there are a lot of challenges in establishing a vibrant seeds industry, the climate and soil conditions for seed production in Myanmar are excellent. Four seed systems can be distinguished in Myanmar:

1. farm saved seed (>80%);
2. the public seed system, including seed farms and outgrowers/ villages;
3. domestic companies producing public varieties
4. international companies, either producing locally or importing seed.

There is no Plant Variety Protection in Myanmar, so most seed companies currently opt for sales of imported seeds. There is a growing demand for hybrid maize and (hybrid) vegetable seeds. A small number of international companies are already producing seeds in Myanmar. A huge influx of international companies is expected soon, once a pending new seed law to protect plant variety will be enacted.

Most farmers now use seed saved from previous harvests or perhaps bought from other farmers. This seed is often of mixed varieties. When milled, paddy grown from such seed produces a high proportion of low-value brokens. This seed may not respond as well as certified seed to high levels of inputs or to improved water control. Disease resistance may also be less. If high-quality seed were available and known to be advantageous, it is likely that there would be a ready market for it. Provision of better seed could be done privately, by the Ministry of Agriculture, or in private-public partnerships. If it is achieved, farmers' access to good seed would result in major gains in production.



**v. Quality control for fertilizer:**

It is reported that most farmers admitted that they could not ensure whether the fertilizer that they bought (except for some brands selling at a 50–100% premium) was of good quality or it was adulterated. Much of the fertilizer purchased comes from China, and quality control is all but nonexistent. Provision of a paid service to check fertilizer quality would be a huge help to farmers who now waste money on fertilizer that often has much less nutrient than claimed. Such a test should not cost much relative to the price of the fertilizer, and it should be made widely available.

**vi. Water control:**

There is a great difference in yields between areas in which farmers are able to channel water to or drain it from fields and areas in which farmers rely on rain and gravity for water control. Farmers in the Irrawaddy Delta estimated that they could achieve yields of 20–30 more baskets of paddy per acre with better water control. The cost of using diesel pumps is too high for many farmers. Rural electrification to lower the cost of pumping water or water control projects would both allow much more production and reduce uncertainty. In the Dry Zone, using infrastructure grants to deepen and expand local reservoirs is another measure that has been tried and that is likely to be effective.

**vii. Tractors and tillers:**

In some areas, there is a shortage of draft animal traction, and planting is delayed until the soil can be ploughed. An obvious alternative, often cheaper, is tractors or cultivators. There is experience by some firms giving tractors to village committees, which in turn manage the machines, maintain them, and allocate them to farmers. The committees are responsible for all fuel, repairs and replacement parts. Access to capacity of this kind allows farmers to plant on time, and it reduces production costs. However, this is not available to all farmers and all regions.

Threshing machines, threshers, power tillers, paddy driers and inter-row cultivators are the important farm machineries used by Myanmar farmers.

**viii. Infrastructure:**

There is a distinct advantage to a village and its farmers if they have access to a good road. Inputs and information reach its people more easily, trips to the market are faster, and better prices are earned for output, as the cost of transport is less. Children can more easily go to higher-level schools, and everyone can get to a clinic or doctor more easily.

Improving rural roads—*not building new highways*—with infrastructure grants would help with better transportation and also provide badly needed off-season work and thus help reduce the burden of excessive debt.

**ix. Reliable information:**

A more recent investigation in 2012 finds that, “extension of agricultural advice is virtually non-existent with farmers depending heavily on each other, private suppliers of inputs and wholesale purchasers.” (Anderson Irrigation, 2012).

A number of pilot projects have provided extension services to farmers. These projects indicate that such services are needed, used and useful. Problems with pests, seed selection, soil conditions and fertilizer, and cropping combinations can sometimes be solved more quickly and cheaply with expert advice. Advice from sellers of inputs or shops sometimes includes promotion of a particular product, even if it is not really appropriate. Sometimes the seller simply does not know what a correct response to the problem is. Government extension services are currently underfunded. Extension officers often have too little knowledge to provide to farmers.

**x. Export**

Myanmar is a net exporter of both rice and pulses. Internal rice consumption is probably growing at 1–2% a year, following population growth. The continuing small but positive export quantities suggest that consumption and output may follow the same trend. For pulses, the official production data show very rapid growth from 2001/02 to 2008/09— from just 2.5 million tons to over 5.0 million tons! If accurate, these figures would represent a great success story for Myanmar over the last decade.

**xi. ICT**

Myanmar started installing Information and Communication Technology (ICT) tools/ applications more than ten years ago. Presently, there are over 250 ICT companies in the country. The ICT coverage for some of Myanmar’s rural areas was initiated by the Post and Telecommunications Department (PTD), which is organizationally under the Myanmar Post and Communication (MPT). A multi-purpose community tele-centre was set up at Phaunggyi village which is located about 48 miles from Yangon. The centre is assisted by the Telecommunication Development Bureau (TDB), and its purpose is to improve living standard of people living in rural areas. The government plans to install about 6,000 small satellite terminals at remote areas within three years or so.

## **xii. Market**

Globalization and the opening up of markets in Myanmar is also resulting in increased competition for small-scale farmers as imports of all kinds, including agricultural products, begin to reach even the most rural areas. Farmers need support to become more competitive by producing higher quality products, reducing costs and diversifying their markets. But this shift requires the government and private sector to set favourable conditions to encourage equitable growth.

The Government in Myanmar should be supportive of producer organizations (POs), ensuring their voices are reflected in policy, so that small-scale farmers can join together to benefit from economies of scale and a stronger, united negotiating voice. POs can link disparate and marginalized producers with more lucrative markets, while allowing them to share risks and costs, meet quality requirements, and negotiate with increased market power.

## **6. Constraints in agricultural development**

A review of different studies related to problems/ constraints related to agricultural development are presented. It is found that a series of institutional, policy and structural constraints has hampered agricultural growth and contributed to Myanmar's current high rates of hunger and malnutrition. The most critical of these problems include:

- highly skewed land distribution, which leaves roughly half of rural households landless,
- Poor water control systems in the presence of global climate change and increasingly unpredictable rainfall,
- High-cost transportation system,
- Weak rural financial institutions,
- Unpredictable and uneven implementation of new government policies,
- Low public investments in agricultural research, and
- Weak links between extension services and farmers.

There are a number of factors hampering growth of agricultural production. These include

- (i) low producer prices;
- (ii) high costs for farm inputs such as fertilizers; inadequate access to markets and inputs due to the poor condition of the rural road network, as well as the imposition of road and bridge tolls by local administrations;
- (iii) lack of access to credit;
- (iv) limited irrigation;
- (v) land tenure system that provides tillage rights but not ownership;

- (vi) non-transparent market mechanisms;
- (vii) poorly developed research, training, and extension services;
- (viii) lack of electricity in rural areas; and
- (ix) Appreciating exchange rate.

The key constraints can be broadly grouped into three- (i) physical constraints, (ii) policy constraints and (iii) institutional performance and governance.

**i) Physical constraints**

Important physical constraints are:

- Rural infrastructure deficiencies.
- Inadequate irrigation.
- Limited and unreliable rural electrification.
- Inadequate flood, drainage, and salinity control structures.

**ii) Policy constraints**

Land tenure situation- Until the recent approval of the revised land laws, all land in Myanmar belonged to the state and farmers had only tillage rights. Formally and legally, land could not be mortgaged, bought, or sold, but could be inherited. The revised land laws include major reforms that will provide farmers with tenure or outright ownership.

Consistency of the land laws with the extant legal and investment framework(s)- In particular, the Myanmar Citizens Investment Law, the Foreign Investment Law, and the emerging frameworks for small- and medium-scale enterprise governance in the agriculture and agribusiness sectors need to be carefully assessed and rationalized.

Tax on exports- An 8% tax on exports and a 2% income tax applies to exporters of farm products.

Directed planting- Farmers within government-sponsored irrigation systems are directed to produce rice in order to meet production targets. With few incentives to do so during the dry season (when rice production is more costly), many farmers grow no crop at all. This reduces the overall agricultural output, employment available to landless labourers, and the level of economic activity generally.

**iii) Institutional performance and governance**

Important constraints are:

- Inadequate access to fertilizers and other inputs.
- Limited access to improved seed.

- Inadequate access to rural finance. The Myanmar Agricultural Development Bank (MADB) is the sole source of institutional credit for crop production.
- Limited coverage and expertise of agricultural extension services.
- Limited farmer-based institutional services.
- Limited funding for agricultural research and training.
- Lack of access to market information.

## **7. Capacity Building of Extension system**

### **i. Training priorities**

A study was conducted to identify the training priorities and the study revealed specific training needs in ten technical subjects as expressed by the extension agents in the following order of priority:

- Extension education
- Rice production technology
- Market information advice
- Pure seed production
- Post-harvest technology
- Pulses and oil seeds crop production technology
- Cropping system
- Industrial crop production
- Plant protection technology
- Farm mechanization

### **Training needs of Extension agents**

A study on the training needs of extension agents in Myanmar indicated that the most important problems of extension agents in their fieldwork are concerned with “inadequate knowledge in agricultural extension”, “lack of proper extension program for the needs of local community”, “poor transport facilities”, “and lack of suitable market and price insurance for farm products”. These four problems were rated considerably higher than other problems. These are followed by “lack of farmers’ finance”, “no crop damage insurance for farmers”, “inadequate extension staff”, “no cooperation of local people in programme implementation”, “assignment of non extension activities”, “illiteracy of farmers”, “reluctance of farmers to accept new practices”, and “too many farmers to advice” orderly.

**ii. Institutional linkages for pluralistic agricultural extension system**

The government has created Myanmar Rice Industry Association (MRIA) to promote the export of rice. The MRIA has been created by merging three existing associations namely, the Myanmar Rice and Traders' Association, the Myanmar Millers' Association and the Myanmar Paddy Producers' Association. In September 2012, MRIA changed the name as Myanmar Rice Federation (MRF). Myanmar Agribusiness Public Corporation (MAPCO) is a wholly-owned non-government Public Corporation, established in September 2012. MAPCO is formed to mobilize public savings and to foster broader investment in agriculture and agro-based industries of Myanmar.

The Government can also improve the transparency and openness of official professional associations, such as the Union of Myanmar Federation of Chambers of Commerce (UMFCCI) and its sister organizations, to enhance their capacity to make markets work better for small-scale farmers, and develop measures that encourage women to participate more in them.

**iii. Reform Areas in Agriculture Sector Development (Policy Statement from the Ministry of Agriculture, Myanmar)**

1. Reform for Land Management and Administration\_(Precision of land, land map and land record for effective land management)
2. Reform for Advanced Agricultural Practices and Seed Industry\_(Dissemination of Good Agricultural Practices (GAP) and seed production of high yielding crop varieties for increases production)
3. Reform for Water Resource Management\_(Construction and effective operation of reservoir and dams, pumping and flood protection for efficient use of water resource)
4. Reform for Agricultural Mechanization\_(Systematic cultivated land reform for switching to mechanized agriculture)
5. Reform for Advanced Agro-based Industry\_(Development of Agro-based industries including construction of chemical and fertilizer factories and modernized rice mill for value added Agricultural Products)
6. Reform for Human Resource Development\_(Human Resource Development in Agricultural Sector)
7. Reform for Research and Technology Development (Development of Agricultural

Research and Technology)

8. Reform for Credit Services\_(Development of Farm Credit systems for Supply Chain

9. Reform for Market Information Service\_(Information and data accumulation for development of Agro-marketing system)

**iv. Strategies suggested for agricultural development**

‘The package of strategies’ is diverse and assumes “comprehensive and applied aspects of the following five strategies:

- |     |                          |   |
|-----|--------------------------|---|
| (a) | Intensification Strategy | -raising productivity through intensive application of inputs / factors of production;  |
| (b) | Extensification Strategy | -area expansion;  |
| (c) | Diversification Strategy | -broadening the base of agriculture in terms of both production and consumption;  |
| (d) | Rehabilitation Strategy  | -land improvement and rural development; and  |
| (e) | Integration Strategy     | -improving the co-ordination and co-operation and working together in concerted efforts between various public and private agencies involved in agricultural development. |

**Strategies for development of agriculture**

- (1) Secure the linkages among R&D, Extension and Market;
- (2) Development of efficient supply chain and industry clusters;
- (3) Assure sustainable land tenure;
- (4) Establish an efficient system of:
  - Inputs (seed, fertilizers & chemicals, machinery etc)
  - Credit

- Guaranteed purchase and prices

- Insurance on crops and climate

(5) Establish efficient buffer policy and system;

(6) Promote Contract Farming;

(7) Develop infrastructures: - SMEs law and regulations - Wholesale market law  
– Rural access roads - Rural electrification and bio-energy

(8) Institutional reform and HRD.

As Myanmar is an agro-based country, the Ministry of Agriculture and Irrigation (MOAI) is mainly responsible for making a plan on a country's agricultural development. The MOAI adopted three tactics for the development of rural livelihood and poverty reduction. These are:

1) **Seed Jump**; using special high yielding varieties in order to increase basic agricultural component,

2) **Technology Jump**; adopting advance agricultural technology during the process from cultivation to harvesting, and

3) **Investment Jump**; supporting the basic needs of agricultural development. According to the current market economic system, it is also encouraging to produce the quality and market demanded products along the supply chain in order to receive a profitable price by farmers. Moreover, it is also encouraging the participation of private sectors in the area of agro-based industries including small and medium enterprises (SMEs) which will be able to support the production of value-added products and of the development of upstream, middle stream and downstream industries which can support the agricultural supply chain.

## **8. Support from International Agencies**

### **i. FAO Support**

FAO has provided assistance through various national projects. Some of them are:

The first-ever FAO project for rice crop development in Myanmar assisted the Ministry of Agriculture and Irrigation to train hybrid rice researchers, seed production supervisors and seed growers to carry out research and development activities on a sustainable basis and formulate medium-term hybrid rice development in Myanmar. The project was designed to address issues of crop intensification and diversification, including



the development of water harvesting and localized small-scale irrigation. It also worked to diversify income opportunities through enterprise development and small-scale livestock production.

When cyclone Nagris struck southern Myanmar during May 2008, it left a trail of death and destruction, devastating much of the fertile Irrawaddy Delta and Yangon, the nation's main city.

FAO and other donors quickly began work to ensure a sustainable long-term recovery by establishing the Emergency and Rehabilitation Coordination Unit to deliver help to some 142 200 households in the Irrawaddy delta as well as 1 906 households in Rakhine State. The people who were affected by the cyclone were given farm inputs such as seeds, fertilizers, power tillers, draught animals, animal feed, veterinary services and fishing equipment as well as water pumps. These were the items most critically needed to get farming and fishing restarted after the disaster.

FAO has been strengthening government capacity to control the avian influenza disease at country level since 2006. In Myanmar, the FAO programme has successfully built surveillance, epidemiology, diagnostic, and response capacity. For the first time in Myanmar, there is a national database, including geographical coordinates, of all commercial poultry farms. This contributes significantly to disease control planning. Also the first time, large-scale national surveillance programmes are being conducted utilizing networks of Community Animal Health Workers.

The availability of vegetables in Myanmar is less than 50 percent the recommended daily dietary intake of vegetables (300 g/day). An FAO assisted project provides the platform to highlight this key issue and initiating remedial action at national level. With US\$2.9 million funding provided by the European Commission, an FAO project in Myanmar supports most needy people in the Northern Rakhine State through food, nutrient and livelihood security and natural resource management.

## **9. Road ahead for Agricultural Development in Myanmar**

The new wave of political reforms have set Myanmar on a road to unprecedented economic expansion, but, without targeted policy efforts and regulation to even the playing field, the benefits of new investment will filter down to only a few, leaving small-scale farmers – the backbone of the Myanmar economy – unable to benefit from this growth. If Myanmar is to meet its ambitions on equitable growth, political leaders must put new policies and regulation to generate equitable growth at the heart of their democratic reform agenda.

These must address power inequalities in the markets, put small-scale farmers at the centre of new agricultural investments, and close loopholes in law and practice that leave the poorest open to land-rights abuses.

Enhancing local government capacity and incentives to support small-scale farmers with effective inputs will be essential. Currently, many local township authorities in Myanmar do not have sufficient capacity or resources to support small-scale farmers with adequate extension services or the right kinds of agricultural inputs. Policies and practices to maximize investment in rice paddy across the country mean some farmers are required to produce crops that are not suitable for their climate, notably in the Dry Zone, a fragile environmental area in central Myanmar characterized by scarce water resources.

Donors and IFIs can help shape the direction of agricultural development in Myanmar by ensuring that their aid invests in promoting small-scale farmers and strengthening their ability to engage with markets. Multi-donor trust funds in Myanmar, such as the Livelihoods and Food Security Trust Fund, and contributing donors should continue to keep small-scale agricultural promotion at the heart of their investments, and work closely with the government to ensure that national policy is explicitly aimed at supporting this group.

#### **i. Making Agriculture a Profitable Business**

The problems of agriculture in Myanmar are many. However, two phenomena deserve special attention. The first is 'landless farmers' ('farm workers' would be a more apt description, for they don't even have tenancy rights). Experts estimate that more than 50% of the 'farmers' are landless. They are among the poorest, who are willing to migrate anywhere they can find a daily wage of Ks. 2,500 instead of the Ks. 2,000 commonly paid on farms.. The second is the troubling perception among farmers that agriculture is not profitable. This can curb investment in agriculture and make the gloomy outlook a self-fulfilling prophecy.

##### **a. Addressing landlessness**

An obvious solution for landlessness is land reform. Large-scale land reform, however, would entail huge political, administrative, and fiscal costs. When Myanmar is about to enter a period of accelerated industrialization (hence shifting of labour out of agriculture), land reform may be too late. With the disrepute of agriculture as a business, most landless farmers may well prefer assistance to make a transition into a new line of work in any case.

Still it will be good to prevent further landlessness. In the past, landlessness was blamed on distorted policies that forced farmers to grow rice and sell it at a low price. After 1988, however, it seems to be caused mainly by a catastrophic illness in the family. If so, the remedy is to be found outside agriculture; the government should strengthen the health insurance system to protect farmers.

#### **b. Making agriculture profitable**

In the near term, conventional interventions would all be relevant, such as better irrigation, diversification of crops, use of improved seeds, and access to adequate financing. But, it is critical to look 30-40 years ahead, when Myanmar's per capita GDP will likely increase from about \$900 to \$10,000 or more. So, for agriculture to remain 'profitable' in comparison with other sectors, farm incomes must rise by not just a factor of 2 or 3, but by a factor of 10.

Two paths are open, and both should be pursued in combination. One is smallholder farming of high-value crops, such as flowers, vegetables, tea, etc. Whereas growing two crops of rice on an acre of land in the Delta may produce an annual income of about \$300, flower production could generate about \$10,000. The latter is of course highly capital intensive, but the point is that vastly more productive farming is possible. The other model is large-scale, mechanized farming of agricultural commodities, such as rice. Even though the yield per acre cannot be increased by anything like 10 times, cost reduction can generate high profits on large farms.

Farmers with 5-10 acres of land will find moving into radically different farming a daunting challenge. Part of the problem is that the cost of being the 'first mover' is heavy, as he has to master the new technology, develop the market, etc. But, if he succeeds, others can readily copy his model, thereby denying him a chance to earn extra profits for taking the high risk. This dynamic tends to lead to an underinvestment in what is good for the country.

It is the same challenge Myanmar faces in promoting manufacturing. Highly modern agriculture is similar to manufacturing. Thus, Myanmar needs an 'industrial policy' to support modern agriculture. Such farming is a new field, requiring a great deal of entrepreneurial spirit. In this context, the government might consider a program to help the most enterprising of the landless to venture into this sector, as an alternative to land reform. At least they know

farming, and settling them in good rural occupations will ease the population pressure on the cities.

Although aiming for doubling of farm incomes is a realistic policy goal for now, it is essential to be thinking ahead, about raising incomes from small farms by a factor of 10. Since such intensive farming will require considerable capital, the transition will take time, much like fostering successful small and medium manufacturing businesses.

Large-scale commercial farming is new in Myanmar. The government may wish to promote private investments by improving supporting infrastructure and offering fiscal incentives. In parallel with special economic zones (SEZs) for manufacturing, it could consider 'agricultural SEZs' for modern and export-oriented farming. Rice, beans, and other commodities could be produced on a large scale. SEZs may also attract investments in intensive farming (such as flowers, vegetables, and tea), which could become nodes of contract farming to prompt smallholders to venture into high-value crops.

### **c. Modernization of agriculture**

Modernization of agriculture is especially important for Myanmar for two reasons. First, given its agricultural potential, building a vibrant agriculture sector is essential for maximizing Myanmar's overall growth. Second, it will help slow the costly urbanization process and eventually create a more pleasant living environment in the country. In an earlier article, I have argued that manufacturing is the core of the economic system that brings about an equitable and stable society. Modern agriculture can complement manufacturing in this approach. If Myanmar succeeds in this endeavour, it will chart a new path that is more balanced than what even Japan, South Korea, and Taiwan were able to find.

## **10. Training priorities identified based on review**

Based on the review of various studies and existing literature, the following topics are derived for conduct of trainings.

- Seed production technology
- Diversified farming
- Market led extension
- Establishing Farmer Producer Organisations

- Farmer Participatory Extension
- Small farm mechanization
- Value added production technology
- Community telecentres
- Public private partnership for farm development
- Farm credit system for Supply chain
- Backyard poultry rearing
- Responsible fisheries and conservation of fish resources
- Drought management
- Paddy-fish integrated farming
- High value crops for small farmers
- Laws related to agriculture

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