



Ministry of Agriculture, Livestock and Irrigation

Roadmap for Scaling up Myanmar Pulses Value Chain

Department of Planning (DOP), MoALI



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ROADMAP FOR SCALING UP MYANMAR PULSES VALUE CHAIN

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Roadmap for Scaling up Myanmar Pulses Value Chain





FOREWORD

MR. TIN HTUT OO

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MINISTRY OF AGRICULTURE, LIVESTOCK AND IRRIGATION

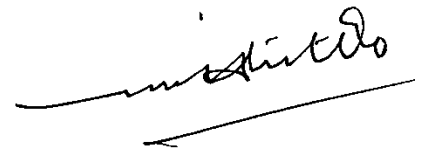
The Department of Planning, Ministry of Agriculture, Livestock and Irrigation (MoALI) of Myanmar, together with the International Fund for Agricultural Development (IFAD), International Food Policy Research Institute (IFPRI) and Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) carried out Agricultural Transformation and Market Integration in the ASEAN Region (ATMI-ASEAN) project, which aims to strengthen the institutional capacity of the ASEAN member states (AMS) to facilitate the integration of smallholders in the regional agri-food market and develop and implement policies to support inclusive transformation and market integration.

This roadmap is an output of the efforts of Department of Planning, Ministry of Agriculture, Livestock and Irrigation and its partners in response to improve the socio-economic condition and livelihoods of smallholder pulses farmers in Myanmar. It presents a vision that "Progressive and productive pulses sector through a more inclusive, integrated, resilient, and globally competitive and recognized pulses value chain to contribute economic growth of Myanmar" and two missions that 1) improve the socio-economic condition of smallholder pulses farmers by creating rural livelihood and income, reduce poverty incidence through pulses-based agribusiness, and 2) maintain Myanmar's position for being one of the largest exporters of the pulses and to be a producer of the quality pulses thereby market integration and diversification of market.

Therefore, I believe that the objectives will be achieved and Myanmar pulses sector will certainly enjoy the another milestone of success through progressive, sustainable, inclusive, integrated, efficient and globally recognized pulses value chain after the action lines are operationalized in well-coordinated network activities with well allocated financial resources and political supports and commitments.

Roadmap for Scaling up Myanmar Pulses Value Chain

Finally, I would like to thank to International Fund for Agricultural Development (IFAD), International Food Policy Research Institute (IFPRI) and Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) for their efforts and contribution to fulfill objectives of ATMI-ASEAN project and writing up the roadmap for scaling up Myanmar pulses value chain to develop pulses sector in Myanmar.



Tin Htut Oo

Union Minister

Ministry of Agriculture, Livestock and Irrigation

ACKNOWLEDGEMENT

Roadmap for Scaling up Myanmar Pulses Value Chain (RSMPPVC) was particularized as a component of Agricultural Transformation and Market Integration in the ASEAN Region (ATMI-ASEAN) project, which aims to foster multi-faceted scaling of pulses value chain and to implement research based model and mega scaling up pulses value chain projects at respective ecological zones and farming systems for site-specific pulses technological intervention. ATMI-ASEAN project is funded by the International Fund for Agricultural Development (IFAD). The formulation of the value chain roadmap was carried out by the Ministry of Agriculture, Livestock and Irrigation and International Food Policy Research Institute (IFPRI) with the technical assistance provided by Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA).

This roadmap highlights three strategic objectives 1) foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain, 2) increase productivity in the production through modernization, diversification, intensification, and processing of pulses in Myanmar, and 3) increase the value and reduce the risk of pulses production and processing in Myanmar. This roadmap can be utilized as strategic guidelines to increase profit margin fair equity ratio along the value chain, quality assurance of pulses products in compliance with international standards and specification facilitating market integration and diversification.

We would like to express our sincere thanks to His Excellency, Union Minister for MoALI, U Tin Htut Oo, for his strong encouragement and interest, kind permission to undertake the formulation of pulses value chain roadmap.

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We would like to express special gratitude to U Kyaw Swe Lin, Director General, Department of Planning and Dr. Thanda Kyi, Deputy Director General, Department of Planning for their tireless encouragement and interest, very useful insights and invaluable suggestions and guidance throughout

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the period of the formulation of Myanmar Pulses Value Chain Roadmap.

Finally, we would like to convey our thanks to three experts, Dr. Tin Htut, Agribusiness Expert, U Soe Win Maung, Industry Expert and U Myo Thu, Commodity Expert for their enthusiasm, patience, work hard for long hours, efforts and contribution to the development of Myanmar value chain roadmap for pulses document.

Ministry of Agriculture, Livestock and Irrigation

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List of Abbreviations

ACIAR	Australian Center for International Agricultural Research
ACMECS	Ayeyawady-Chao Phraya- Mekong Economic Cooperation
AEZ	Agro-ecological Zones
AMD	Agricultural Mechanization Department
AMS	ASEAN Member State
ANR	Agriculture and Natural Resource
ASEAN	Association of South-East Asian Nations
ATMI-ASEAN	Agricultural Transformation and Market Integration- Association of South-East Asian Nations
BIMSTEC	The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
CBM	Central Bank of Myanmar
CLMV	Cambodia, Lao, Myanmar, Vietnam
CSO	Central Statistical Organization
DAP	Department of Agricultural Planning
DAR	Department of Agricultural Research
DG	Director General
DOA	Department of Agriculture
DOP	Department of Planning
DZ	Dry Zone
FAO	Food and Agriculture Organization
FAQ	Fair Average Quality
FDI	Foreign Direct Investment
FE	Foreign Exchange
FQ	First Quality
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GMS	Greater Mekong Subregion
GOM	Government of Myanmar
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
INGO	International Non-government Organization

ITC	International Trade Centre
IWUMD	Irrigation and Water Utilization Management Department
MAB	Myanmar Apex Bank
MIFER	Ministry of Investment and Foreign Economic Relations
MMK	Myanmar Kyat
MoALI	Ministry of Agriculture, Livestock and Irrigation
MoC	Ministry of Commerce
MoCon	Ministry of Construction
MoCRD	Ministry of Cooperatives and Rural Development
MoPF	Ministry of Planning and Finance
MoTC	Ministry of Transport and Communications
MPBMSMA	Myanmar Pulses, Beans, Maize and Sesame Seeds Merchants Association
MPVCOB	Myanmar Pulses Value Chain Oversight Board
MPVCSC	Myanmar Pulses Value Chain Steering Committee
MSMEs	Micro, Small and Medium Enterprises
MT	Metric-ton
NCSU	North Carolina State University
NES	National Export Strategy
NGO	Non-government Organization
RSMPVC	Roadmap Scaling up Myanmar Pulses Value Chain
SEARCA	Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SOP	Standard Operating Procedure
SPSS	Sustainable Pulses Seed System
SQ	Special Quality
SSID	Small-scale Industries Department
SWOT	Strengths, Weaknesses, Opportunities and Threats
UMFCCI	The Union of Myanmar Federation of Chambers of Commerce and Industry
UN	United Nations
UPLB	The University of the Philippines Los Banos
USA	United States of America
USD	United States Dollar
YAU	Yezin Agricultural University

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EXECUTIVE SUMMARY

This roadmap sets the direction for the Myanmar Pulses Sector Development. It encompasses the situation analysis, issues and challenges encountered in pulses sector and scaling up pulses value chain through strategic pathway and planning. As the pulses sector development cannot be achieved by a single factor approach, this roadmap identified the potential multiple approaches such as market diversification, strong governance and institution, and encouraging research, development and extension.

The current roadmap is intended for scaling up the pulses value chain with the vision of "Progressive and productive pulses sector through a more inclusive, integrated, resilient, and globally competitive and recognized pulse value chain to contribute rural economic growth of Myanmar".

Where Are We Now?

Myanmar is recognized as one of the giant pulse producers and exporters in the world. It is largely due to no or low government intervention but private-led economic after agricultural liberalization. Moreover, export price shock in 2017 due to trade restriction of India alarmed Government of Myanmar (GOM) and private sector to recognize the nature of Myanmar pulses export to India is monopsonistic. Pulses value chain is the most important in Myanmar because of its large share in the crop area, export earnings and engagement of the working labor force in addition to the support of food and nutrition of the people.

Annual pulses production in last ten years was averaged to (7.28) million metric tons ranging from (6.67) to (7.91) million metric tons, positioning Myanmar as the second, third and fourth largest producer of dried bean, pigeon pea and chick pea respectively in the world. It is well recognized that pulses crops are widely grown and produced across all States and Regions of Myanmar and Sagaing, Bago, Magway, and Ayeyarwady stand as the largest pulses producing regions.

Myanmar annual pulses export from 2011-12 to 2020-21 ranged from (887) million USD to (1571) million USD resulting an average value of (1168) million USD. The highest export was achieved in 2020-21, which was not only the highest record in value but also in export volume. It amounts to (2030) thousand MT while last ten years average volume was registered as (1516) thousand MT. However, Myanmar experienced a sudden fall down in pulses export in 2017-18 affected by the restriction on imports of pulses by the Government of India after recording annual increase in export revenues over the period 2013-14 to 2016-17. It is needed to change the pulses

sector with transforming supply chain into efficient value chain which will be demand driven can go far beyond its traditional markets like India and China, the second wave of success will become reality.

Where Do We Want to Go?

Vision

“Progressive and productive pulses sector through a more inclusive, integrated, resilient, and globally competitive and recognized pulses value chain to contribute rural economic growth of Myanmar”.

Mission

- I. Improve the socio-economic condition of smallholder pulses farmers by creating rural livelihood and income, reduce poverty incidence through pulses-based agribusiness, and
- II. Maintain Myanmar's position for being one of the largest exporters of the pulses and to be a producer of the quality pulses thereby integration and widening global new market.

The strategic objectives

For the sake of scaling up Myanmar pulses value chain, there are three strategic objectives which have been laid out in “Myanmar Pulses Sector Development Strategy” by the leadership of Department of Agricultural Research (DAR), Department of Agriculture (DOA) and various stakeholders with the help of Australian Center for International Agricultural Research (ACIAR) (2017).

Strategic objective-1. Foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain,

Strategic objective-2. Increase productivity in the production through modernization, diversification, intensification, and processing of pulses in Myanmar, and

Strategic objective-3. Increase the value and reduce the risk of pulses production and processing in Myanmar.

How Do We Get There?

Operational roadmap and the list of actions under the strategic objectives

In order to realize the desired goals and achieving the three strategic objectives, the three key

stakeholders namely public sector, private sector, and primary pulses producers must play in a balanced position through coordinating manners in operating the value chain through participatory fashions for sustainability of the Myanmar pulses sector. It is advisable to implement the strategic actions through improved networking.

The profit triangle is translated into the three thematic areas under which activities should be implemented on each of the strategic objective as follow:

1. Market development,
2. Governance and institutions, and
3. Research, development and extension.

Strategic objective-1: Foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain

This objective can be achieved by implementing the following action lines:

- a. improving export market intelligence,
- b. enforcing use of developed protocol for nationally-standardized set of quality requirements for major exporting pulses and beyond,
- c. strengthening trade promotion programs for expanding Myanmar pulses brand,
- d. market diversification through developing new pulses commodities, possibly by value addition or other diversity of pulses species or commodities of underutilized pulses crops for new markets,
- e. enhancing use of a standardized system and continue developing for testing all pulses exports,
- f. promoting domestic/export/import market access to the primary producers and value chain actors through accountable market information service,
- g. encouraging stakeholders concerned for industrial leadership with clearer vision,
- h. encouraging industry funding and co-funding to support development of the sector,
- i. inclusive financing for stakeholders in the value chain,
- j. wide-scale training on basic financial education and management for farmers and stakeholders,
- k. wide-scale application of mobile technology, and
- l. setting priority to massive capacity building for concerned officials and their respective institutions either public or private in relation to research and extension, business management, and entrepreneurial skill.

Strategic objective-2: Increase productivity and production through modernization, diversification, intensification, and processing of pulses in Myanmar

This objective may be achieved through the following activities:

- a. strengthening governance through providing concrete policy supports and business initiatives periodically,
- b. sensitizing government to solve outstanding issues such as water use, land use and land use right,
- c. promoting pulses research and development, strengthening all-inclusive national agriculture research system (DAR, DOA, DOP, Yezin Agricultural University (YAU), and relevant departments under MoALI as well as under other line ministries and private sector) i.e., increasing capacity of individual researcher as well as allocation of funding for research and development on pulses with special emphasis on pulses varietal development and maintenance breeding of released varieties (Producing early generation seeds),
- d. setting up pulse's knowledge management mechanism/ establishing pulses knowledge bank,
- e. creating pulses seed network including public sector, private sector and farmers for producing more amount of early generation seeds such as breeder seeds, foundation seeds, registered seeds to produce more certified seeds and encouraging informal quality seed sector,
- f. devising an extended plan for availability of good quality seeds in terms of extended seed production and distribution system at least certified seeds to ensure quality products through the Sustainable Pulses Seed System (SPSS) along with seed saving technology, encouraging mainstreaming and streamlining of both formal seed system and informal seed system or other alternative seed systems,
- g. strengthening extension activities of DOA for Good Agricultural Practices (GAP) for pulses production specific to respective pulses and their farming system as well as organic pulses production for the niche markets,
- h. promoting research and extension for promising underutilized pulses species for farming system diversification and organic pulses to access niche market domestically or internationally,
- i. promoting linking research and extension system to production industries,
- j. enhancing yield of pulses by at least one or two supplementary irrigations through low lift and shallow tube well by possible private sector irrigation services under public-private partnership through water policy review and reform,
- k. accelerating farm mechanization at various stages of cultural managements such as tilling, seeding, cultural operation, irrigation service, harvesting, drying and post harvesting for time

and labor saving, and

- l. transforming current resource-based pulses farming system into knowledge-based pulses farming system.

Strategic Objective 3: Increase the Value and Reduce the Risk of Pulses Production and Processing in Myanmar

The strategic objective-3 may be achieved by following activities:

- a. considering options for linking pulses based small and medium-sized enterprises to the market (to help growers and processor, know which traders are selling to which export markets. This allows farmers to choose which trader/exporter to sell to rather than taking the opportunities available to them at the time),
- b. simplifying and clarifying policies relating to foreign direct investment and foreign currency flow for the purpose of attracting FDI,
- c. considering options for crop insurance and warehouse receipt and financing,
- d. promoting market access through better logistic supports by rethinking mass transportation through railways and water ways, facing the challenges of looming crisis of energy nexus,
- e. provision of market-led extension service,
- f. holding annual crop outlook conferences with information available on a website and other information and communication technology platforms, and
- g. holding periodical talk-show for skill building and knowledge sharing.

1. INTRODUCTION

After withdrawal of centrally planned economy and liberalization of agricultural production and marketing, pulses sector came to play a significant role for rural economic transformation in Myanmar. Since the time Myanmar had changed its economic policy from the “planned economy” to the “market-oriented economy” in 1989, agricultural commodity value chain recognized as market-based initiatives becomes more and more progressively pervasive to support smallholder rural farmers by assisting them to enter the larger markets. It also provided a pathway of enhancing their socio-economic well-being. Lately, it is unanimously agreed that integrated, inclusive and innovative value chain development along with its functional supply chain are the vital elements for agricultural development and pro-poor approach for the impacts of changes in Myanmar. Thus, various researchers, agencies, and different institutions in Myanmar have conducted the studies and analysis of Myanmar agricultural commodity value chains including pulses value chain. In fact, Myanmar is a country in which the various aspects of its agricultural development have been studied most by the development agencies in the last decade.

Since the pulses are produced mainly for export in Myanmar, value chain development approach becomes indispensable for sustainable growth and vitally important for the economic development of the country in the backdrop of good agriculture policy. Although pulses possess high nutritional value and are important for carrying out nutrition sensitive agriculture in Myanmar, domestic consumption is still far less than export volume. Then, the pulses became the largest agricultural export item for Myanmar economy for thirty years. It has significantly contributed as much as 32% of the export revenue from crop sub-sector in 2019-20 (Ministry of Commerce).

1.1 Agricultural Setting of Myanmar

The agricultural sector of Myanmar is estimated to contribute 22% of Gross Domestic Product (GDP), while industry accounts for about 36% and services about 42% of GDP (DOP, 2020). As in other countries in the region, a significant proportion of industry and trade is also related directly or indirectly to the agriculture and natural resource (ANR) sector.

Approximately 70% of the population lives in rural areas (DOP, 2020). According to the Myanmar Living Condition Survey 2017, the poverty rate in Myanmar was approximately 24.8% and about 85% of poverty is concentrated in rural area, where 24% of rural households is considered vulnerable. With a per capita income of United States Dollars (USD 1.1) 1,653 Kyat (World Bank estimate), Myanmar is ranked 165th out of 199 numbers of listed countries in the world. (1 USD = 1480 MMK in 2019, Central Bank of Myanmar)

1.2 Impacts of Covid-19 on Agricultural Production and Food Systems in Myanmar

The pandemic disease, Covid-19 has made the severe global economic recession and Myanmar economy is no exception. It has caused major disruption not only on local agricultural trade but also international trade largely due to travel restriction, limiting the flow of the value chain. In order to prevent the further spread of Covid-19, the government imposed three weeks lockdown policy on entire country and closed all the international borders during the first wave of pandemic. The closure of the international border particularly of China has great negative impact not only on agricultural commodity exports but also on imported agricultural inputs like fertilizers and agrochemicals, farm machineries and their spare parts. Thus, input price increased and poor primary producers could not afford to purchase there by expecting reduced agricultural productivity.

The study has shown that, due largely to travel restriction, the economic effects of Covid-19 disruptions on farm and agricultural labor, dependent households, agribusiness enterprises, and rural and urban consumers have been severe. The agri-food system, as a whole, has been hit by multiple shocks including domestic and foreign demand shocks, supply disruptions due to movement restrictions, and liquidity constraints. Farm households, in response to income losses and lower crop prices, cut back on investment in monsoon season crop production, with systemic effects on firms providing agricultural inputs and mechanization services.

The study also showed that while the agri-food system appears to have been resilient in its ability to adapt to disruption in the short run, persistent income losses among all types of actors may result in a prolonged recovery period. It is noted that there are three key lessons emerged to enhance the resilience of Myanmar's agri-food system in the face of any similar future event as follow:

- 1) Agricultural inputs, services and products must be allowed to move freely while ensuring safety measures appropriate to Covid-19 prevention,
- 2) Additional financial liquidity should be made available to farmers and businesses, along with flexible terms, to prevent disruption of farm activities and service provision,
- 3) Additional social protection will likely be required to avoid severe food insecurity and malnutrition among vulnerable households.

2. THE STATE OF MYANMAR PULSES SECTOR

2.1 Pulses Value Chain Development

Pulses value chain is the most important value chain in Myanmar because of its large share in the crop area, export earnings and engagement of the working labor force in addition to the support of food and nutrition of the people. In this value chain, it involves the processes of production, value-addition, marketing, up to final consumption. Its coverage concerns all the stages from “farm to fork”, which means from provision of inputs to primary production, transformation, primary processing, marketing, and final consumption at home and abroad. Players and their functions along the pulses value chain (Figure 1) are given below:

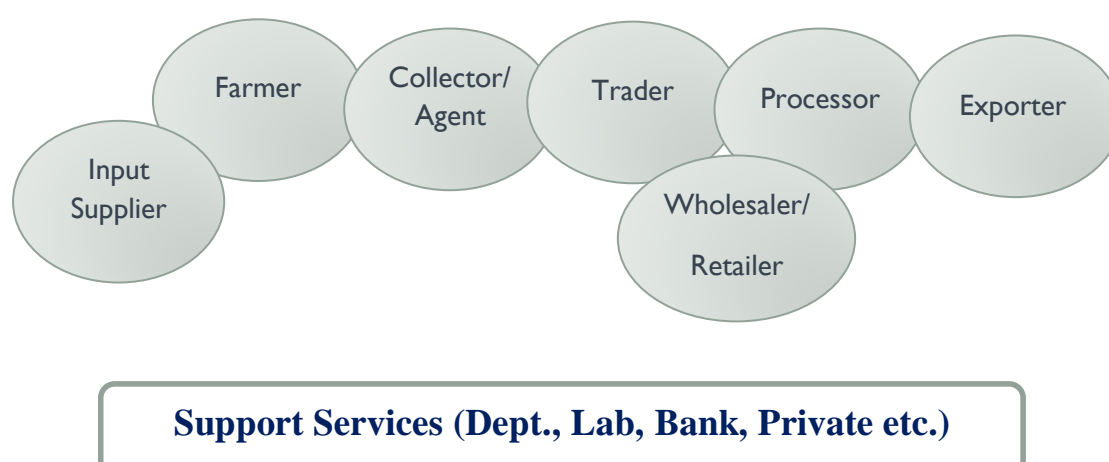


Figure 1. Diagram of Value Chain Players for Myanmar Pulses

Input supplier:	Supply of agricultural inputs such as: seed, fertilizer, pesticide, farm equipment.
Farmer:	Land preparation, planting, plant caring, harvest, post-harvest, and storage are managed by farmer. Farmers Group and agricultural cooperatives also play the role of farmer.
Collector/Agent:	Collect products from farmers in village or at nearby town. Primary processing of cleaning is generally done by them.
Trader:	Buy pulses from collector/agent, transport, ware-housing.
Processor:	Cleaning, sorting, sizing, splitting, value-addition, packaging and labeling.
Exporter:	Buying, selling, and shipping.

Wholesaler/Retailer: Buying, selling the pulses products to consumers.

Support Services: Provide services such as: research, extension, policy, trade facilitation, legal & regulation, lab testing, certification, financial services, technical and maintenance services, logistics and other services. Government departments, private sector, lab, banks, other related institutions are major service providers.

Globally, Myanmar is recognized as one of the giant pulse producers and exporters in the world. It is largely due to no or low government intervention but private-led economic style after agricultural liberalization. Myanmar pulses sector has been recognized by many interest groups and researchers as the nature of *Laissez-faire*. However, while private sector has been enjoying its own efforts at their ends, it is suffering from the shortfalls of government policy instruments and supports together with implementation of the policy such as provision of regulatory guidelines and essential support services. Particularly, shortfalls in laying down of appropriate policy for the pulses sector development; high prioritization only on rice crop; provision of research and extension services; low investment in the pulses value-chain; limited crop loan, agricultural inputs, farm mechanization, and quality infrastructure; modernization of trade system; etc. are expected to be in line with the development process.

Because of rapid pulses sector transformation and success stories in Myanmar, it has drawn the interests and attention of international and local scholars, academia and international development partners to study Myanmar pulses sector. Moreover, export price shock in 2017 due to trade restriction of India alarmed Government of Myanmar (GOM) and private sector to recognize the nature of Myanmar pulses export to India is monopsonistic. Therefore, series of studies and investigations on pulses value chain were carried out by various investigators and development agencies from 2017 onward.

As of recent development in pulses sector in Myanmar, several activities and initiatives have been launched for the development of the sector, for example, very first “**Myanmar Pulses Sector Development Strategy**” has been formulated in 2017 with the support of Australian Centre for International Agricultural Research (ACIAR) which highlights on three objectives of a) foster a demand-driven, rather than supply-driven, pulses sector, b) increase productivity in the production and processing of pulses in Myanmar, and c) increase the value and reduce the risk of pulses production and processing in Myanmar.

In addition to that strategy, “**National Export Strategy (NES) 2015-2019**” has been laid down

in 2014 with the help of the International Trade Center (ITC) aiming to support the export-led development of 11 priority sectors including pulses and oilseeds sector. It focuses on export competitiveness issues (4-gears analysis) of a) supply-side capacities, b) business environment, c) market entry and d) development impact. The extension of the strategy has been implemented for another five years from 2020 to 2025.

“**Myanmar Good Agricultural Practices (GAP)**” has been initiated in 2017 and protocol for black gram, green gram, pigeon pea, chickpea, cowpea (Pelun), soybean and groundnut have been introduced together with other crops by the Department of Agriculture (DOA), and GAP certificates are issued after inspections by the department. It is established on four modules of: a) food safety module, b) environmental management module, c) produce quality module and d) workers health safety and welfare module.

Other important development is the drafting of the “**Standard Operating Procedure (SOP) for Contract Farming**” in 2020 by the Ministry of Agriculture, Livestock and Irrigation, highlighting on duties and functions of the farmers, company/ private/ group, and government department.

2.2 Pulses Production in Myanmar

Annual pulses production in last ten years was averaged to (7.28) million metric tons ranging from (6.67 to 7.91) million metric tons (Figure 2), positioning Myanmar as the second, third and fourth largest producer of dried bean, pigeon pea and chick pea respectively in the world.

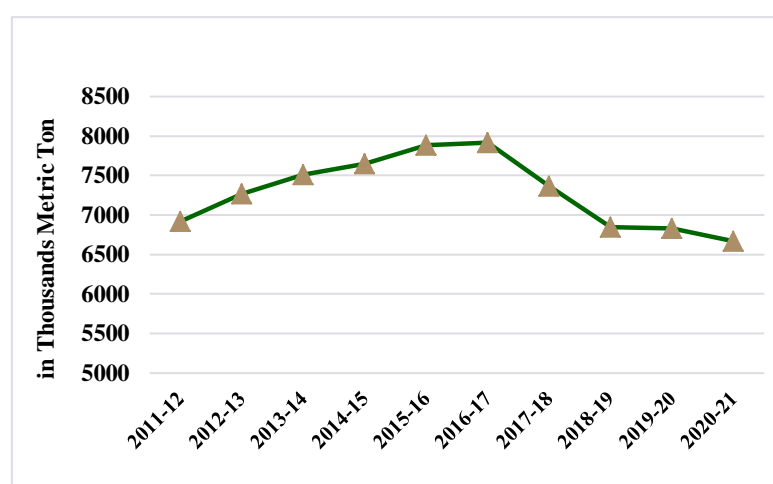


Figure 2. Pulses production, 2011/12 – 2020/21

In 2017-18, Myanmar pulse production showed downward trend of (7.36) million tons, or negative growth of (-) 7% on the previous year. The decrease can be attributed to the introduction of quotas on imports of pulses such as black gram, green gram and pigeon pea in India in 2017. As a

result of these restrictions, Myanmar farmers tried to shift from growing pulses to more lucrative crops such as maize and cotton.

Average production share of different pulses crops for the last ten years can be presented in Figure (3). According to these data, leading pulses are groundnut, green gram and black gram contributing (21) percent, (21) percent and (21) percent respectively followed by pigeon pea (10) percent and chickpea (7) percent while the rest (20) percent shared by other minor pulses.

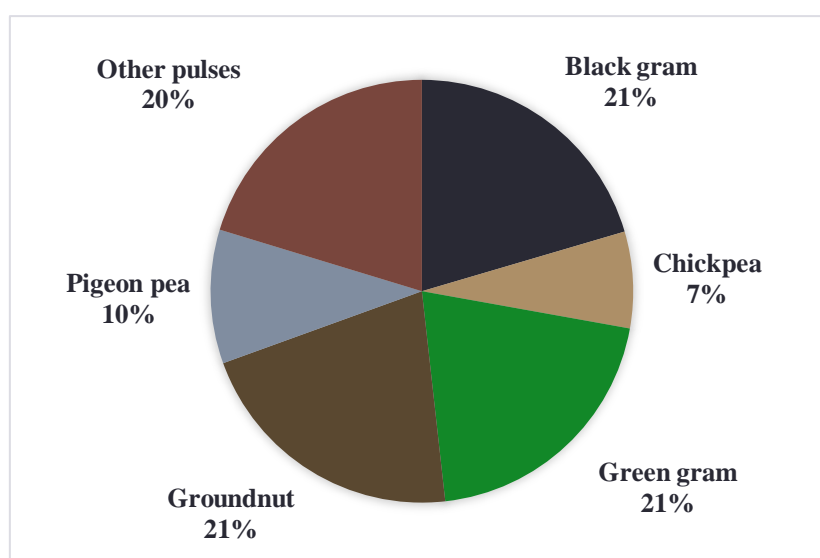


Figure 3. Pulses production by varieties, 2011/12 - 2020/21

It is well recognized that pulses crops are widely grown and produced across all states and regions of Myanmar and Sagaing, Bago, Magway, and Ayeyarwady stand as the largest pulses producing regions. During the last ten years, average pulses production of these regions shows (1978), (1399), (1231) and (955) thousand metric tons respectively (Figure 4).

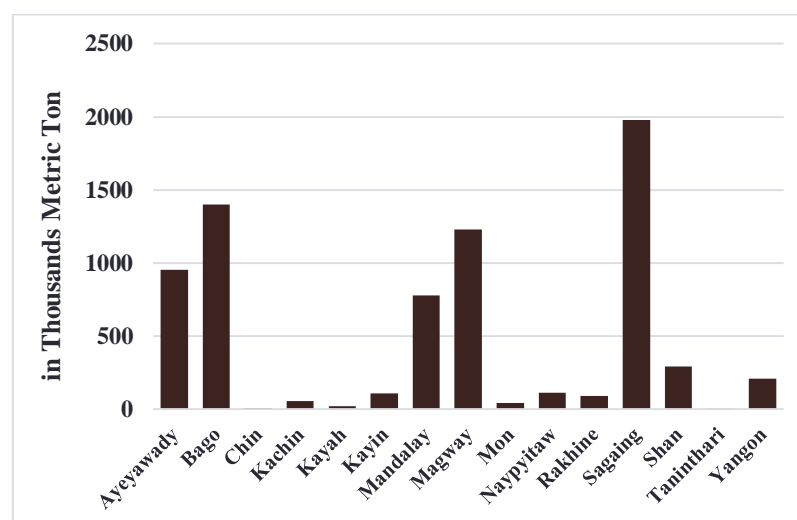


Figure 4. Pulses production by region, 2011/12 -2020/21

2.3 Pulses Growing Areas

According to Figure (5), pulses growing areas in Myanmar for the last ten years average was (5.37) million ha which reflected more or less the same trend as production. Maximum area of (5.65) million ha was sown in 2016-17 and then it decreased because of unattractive market situations. As a result, there was a negative growth rate of (-) 3.11 percent.

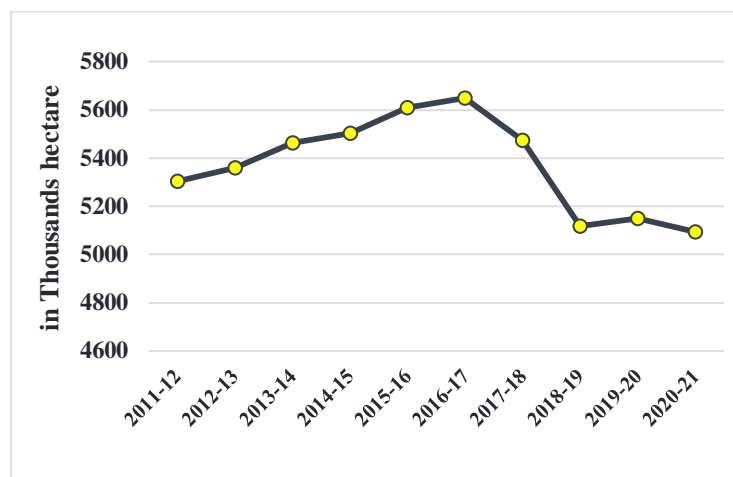


Figure 5. Total pulses sown area, 2011/12– 2020/21

Variety-wise area showed that the largest area of (1.16) million ha was under green gram and smallest area of (1.4) thousand ha occupied by lentil. Among regions, Sagaing, Magway, Bago, and Ayeyarwady regions are top regions with average sown area of (1349), (939), (888), (717) thousand ha respectively for last ten years. And in case of sowing season, approximately (64) % of pulse areas are grown in the post-monsoon cool season (from October to January) and the remaining (36) % in the monsoon season (from June to September). The largest areas fall under the rainfed rice-based farming systems and rainfed dryland farming system while limited areas fall under alluvial river-bed farming system and irrigated farming system.

Myanmar could be divided into four main agro-ecological zones (AEZ): Delta Zone, Coastal and Valley Zone, Dry Zone (DZ), and the Hill and Plateau Zone (Figure 6). The Delta Zone has the highest population density, highest land productivity having mostly alluvial soil, and moderately high rainfall with generally flat topography suitable for rice and rice-based cropping system, suitable for black gram and green gram after rice largely using residual moisture. In contrast, Dry Zone has the lowest annual rainfall, sandy soil, and second highest population density where pigeon pea and green gram are grown as monsoonal crops. In certain peripheral Dry Zone, which is known as transitional zone, green gram is grown as irrigated crop with high productivity by underground tube well water. Hills and Plateau Region has sub-tropical or temperate climate with moderate rainfall suitable for cool season pulses and bean like garden pea, lentil, faba bean, kidney bean and other underutilized legumes.

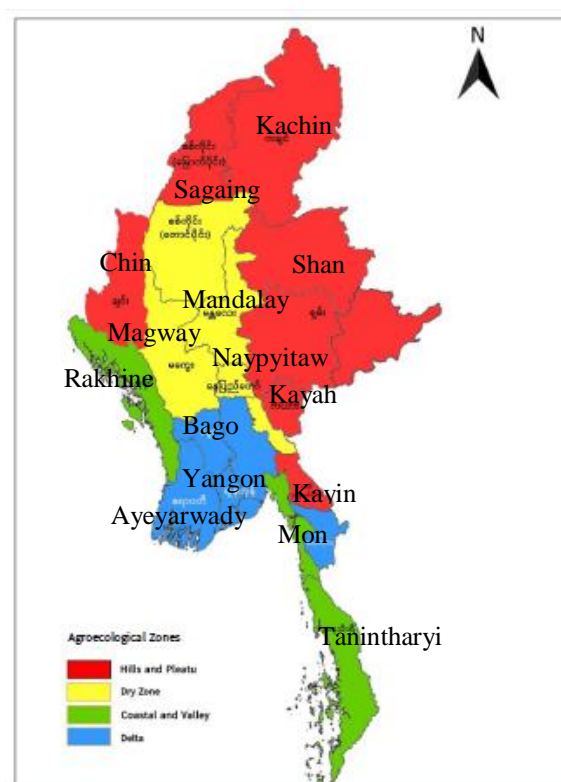


Figure 6. Agro-ecological zones and regions & states of Myanmar

2.4 Productivity of Pulses Crops in Myanmar

Performance in average yields per unit area from 2011-12 to 2020-21 shows 1356 kg ha^{-1} with the growth rate of (0.08), followed the similar trend as production and sown area. The best year of productivity was 2015-16 instead of the peak production year of 2016-17 while the year 2011-12 was the lowest. According to the records, highest yielding crop was groundnut (1559 kg ha^{-1}) while lentil was recorded as the lowest yielding pulses for its average yield of (908 kg ha^{-1}). In terms of the regions, Bago is the best region with highest yield of (1574 kg ha^{-1}) in comparison with the lowest yield of (595 kg ha^{-1}) in Tanintharyi region.

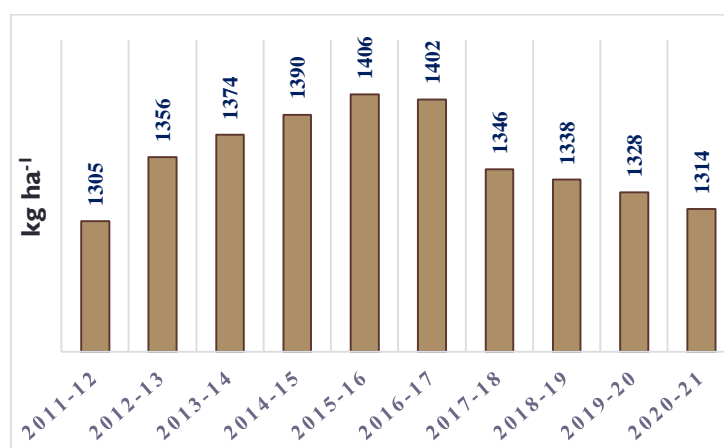


Figure 7. Productivity of pulses, 2011/12- 2020/21

2.5 Pulses Consumption in Myanmar

Pulses are alternative sources of protein and dietary fiber for a country like Myanmar in which majority of Buddhist people refrain from consuming meat. However, except in pulses producing areas, pulses are consumed in small amounts particularly in the case of pigeon pea and black gram. Since pulses are generally considered as poor person's diet, consumption is comparatively greater in rural than in urban areas. However, Indian descents in Myanmar consume more pulses than native people of Myanmar. Generally, Myanmar people eat limited amounts of pulses in their diet largely due to lack of knowledge on various food preparation methods to meet their taste, requiring longer cooking time and more kitchen energy consumption. In this respect, concerned public and private agencies may play a role for innovative use in food preparation for instant uses and increase culinary values.

There are various ways to prepare foodstuff from pulses such as cooking, frying, roasting, boiling, bean pastes, sprouting, making bean curd, various snacks, and uses as ingredients for local cuisines etc. According to the Household Expenditure Survey 1997 conducted by Central Statistical Organization (CSO) reveals that local monthly pulses consumption is about (0.21) viss (1 viss = 1.6329 kg) per person. Food and Agriculture Organization (FAO) estimates in its “Food Balance Sheet” of Myanmar (Table 1) that indicates the tendency to increase consumption of pulses as food.

Table 1. Domestic utilization of pulses, 2014-2019 (000 MT)

Year	Feed	Seed	Processed	Waste	Other Utilization	Food
2014	80	237	1671	251	159	842
2015	44	287	3307	235	239	1106
2016	32	287	3307	201	100	985
2017	41	141	27	164	874	1393
2018	26	139	27	95	1399	2057
2019	25	133	27	54	661	1371

Source: CSO (2021), Myanmar Agricultural Statistics, 2011/2012 – 2019/2020

2.6 Myanmar Pulses Export

Myanmar annual pulses export from 2011-12 to 2020-21 ranged from 887 million USD to

(1571) million USD resulting an average value of (1168) million USD. The highest export was achieved in 2020-21, which was not only the record peak in value but also in export volume. It amounts to (2030) thousand MT and while in the last ten years, average volume was registered as (1516) thousand MT. However, Myanmar experienced a sudden decline in pulses export in 2017-18 affected by the restriction on imports of pulses by the Government of India after recording annual increase in export revenues over the period 2013-14 to 2016-17 (Figure 8).

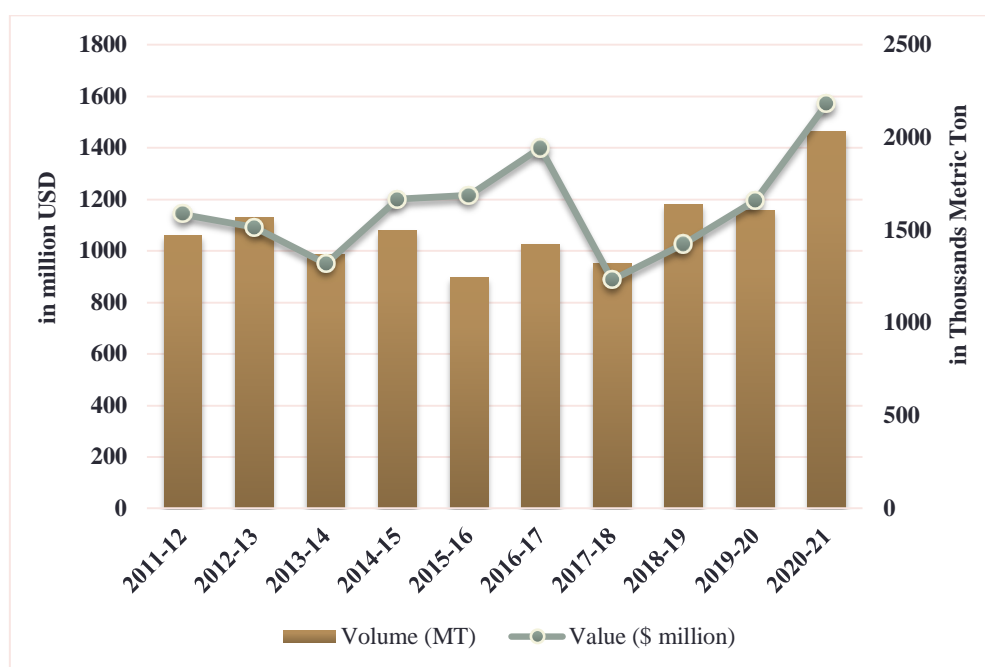


Figure 8. Myanmar pulses export, 2011/12– 2020/21

Among the export items, black gram, green gram, pigeon pea and groundnut are important leading pulses as their average contribution in exports for last ten years amounted to as much as (38), (29), (12) and (8) percent respectively.

Pulses are generally exported as raw products after sorting, grading and sizing and only about (5) to (8) percent of the export may be in value-added products. Products like whole or split, with husk or without husk are usually exported. Value-added products such as powder, roasted, fried, canned and different kinds of snacks produced by local processors are also available. GAP products and organic-certified pulses products could be exportable also however; availability and limited market opportunity with niche market need to be promoted.

Although Myanmar exports pulses to more than (200) countries, India and China are major destinations and other important markets includes Singapore, Pakistan, Vietnam, Bangladesh, United Arab Emirates, Malaysia and Japan. The quality standard of the export products could be classified

into: fair average quality (FAQ), first quality (FQ) and special quality (SQ).

Since Myanmar has a (6522) km long land border and (1930) km long coastline, both of marine trade and border trade with neighboring countries like India, China, Thailand, Bangladesh and Lao are important. In case of pulses, border trade increased from (156) million USD in 2011-12 to (604) million USD in 2020-21, constituting about (38) % of total export value.

Leading pulses crops and their respective export quantity, share of export, value and price of Myanmar as of 2020-21 may be appreciated in Table (2).

Table 2. Leading pulse and their respective export quantity, share of export, value and price of Myanmar as of 2020-21

Type of pulses	Volume exported (MT)	Share of Volume (%)	Export value (USD 000s)	Share of value (%)	Average price (USD/MT)
Black gram	677526	33	526714	34	777
Green gram	673123	33	525381	33	781
Groundnut	150669	7	183083	12	1215
Pigeon pea	214092	11	144100	9	673
Kidney bean	53863	3	38032	2	706
Rice bean	61893	3	33418	2	540
Cowpea	49963	2	28337	2	567
Butter bean	45226	2	25678	2	568
Chick pea	27213	1	15985	1	587
Others	76128	4	49979	3	657
Total	2029696	100	1570707	100	774

Source: Ministry of Commerce, Myanmar

2.7 Pulses Crop Genetic Resources: Potential for Diversification in Myanmar

It can be noted that Myanmar pulses export sector may be considered not commercially well

diversified in terms of farm level cropping systems as well as export markets. Logically, it can also be speculated that market diversification of Myanmar pulses sector needs farm level diversification even within the same pulses crop species.

At this point, it should be noted that successful and sustainable crop diversification, similar to crop rotation, requires stronger seed system and related essential support services. Moreover, this activity is not a single farmer's practice. Rather, it is a community practice, requiring strong and effective pulse farmers' participation and association sharing common interests.

Pulses composed of more than (20) species and cultivated commercially (Table 3) are being cultivated across different agro-ecosystems. Some of the pulses may not be so important for foreign export at present but they are rather important for local food value chain and the opportunities exist to tap commercially. If there are value addition activities and developing value chain to suit importing countries preference, the value of unexploited pulses crop species can be utilized for their full potential to exports.

Table 3. Pulses production by species in 2020-21

Pulses and Bean	Botanical name	Sown Area (000'ha)	Harvested Area (000'ha)	Yield (kg/ha ⁻¹)	Production (000'MT)
Black Gram	<i>Vigna mungo (L.) Hepper</i>	938	938	1438	1349
Green Gram	<i>Vigna radiata (L.) Wilczek</i>	1153	1150	1265	1454
Butter Bean	<i>Phaseolus lunatus (L.)</i>	59	59	1107	65
Bocate	<i>Vigna unguiculata subsp. cylindrica</i>	122	122	1301	159
Sultani	<i>Phaseolus vulgaris (L.)</i>	12	12	1133	14
Sultapya	<i>Phaseolus vulgaris (L.)</i>	96	96	1207	116
Soybean	<i>Glycine max (L.) Merr.</i>	132	131	1506	198
Chick Pea	<i>Cicer arietinum (L.)</i>	361	361	1356	490
Cowpea	<i>Vigna unguiculata (L.) Walp.</i>	119	119	1286	153

Pigeon Pea	<i>Cajanus cajan</i> (L.) Millsp.	432	430	1090	469
Rice Bean	<i>Vigna umbellata</i> (Thunb.) Ohwi& H.Ohashi	48	47	1113	53
Duffin Bean (White Bean)	<i>Phaseolus lunatus</i> (L.)	13	13	1091	14
Lablab Bean	<i>Lablab purpurius</i> (L.) Sweet	102	102	1151	117
Lima Bean	<i>Phaseolus lunatus</i> (L.)	11	11	1063	12
Garden Pea	<i>Pisums ativum</i> (L.)	45	45	1181	53
Lentil	<i>Lens culinaris</i> (Medik)	1	1	981	1
Krishna Mung	<i>Phaseolus radiates</i> (L.)	65	65	851	56
Groundnut	<i>Arachis hypogea</i> (L.)	1141	1131	1433	1621
Other Pulses	-	244	243	1148	279
Total		5093	5076	1314	6671

Source: Ministry of Agriculture, Livestock and Irrigation

Although Myanmar is rich in biodiversity of pulses species, only limited species such as: Green gram - *Vigna radiata* (L.) Wilczek, Black gram - *Vigna mungo* (L.) Hepper., Groundnut - *Arachis hypogea* (L.), Pigeon pea - *Cajanas cajan* (L.) Millsp, Chick pea - *Cicer arietinum* (L.), and Cowpea - *Vigna unguiculata* (L.) Walp are grown widely across diverse climatic zones and different cropping systems. It is well evident that current pulses export focuses more on only very few species and dominated in the pulses value chain of Myanmar. Thus, relevant research institutions are encouraged to fully investigate and explore to identify major ecological zones and cropping systems for commercial exploitation of other minor pulses. It is very clear that market promotion of different pulses species may help diversifying the global export markets for Myanmar to export. However, so far, the diverse pulses genetic resources in Myanmar are neither largely untapped for their genetic and commercial worth nor developed their respective value chain.

With an intension of diversifying international market through diversifying pulses exports, a set of pulses research policy is needed for Myanmar to extensively utilize its underutilized pulses and pulses genetic resources in commercial scale.

2.8 Impact of the Covid-19 Outbreak on the Pulses Sector in Myanmar

Global demand for beans, pulses as essential ingredients for the human diet and animal feed has remained largely stable. The main impact on the availability of products has come from border closures, particularly with China and India, as well as logistical restrictions on trucking and shipping, although these have generally been temporary and partial. Land border closures with China and India during the peak of the Covid-19 pandemic and the imposed lockdowns caused temporary disruptions in trade operations. Inland freight prices have significantly increased as trucking became more difficult and options more limited. More than half of sector respondents to an ITC survey on the impact of the pandemic indicated that it had affected their ability to export products.

From a production perspective, the measures introduced by the Government to combat the virus have not caused major disruptions despite the harvesting season for winter crops coinciding with the peak of the pandemic outbreak in February and March. While the total production will also depend on the harvest of monsoon crops, production is anticipated to be at normal levels in 2020, provided that there is limited climate change impact. However, Covid-19 third wave in 2021 hit harder to some areas resulting high mortality rates. Thus, precautionary measures are required for rural community to adapt Covid-19 rules and regulation in order to minimize the damage to rural functions.

Covid-19 preventive measures to comply with social distancing, such as shift arrangements and workspace reorganization, are likely to present challenges for exporters in the short-to-medium term. Movement restrictions continued to prevent access to the workplace for a number of workers. Closure of border trades, higher logistic costs, more expensive farm inputs are thought to be responsible for the significant increase in production costs, including labor. While market conditions continue to be favorable, there are concerns that the anticipated loss of competitiveness resulting from this negative impact on productivity will harm exports in the sector.

3. ISSUES AND CHALLENGES OF MYANMAR PULSES SECTOR: BEYOND FARM GATE

3.1 Strengths, Weakness, Opportunities and Threats Analysis (SWOT analysis)

Several pulses value chain analysis in Myanmar has identified issues and challenges by series of comprehensive SWOT analysis. Issues, challenges, and lessons learnt reportedly common are useful for formulating a roadmap for scaling up pulses value chain as mentioned below.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Resource endowment and good climatic conditions for pulses production • Well-experienced farmers and traders • Proximity to the huge markets • Rich in biodiversity of pulses varieties • Diverse agro-ecological zones for different variety of pulses • Easy access to international markets 	<ul style="list-style-type: none"> • Seed industry development • Lack of public support particularly in breeding and agronomic research • Lack of trade financing • Low domestic consumption • Low quality of farm inputs and limited agronomic option for high productivity • High cost of transportation • Frequent episodes of low farm gate prices • Weak sector coordination • Limited access to finance for farmers and other stakeholder alike • Gap in skillful human capital • Low awareness in environment • Empowerment of women & youth • Limited market analysis and forecasting • No value addition • Limited farm machinery service
Opportunities	Threats
<ul style="list-style-type: none"> • Huge market and export potential • Exportable crop and growing demand • Organization of pulses network • Support to food and nutrition security • New products development • GAP and Organic products • Contract farming 	<ul style="list-style-type: none"> • Diseases (e.g., Yellow Mosaic Virus) • Lack of market diversification • Under investment • Lack of modernization of processing industry • Climate change • Covid-19 • Exchange rate policy • Sector policy • Political stability

Note: By processing of pulses within Myanmar, there would be more FE earning and more job opportunities and it would support new products development.

Exchange rate in Myanmar was not stable in general and it ranged from 830 (low) to 1961 (high) while current official rate is (1850) Kyat USD⁻¹. Central Bank of Myanmar (CBM) controls the rate by selling its USD occasionally and management of FE earnings. Exporters have to follow the instructions of CBM to sell/ use or change to local currency within limited time. Consequently, exchange rate policy has played important role to determine the cost and return. From the SWOT analysis, some of the outstanding issues and challenges are elaborated.

3.2 New Value-Added Product Development

According to studies on the progress of Myanmar pulses sector conducted in the last ten years indicated that, at least, Myanmar possess strong pulses supply chain. If Myanmar continues to develop its pulses sector with transforming pulses supply chain into efficient pulses value chain which will be demand driven can go far beyond its traditional markets like India and China, the second wave of success will become reality.

As it is previously mentioned, Myanmar exports the major pulses and other assorted pulses commodities as raw materials to the traditional markets. In order to expand Myanmar pulses export markets, various studies have advocated that Myanmar pulses industries should pursue for the value-added pulses product commodities according to intended market and creating stable niche markets. However, studies have also shown that Myanmar's regular markets like India and China were not ready for importing the value-added pulses products from Myanmar because they simply have their own value-added industries to suit their local needs. Thus, Myanmar private entrepreneurs must give a due attention and priority to new pulses product development according to the market. Unless Myanmar have full knowledge of the value required for their local needs, it would be very difficult to get the stable market niche. Then, it is advisable for Myanmar to understand the specific market requirement and promote foreign direct investment (FDI) regarding to produce specific value-added pulses commodities for specific niche markets. Consequently, clearer policy and conducive investment climates are essential. Therefore, preparatory measures such as laws, policies, regulatory measures, capacities development, water and electricity for industry, taxes and privileges for FDI must be highly recommended while protecting Myanmar investors.

3.3 Standardization of Marketable Pulses Quality

Although some Myanmar pulses are exported according to certain quality standard designated by the Ministry of Commerce, it is important to standardize the quality of Myanmar pulses according to international markets in general and specific niche market in particular. Such quality criteria must also be transmitted to the primary producers, research community, and extension agency for quality-

oriented pulses production. It is imperative for concerned organizations, public or private, to pursue quality control mechanisms including developing testing procedure according to international standard. Thus, quality standardization must be given great weight in the roadmap for the sake of market expansion.

3.4 Logistic Arrangement

Compare to its enormous production of pulses crop commodity, logistic service sector receives far less attention in Myanmar. The logistic services encompass a) inbound transportation, b) outbound transportation, c) fleet management, d) warehousing, e) materials handling, f) order-fulfillment, g) inventory management, and) demand planning. Generally, it should be recognized that Myanmar need to scale up its logistic service sector towards efficient integrated supply chain network which links producers and consumers through multiple transportation modes such as road, railways, and waterways. Compare to the last decades, Myanmar has better road networks at present but because of ever increasing fuel price due to the world energy crisis, cost of transportation by road is far higher than railways and waterway. However, long time failure of providing due attention to railways and water way development or even restoration, which may seem much cheaper and more efficient than road transportation, there seems to be no better option than road transportation at present. Thus, for the sake of having efficient supply chain networks for the second wave of success for Myanmar pulses sector, restoration of railways and water ways is required for the long run.

3.5 Market Analysis and Price Forecasting

Many studies have shown that market analysis and price forecasting play a crucial role for the small farmers and large farmers alike to be able to make the right decision for selling their pulses products in Myanmar. It also helps increasing the value and reduces the risk of pulses production and processing as well. Practically, majority of farmers feel uncertain to make the most out of the input and energy they have invested for the whole season. Thus, recent studies on pulses sector of Myanmar have made recommendation to conduct market analysis and price forecasting, both local and international, for pulses. It is one of the core activities for market inclusion of small pulses farmers, increasing the value and reducing the risk of pulses production and processing in Myanmar.

3.6 Developing Good Agricultural Practices (GAP)

Due to increasing global awareness of food safety, the extended adoption of GAP is the serious concern for the global consumers of pulses products. This issue has become very important as trade related non-tariff barriers for pulses exporting nation. The GAP certification is crucial for sustainable markets and new markets expansion. In this respect, DOA of Ministry of Agriculture, Livestock and

Irrigation (MoALI) Myanmar has drafted and extended the ASEAN standard GAP guideline for pulses-to-pulses farmers. However, more research and extension activities are still required for investigating technical feasibility and verification for wider adoption of GAP. In fact, GAP for pulses is so vital for branding Myanmar pulses as well. Thus, for wider scale of technical adoption and verification, stronger linkage through function network among Department of Agricultural Research (DAR), DOA, University including other relevant research institutions and farmers is highly advised.

However, in reality, indiscriminate spraying of pesticides is still practiced in almost all pulses across farming system. Due to indiscriminate spraying for some years wipe out the natural enemies of pulses pests. Consequently, pest and disease incidence are so high in all four major exporting pulses particularly in black gram and green gram. The most common and severe pest and disease is yellow mosaic virus which is carried by white fly (*Bemisia tabaci*). So far, only a putatively resistant variety is available. Thus, the best control measure is using appropriate cultural control measures such as crop rotation and adoption of ecological engineering principle to reintroduce predators and natural enemies of pulses pests.

However, there is still low adoption of GAP in pulses production. Price remuneration could be one of the measures for faster adoption of GAP. Moreover, developing an appropriate mechanism and testing protocols for traceability of GAP adoption are required for sustainable market with good price and better trading process.

3.7 Three Musts and Four Reduction Principles

When developing GAP for pulses production, (3) musts and (4) reduction principles must be integrated for increasing production efficiency thereby increasing production economy of scale and sustainable pulses farming system as well as ecosystem. The components of the principle are as follow:

The (3) musts are:

- Using Certified seeds,
- Using balanced fertilization through crop and site-specific nutrient management aiming for fertilizer use efficiency, and
- Using supplementary irrigation.

The (4) reductions are:

- Seed reduction,
- Pesticide reduction,
- Labor reduction, and

- Post-harvest losses reduction.

It should be used as extension materials and widely adopted. Detail investigation and verification need to be done by all stakeholders and organization concern. Thus, principles need to be put in place in the preparation of the roadmap.

3.8 Availability of High Yield Pulses Varieties and Good Quality Seeds

Previous studies have pointed out that continued growth of Myanmar pulses sector can be achieved through implementation of "Profit Triangle" policy. The first corner of the profit triangle is 1) raising farm productivity through better crop management techniques, 2) adoption of high yielding varieties with good market ready quality and resistance to biotic and abiotic stresses supported by sustainable seed system, and 3) increasing access to profitable international markets through improved traceability system with internationally recognized testing protocols and certification.

Changing with times, the pulses farmers in Myanmar are ready to accept and willing to adopt high yielding pulses variety with good market quality and adaptation to given agro-ecological environment pulse biotic and abiotic stress resistance. In fact, high yielding varieties with adequate seed production and distribution system help increase labor productivity, water productivity, fertilizer productivities with nutrient use efficiency and other input use efficiency.

Although there are certain number of higher yielding varieties have been developed, the pulses varietal development may be considered lagging due to limited/low/no experienced and qualified pulses breeder compounding with insufficient budget allocation. In addition, to obtain faster adoption of newly released varieties is largely restricted by inadequate seed production and distribution system. Studies have shown that farmers used either own farm saved seeds or farmer to farmer exchange or from local brokerage. Thus, poor access to good quality seeds, which is largely limited by early generation seed, is the main constraint for raising farm productivity. It is recommended that concerned organization should undergo the reform process or even reorganized through mainstreaming and streamlining process for breeding division. Thus, it comes an important roadmap for scaling up Myanmar pulses value chain.

3.9 Accelerating Farm Mechanization

The studies have shown that Myanmar has rapidly changed farm mechanization process in the last ten years. Currently, labor scarcity and higher wages are the common problem across farming system. MoALI has pushed to accelerating agricultural mechanization from plowing to harvesting and processing through provision of hired operation service, hire-purchase farm tractors, two-step loan for farm machineries, and other financing arrangement. However, the problem still persists for

small farmers to have timely access to farm machineries particularly pulses farming system which is solely relying on residual moisture in rice-based pulses and rain fed dryland pulses farming system. Current problems of inadequate access to farm machinery are compounded by current energy crisis. Thus, this issue needs to be solved by extended farm machineries service to private sector or public-private partnership or community farm mechanization activities. Nonetheless, it is advisable to include in the scaling up road map for pulses value chain.

3.10 Increasing Access to Irrigation

In Myanmar, pulses are cultivated in not resource endowed areas across farming system particularly depending on rain or residual soil moisture after rice harvest or alluvial riverbed area. Most pulses grown areas possess high evaporation rate combined with low or no rainfall pattern. Thus, based on research from DAR, one or two supplementary irrigations will boost pulses yield up to certain level. Some farmers enjoy high productivity of pulses by one or two supplementary irrigations using portable set of water pumps. This cultural practice may offer farmers not only yield per unit area but also better grain quality.

Thus, Agricultural Mechanization Department (AMD), Irrigation and Water Utilization Management Department (IWUMD) should cooperate and demonstrate the yield increase on pulses with one or two supplementary irrigations. It is also recommendable that DOA, AMD, IWUMD of Irrigation should be collaborated with private sector for promoting access to small scale irrigation by providing support services or establish a rental system of irrigation pump and accessories. It should also be considered for road mapping exercise.

3.11 Institutional Undertaking

3.11.1 Agricultural research and extension

In order to exploit full potential of pulses sector to contribute to sustain Myanmar economic growth, continuous research effort must be paid to pulses varietal improvement, germplasm enhancement, and seed production particularly early generation seeds as well as developing crop management options for higher farm productivity and good quality. Innovative research system like farmer participatory research method must be integrated and mainstreaming. It would be highly rewarding if pulses knowledge bank can be constructed and build pulses bio-park, demonstrating other use of pulses than food such as feed, feedstock for energy particularly high biomass of pigeon pea. Thus, pulses research system should be aimed for inclusive and dynamic.

In addition, one of the core activities for scaling up pulses value chain is the inclusion and integration of smallholder pulses farmers and their farming system in to the mainstream of pulses

markets, both local and global. For farmers, to be able to make better decision to gain productivity, profitability, and prosperity is the ability of farmers to understand local and global pulses market scenarios and respond quickly to the market signal. To date, the DOA extension methods do not include market-led extension. In fact, market-led extension can be best defined as enabling farmers to get high returns (money to money) out of the entire farming business and facilitation to farmers with diverse baskets of package of practices suitable to local situations/farming system.

Current extension system of DOA is focusing more on production-oriented extension rather than market-oriented extension. Most of the farmers received market extension from local brokerage instead of DOA extension staffs.

3.11.2 Financing for Scaling up Pulses Value Chain

Financing in agriculture is a globally important development agenda nowadays. Almost every agro-based country is paying much emphasis on financing in agriculture especially on smallholder farmers for food security and agricultural development. Financing itself is a rapidly developing subject among development workers and development agencies around the world. Although it becomes a top agenda for global agriculture, the results are the mixture of successes and failures. In this respect, Myanmar is no exception although it established the financial institution in as early as in 1953. It has passed series of regimes and eras without any progressive changes.

With liberalization of agriculture, Myanmar has changed in agriculture and related policies overtime including financing policies and gradually allowing private financial institutions such as private companies, Non-government Organizations (NGOs), International Non-government Organization (INGOs) aside from state own financing institutions. Current financing scheme is focusing on individual farmer rather than value chain. However, it is well evident that there are businesses as usual and less beneficial impacts on farmers. Throughout the periods, it was well acknowledged that there were many instances of mismatch between financial products and farmers. It may be well related to socio-cultural behavior specific problem as well. Currently, smallholder farmers are facing numerous difficulties in moving their products to local markets or brokers and moving their products for more sophisticated value markets complying with specific consumer demand. Their difficulties include:

- Poor access to inputs,
- Timely delivery of inputs by cooperatives and/or government extension system in a timely manner,
- High cost of inputs like seeds, fertilizer or feed,

- Lack of capacity (human and financial) to adopt improved agricultural techniques to increase yields,
- Weak farmer organizations,
- Low investment in postharvest management and technology,
- Limiting economies of scale necessary to attract reliable buyers,
- Insufficient transport,
- Difficulties in meeting quality requirements, and
- Lack of access to credit for equipment, Inputs and labor for production, among others.

Given these challenges, increasing access to finance is an essential step to help farmers and other value chain actors to increase their capacity and productivity and thereby income in their current scale of operation. At the same time, securing the loan is also depends on the success of the crop with increasing productivity and good market price. Thus, technical backstopping to smallholders is an essential operation for financial institution. It is important to collaborate between financial institutions and extension department. However, there is modality for such partnership. It is an opportunity for organizing private extension service to ensure smallholders to adopt technical backstopping.

3.11.3 Developing conducive agri-business development

Agri-business development is the vital pathway for smallholder farmers and rural community to escape from poverty in Myanmar. In the past, series of governments have focused on farm production and productivity only. Since Myanmar used to be the world largest rice exporter during colonial period, this sentiment has led Myanmar to be a rice centric country. It has failed to exploit the potential of other crops. Under socialist regimes and before democratic government took over the power, developing agribusiness had been less appreciated. After liberalization of economic policy and opening its economy to the world, development of agribusiness has been well appreciated.

In Myanmar, business environment is, notoriously, not conducive for the dynamism of not only agricultural trading but also any business operations. It is a major hindrance for the economic development of the country. It is underlining that Myanmar public institutions have not been streamlined in accordance with its liberalization of its economy. Thus, expert viewed that Myanmar economic liberalization is rather unbalanced requiring massive institutional reform.

Since it is an agrarian country and majority of the peoples' livelihood is based on agriculture, the main income of the rural agrarian society depends on agricultural business and trading especially foreign exports. However, underdeveloped institutional practices and lack of facilitating standard operating procedures of different concerned department hinder the business efficiencies and its

functions. In other words, taking longer time to process wastes valuable time and makes the business operating cost higher than the operating cost of other countries, which makes Myanmar agribusiness less competitive compare to its ASEAN neighbors. In fact, trade liberalization requires relaxation of certain rules which are not beneficial to trade is necessary.

Moreover, lack of conducive infrastructure like road and transport as well as energy creates added costs of primary production and value addition. As a consequence, Myanmar suffers lower economy of scale for producing its agricultural produce. Thus, the suggested mega projects must be able to create conducive environment for pulses export. The project success, by experience, is depending on the ownership of the project, MoALI is advised to designate DOA strictly and strongly as the owner of the mega project even by an executive order. In the long run, law and regulation may be drafted for implementing a project for sure success. Remuneration of a selected project staff must also be seriously considered in terms of project salaries or work promotion as in the past in 80s in Myanmar. These issues need to be put in place in the roadmap as main challenges to overcome.

4. SCALING UP MYANMAR PULSES VALUE CHAIN: STRATEGIC PATHWAYS AND PLANNING

4.1 Where Do We Want to Go?

It is well understood that integrated and inclusive value chain development is a key to success for Myanmar agricultural development. And, the integration and inclusiveness encompass the most stages of the value chain from inputs supply to production, processing, marketing, and financing for its sustainability and effectiveness. Thus, Myanmar should aim to achieve the most efficient value chain in agriculture in general and pulses value chain in particular.

However, it must be recognized that the value chain is rather complex and posing many challenges to overcome. Since it involves multiple actors and activities, it requires numerous interfaces between the public and private sectors, which often have different remuneration for respective stakeholder. Thus, the various actors in the chain must play in synchrony to achieve the harmonized results.

A particular challenge is to ensure that the scaling up the value chain will benefit the poor, thereby, contributing to rural livelihood and economy. However, in most of the cases, the value chain favor better-off farmers, processors, and traders, while poorer actors in the chain, who are usually primary producers, especially smallholder farmers are largely excluded. Thus, the strategic pathway and planning should aim to achieve inclusiveness of smallholder farmers and their farming systems through sustainable development of pulses value chain in Myanmar.

Nonetheless, to some extent, existing pulses value chain is scalable and contributing to Myanmar rural economy as well as national economy for decades. In wake of globalized agricultural economic development, competition among pulses producing and exporting countries for market is immensely large. According to several studies, second wave of success in pulses sector is possible if the appropriate scaling up actions is taken.

In order to realize the sustained wave of success in pulses sector, Myanmar requires series of action towards both scaling up and scaling out with its concrete undertakings. The aim of developing the pulses value chain is to be more inclusive and integrated for the betterment of smallholder farmers, who are primary producers and their farming systems while it is assuring the wealth and benefits of the drivers of the chain.

In order to achieve this, all stakeholders involved in the value chain; government institutions, private sectors; exporters, wholesalers, brokers, collectors and farmers, donors, INGOs, NGOs, and

CSOs must be able to work in harmony and in coordinated fashion through better networking. In keeping with this, emerging the governance mechanisms of pulses value chain must be a priority for Myanmar and it is considered to be so crucial for sustaining the progress.

However, noting the success of the first wave, the caution must be taken that the governance mechanism must not lead the pulses value chain into the government-led value chain which will certainly fail later. Through the previous lessons and experiences, it had better be private-led pulses value chain. Here, the role of the government must be clearly defined and regulate the flow of the value chain, ensuring support and the efficient function of the value chain.

Based on previous pulses value chain analysis and discussions on existing challenges and limitations, the principles policy option as a "Profit Triangle" should be exercised to make the success of the second wave in reality. The profit triangle can be depicted as 1) measures for increasing farm productivity, 2) intense research efforts for developing and testing better adapted and higher yielding pulses variety with biotic and abiotic stress resistance plus higher market quality and, 3) measures for expanding international markets. The "profit triangle" approach may ease of current constraints imposed on pulses value chain as suitable variety, seed availability, good agricultural practices, infrastructure, credits, and support prices.

The vision, mission, and strategic objectives for the scaling up and out the pulses value chain in Myanmar are laid out as follow:

4.1.1 Vision

"Progressive and productive pulses sector through a more inclusive, integrated, resilient, and globally competitive and recognized pulses value chain to contribute rural economic growth of Myanmar".

4.1.2 Mission

- i. Improve the socio-economic condition of smallholder pulses farmers by creating rural livelihood and income, reduce poverty incidence through pulses-based agribusiness, and
- ii. Maintain Myanmar's position for being one of the largest exporters of the pulses and to be a producer of the quality pulses thereby integration and widening global new market.

4.1.3 The strategic objectives

For the sake of scaling up Myanmar pulses value chain, there are three strategic objectives which have been laid out in "Myanmar Pulses Sector Development Strategy" by the leadership of DAR, DOA and various stakeholders with the help of ACIAR (2017). These strategic objectives are

still valid (The strategy has not yet, somehow, enforced so far) with possible updates and appropriate modification to realize this vision.

When the strategy is implemented, it is important to set up a Myanmar Pulses Value Chain Oversight Board (MPVCOB) or Myanmar Pulses Value Chain Steering Committee (MPVCSC) in order to keep tracking the performance and necessary steering the value chain. It may better that the oversight board or committee be a permanent mechanism. It will also be applicable to other agricultural value chain as well. These strategic objectives are as follow:

Strategic objective-1. Foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain,

Strategic objective-2. Increase productivity in the production through modernization, diversification, intensification, and processing of pulses in Myanmar, and

Strategic objective-3. Increase the value and reduce the risk of pulses production and processing in Myanmar.

The strategic objectives are equally applicable for all the major exporting pulses; black gram, green gram, chickpea, and pigeon pea, being produced across pulses farming systems of Myanmar namely dry-land pulses farming system, mountain upland farming system and rain-fed or irrigated lowland rice-based farming systems and alluvial river-bed farming system.

4.2 Implementation Plan: How Do We Get There?

4.2.1 Operational roadmap and the list of actions under the strategic objectives

The actions in this operational roadmap must be undertaken by multiple stakeholders in participatory and collaborative manners in nature. In order to realize the desired goals and achieving the three strategic objectives, the three key stakeholders as follow;

1. Public sector involving DOA, DAR, DOP under MoALI, concerned departments under Ministry of Commerce (MoC), concerned departments like the department of cooperatives and the Small-Scale Industrial Department (SSID) under Ministry of Cooperatives and Rural Development (MoCRD), Ministry of Planning and Finance (MoPF), Ministry of Construction (MoCon), Ministry of Transport and Communications (MoTC), and other concerned departments and ministries,

2. Private sector involving Myanmar Pulses, Beans, Maize and Sesame Seeds Merchants Association (MPBMSMA) and other pulses trade related private organizations and

3. Primary pulses producers involving pulses producer association and its regional clusters,

farmer associations and other allies associations under UMFCCL.

They must play in a balanced position through coordinating manners in operating the value chain through participatory fashions for sustainability of the Myanmar pulses sector. It is advisable to implement the strategic action through improved networking.

The profit triangle is translated into the three thematic areas under which activities should be implemented on each of the strategic objective as follow:

1. Market development,
2. Governance and Institutions, and
3. Research, development and extension.

4.2.1.1 Strategic objective-1. Foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain

This objective can be achieved by implementing the following action lines:

- a. improving export market intelligence,
- b. enforcing use of developed protocol for nationally-standardized set of quality requirements for major exporting pulses and beyond,
- c. strengthening trade promotion programs for expanding Myanmar pulses brand,
- d. market diversification through developing new pulses commodities, possibly by value addition or other diversity of pulses species or commodities of underutilized pulses crops for new markets,
- e. enhancing use of a standardized system and continue developing for testing all pulses exports,
- f. promoting domestic/export/import market access to the primary producers and value chain actors through accountable market information service,
- g. encouraging stakeholders concerned for industrial leadership with clearer vision,
- h. encouraging industry funding and co-funding to support development of the sector,
- i. inclusive financing for stakeholders in the value chain,

- j. wide-scale training on basic financial education and management for farmers and stakeholders,
- k. wide-scale application of mobile technology, and
- l. setting priority to massive capacity building for concerned officials and their respective institutions either public or private in relation to research and extension, business management, and entrepreneurial skill.

Operational plan and arrangement for the strategic objective-1

Theme-1. Market development

- a. Improve export market intelligence in the short-term by starting a quick analysis of domestic and export markets to understand the type and quality of pulses consumed locally as well as internationally in the first year. It is suggested that this should be done by a qualified Market Analyst periodically. In the long term, export market intelligence should be tasked to competent organization in the network. The results of the analysis and forecasting must be widely circulated or publish periodically.
- b. Improve or develop a nationally-standardized set of quality requirements for different grades of pulse exports according to the type of pulses and make them clear and transparent for all actors in the value chain. Necessary promulgation should be made for the public knowledge through the web or various media.
- c. Develop diverse Myanmar pulses commodities and branding along with certifying quality of different Myanmar pulses products. It is suggested that it should be tasked by drafting Myanmar pulses trade promotion scheme led by competent authority either private or public or both or lead industry group in timely manner. Promoting Myanmar pulses brand could be done by regular participation of international trade fairs and showcasing Myanmar pulses products with assistance of economic attaché/ Myanmar diplomatic missions/ economic counselors around the world. It will help market diversification and in a way of attracting foreign investor in the pulses sector.

Theme-2. Governance and Institutions

- a. Set up a standardized system and protocols for testing all pulse exports for quality (especially foreign materials) sold under particular brand. It is advisable that this be led by a third-party inspection recognized by stakeholders in the chain and international buyer. The inspection result is expected to be transferred to the lead industry group in time. This should also be done by drawing from the experience of other exporting countries or upon the consultation of

expert group.

- b. Encourage industry leadership with clear vision. Identify competent industry group e.g., Myanmar Pulses, Beans, Maize and Sesame Seeds Merchants Association (MPBMSMA) with strengthened capacity and upgraded functions to lead:
 - i. on-going market intelligence,
 - ii. updates to the nationally-standardized quality requirements,
 - iii. advise for government funding, and
 - iv. sensitizing the government for supportive policy interventions regarding pulses value chain.
- c. Encourage industry funding to support development of the pulses sector by suggesting a system for levying all products exported under the Myanmar pulses brand (e.g., 1% Levy according to ACIAR). Advice can be taken from expert group. This levy could be paid to lead industry group to fund:
 - i. on-going market intelligence,
 - ii. updates to the nationally-standardized quality requirements,
 - iii. branding Myanmar pulses, and
 - iv. testing pulses traded domestically and internationally, and product promotion.
- d. Enhancing ease of doing business e.g., licensing export and import business, sanitary and conducive process of phytosanitary measures, reducing certain procedures and processes for exports such as custom procedures, facilitating port procedure and process to reduce transaction cost, reducing amount of paper works, and relaxation of certain rules and regulations in pulses export promotion scheme.
- e. Exploring opportunities for pulses value chain financing through dialogues with Myanmar Agricultural Development Bank (MAB) and other development banks for extending Micro, Small and Medium Enterprises (MSMEs) loan as well as warehouse receipt financing to primary producers and crop insurance to reduce the impacts of climate change.

4.2.1.2 Strategic objective-2: Increase productivity and production through modernization, diversification, intensification, and processing of pulses in Myanmar

This objective may be achieved through the following activities:

- a. strengthening governance through providing concrete policy supports and business initiatives periodically,
- b. sensitizing government to solve outstanding issues such as water use, land use and land use

right,

- c. promoting pulses research and development, strengthening all-inclusive national agriculture research system (DAR, DOA, DOP, Yezin Agricultural University (YAU), and relevant departments under MoALI as well as under other line ministries and private sector) i.e., increasing capacity of individual researcher as well as allocation of funding for research and development on pulses with special emphasis on pulses varietal development and maintenance breeding of released varieties (Producing early generation seeds),
- d. setting up pulse's knowledge management mechanism/ establishing pulses knowledge bank,
- e. creating pulses seed network including public sector, private sector and farmers for producing more amount of early generation seeds such as breeder seeds, foundation seeds, registered seeds to produce more certified seeds and encouraging informal quality seed sector,
- f. devising an extended plan for availability of good quality seeds in terms of extended seed production and distribution system at least certified seeds to ensure quality products through the Sustainable Pulses Seed System (SPSS) along with seed saving technology, encouraging mainstreaming and streamlining of both formal seed system and informal seed system or other alternative seed systems,
- g. strengthening extension activities of DOA for Good Agricultural Practices (GAP) for pulses production specific to respective pulses and their farming system as well as organic pulses production for the niche markets,
- h. promoting research and extension for promising underutilized pulses species for farming system diversification and organic pulses to access niche market domestically or internationally,
- i. promoting linking research and extension system to production industries,
- j. enhancing yield of pulses by at least one or two supplementary irrigations through low lift and shallow tube well by possible private sector irrigation services under public-private partnership through water policy review and reform,
- k. accelerating farm mechanization at various stages of cultural managements such as tilling, seeding, cultural operation, irrigation service, harvesting, drying and post harvesting for time and labor saving, and
- l. transforming current resource-based pulses farming system into knowledge-based pulses

farming system.

Operational plan and arrangement for strategic objective-2

Implementing the plan for meeting the strategic objective-2, all the activities shall be carried out under only thematic area 2 and 3 which are governance and institutions and research development and extension.

Theme 2: Governance and Institutions

- a. Strengthen governance, especially with regard to enforcing rule of law adherence to contractual obligations and protection of the property rights as well as provision of conducive policy intervention and transformation of current institutional structures and cultures into favorable and conducive institutional structure and culture for agricultural growth,
- b. Advocating government to secure land tenure by providing documentation rights, and enforcing these rights. It is expected that this will lead to increased availability of affordable credit, input market development, and increased investment into production and processing technology (e.g. increased use of inputs, mechanization, and irrigation service),
- c. Increase funding into research and development for pulses, especially with respect to the diffusion of locally-adapted and improved varieties, essential marketing information services and processing for good quality pulses products. The increased funding into agricultural research and development could be a staged increase to 0.4% of GDP - commensurate to other Asian countries (ACIAR-2017). ACIAR stated that given that pulses represent approximately 20% of the value of agricultural production in Myanmar, approximately 20% of the agricultural research expenditure should be targeted to pulses. From the past to the present, accounting procedures, rules and regulations for agricultural research has been treated as general accounting rules and regulations which is a rather hindrance and restriction to research project implementation on the grounds, meaning inflexibility. Thus, developing a flexible and special accounting procedures, rules and regulation for research and development, which is quite different from common civil accounting procedure, is essential for boosting research activities. In addition, it would be safer to use of public funds without any misuses or breach of the financial regulation for researchers and managers.

Increased funding could be allocated to:

- i. improve capacity by offering remuneration measures plus freer execution of research programs to attract qualified researchers,
- ii. explore opportunities for training and capacity building of different layer of the stakeholders,

- iii. explore opportunities for introducing reformed measures for DAR, focusing pulses research and respective disciplines such as breeding, agronomy, post-harvest, and crop protection along with good institutional culture,
- iv. conduct a comprehensive statistical review and analysis of production and consumption data of pulses in Myanmar at the state and regional level,
- v. conduct a comprehensive review of demand for pulses domestically and internationally, including the demand for different types of processed pulses, to inform current and potential processing companies as well as to policy makers, and research organizations,
- vi. capitalize on the use of international germplasm for developing locally adapted pulse varieties with good quality and biotic and abiotic stress resistance,
- vii. align plant breeding, seed and inoculants (Rhizobium, Trichoderma and Phosphorus Solubilizing Microbes) multiplication and distribution activities of DAR and DOA,
- viii. strengthening the capacity, timeliness and breadth of the current Market Information System,
- ix. promoting investment opportunities for local and foreign investor for improving pulses processing in Myanmar, and
- x. devising a funding mechanism for improving pulses processing projects in Myanmar.

Theme-3: Research, Development and Extension

- a. Increase research and extension for pulses, especially with respect to Good Agricultural Practices, through both public-private partnerships with fertilizer and chemical companies (align with implementation plan of the Fertilizer Strategy) and farmers participatory measures for site specific nutrient management,
- b. Mainstreaming farmer participatory research methodologies from varietal improvement, varietal selection and early generation seeds production to production technology generation, developing packaged technology, and dissemination of proven technology for each specific pulse,
- c. Focus on pulses germplasm enhancement and introduction in varietal development through effective use of mutation breeding and integration of biotechnology,
- d. Pulses genetic resources conservation and utilization and pre-breeding activities, and
- e. Conducting research for post-harvest technology and food technology on pulses products.

4.2.1.3 Strategic Objective 3: Increase the Value and Reduce the Risk of Pulses Production and Processing in Myanmar

The strategic objective-3 may be achieved by following activities:

- a. considering options for linking pulses based small and medium-sized enterprises to the market (to help growers and processor, know which traders are selling to which export markets. This allows farmers to choose which trader/exporter to sell to rather than taking the opportunities available to them at the time),
- b. simplifying and clarifying policies relating to foreign direct investment and foreign currency flow for the purpose of attracting FDI,
- c. considering options for crop insurance and warehouse receipt and financing,
- d. promoting market access through better logistic supports by rethinking mass transportation through railways and water ways, facing the challenges of looming crisis of energy nexus,
- e. provision of market-led extension service,
- f. holding annual crop outlook conferences with information available on a website and other information and communication technology platforms, and
- g. holding periodical talk-show for skill building and knowledge sharing.

Operational Plan and Arrangement for Strategic Objective-3

The activities for meeting the strategic objective-3 shall be carried out under the designated themes.

Theme 1: Market Development

- a. Consider options to linking small and medium-sized enterprises to the market to help growers and processors to know which traders are selling to which export markets. This allows farmers to choose which trader/exporter to sell to rather than taking the opportunities available to them at the time,
- b. Promoting access to market through strengthening existing commodity exchange center and linkages between and wholesale and retail markets, and
- c. Providing detail information of market such as who is selling which pulses and where, at what price in which quality and how much the stock available.

Theme 2: Governance and Institutions

- a. Simplify and clarify policies relating to foreign direct investment and foreign currency flow as well as land acquisition law and regulation,
- b. Exploring to introduce the option for crop insurance,
- c. Fostering contract farming as a measure for market provision,
- d. Devising a pulses pricing policy in favor of primary producers e.g., setting minimum support price for respective kind of pulses to reduce the production risks, and
- e. Establishing competent market information service.

Theme 3: Research, Development and Extension

- a. Increase capacity in market forecasting to determine the factors affecting production and prices of different pulse crops and products around the world, to help pulse producers and processors in Myanmar manage climate and production risk,
- b. Hold annual crop outlook conferences providing information to growers, grower organizations and processors about global trends in crop production and price forecasts,
- c. Make crop outlook information available on a website and other information and communication technology platforms, and
- d. Provision of market-led extension service for skill building to farmers as agri-entrepreneurs.

4.3 Monitoring and Evaluation for Implementation of the Roadmap

During the implementation phase of the roadmap, certain key deliverables are required to monitor and evaluate the process. The key deliverables for each strategic objective and respective actions are determined as follow:

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4.4 Key Deliverables for Respective Strategic objectives

Strategic Objective	Action	Key Deliverables	Implementing Agency	Time frame
Strategic objective-1: Foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain	1) Improving export market intelligence,	<ul style="list-style-type: none"> Mechanism of market intelligence is established, 	✓ MoALI, MoC, and MPBMSMA	2022-2024
	2) Enforcing use of developed protocol for nationally-standardized set of quality requirements for major exporting pulses and beyond,	<ul style="list-style-type: none"> Delivering a bulletin of local and global market information with analysis and interpretation is circulated to the stakeholders in the value chain, 	✓ MoALI, MoC and MBPMSMA	2022-2023
	3) Strengthening trade promotion programs for expanding Myanmar pulses brand,	<ul style="list-style-type: none"> Enforcing the adopted set of quality standards, adapted from codex and specific quality standards for specific market of respective pulses crops that are exported and exportable, 	✓ MoC, MoALI	2023-2027
	4) Market diversification through developing new pulses commodities, possibly by value addition or other diversity of pulses species or commodities of underutilized pulses crops for new markets,	<ul style="list-style-type: none"> Annual domestic or International Myanmar pulses trade fair show casing local pulses products, 	✓ MoC, MIFER, MoALI	2022-2027
	5) Enhancing use of a standardized system and continue developing for	<ul style="list-style-type: none"> Partial process, frozen, and canned local peas and beans products, 	✓ MoALI, MPBMSMA	2022-2027

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	testing all pulses exports,	<ul style="list-style-type: none"> Developing laboratory testing protocol for all pulses being exported, 	✓ MoALI, MoC	2022-2027
	6) Promoting domestic/export/import market access to the primary producers and value chain actors through accountable market information service,	<ul style="list-style-type: none"> Farmer receive updated price information and specific quality criteria for specific market thereby increasing regular export quota, 	✓ MoALI, MoC MPBMSMA, MoC	2023-2024
	7) Encouraging stakeholders concerned for industrial leadership with clearer vision,	<ul style="list-style-type: none"> Capacity building program for visionary leadership for pulses industry, 	✓ MoALI, MoC, MOPF, Banking Institutions	2023-2027
	8) Encouraging industry funding and co-funding to support development of the sector,	<ul style="list-style-type: none"> Possible dialogue with financial sector and developed or identify sustainable industrial funding mechanism, 	✓ MoPF, MoCRD	2023-2027
	9) Inclusive financing for stakeholders in the value chain,	<ul style="list-style-type: none"> Sustainable farm credit system, expansion of current MSMEs loan and workable financial instruments for pulses value chain, 	✓ MoPF, MoCRD	2023-2027
	10) Wide-scale training on basic financial education and management for farmers and stakeholders,	<ul style="list-style-type: none"> Financial education programs for pulses farmers and relevant stakeholders launched, 	✓ MoALI, MoC, MoPF, Financial institutions	2023-2027
	11) Wide-scale application of mobile technology, and			

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	12) Setting priority to massive capacity building for concerned officials and their respective institutions either public or private in relation to research and extension, business management, and entrepreneurial skill.	<ul style="list-style-type: none"> • Periodical nationwide E-forum, increasing number of users for various mobile application for crop management, market information, mobile banking, weather and other related application by mobile phones, • Series of training programs for officials, private sector and farmers for improving entrepreneurial skill. 	✓ MoALI, MoC, MPBMSMA	2022-2027
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Strategic Objective	Action	Key Deliverables	Implementing Agency	Time frame
<u>Strategic objective-2</u> Increase productivity and production through modernization, diversification, intensification, and processing of pulses in Myanmar	1) Strengthening governance through providing concrete policy supports and business initiatives periodically,	• Supportive public policy for efficient pulses value chain and its governance mechanism is developed (e.g., establishing pulses commodity board),	✓ MoALI, MoC, MPBMSMA,	2023-2025
	2) Sensitizing government to solve outstanding issues such as water use, land use and land use right,	• Series of high level policy dialogues and realistic policy advocacy and solution to the government,	✓ MoALI, MoC & concerned ministries	2022-2025
	3) Promoting pulses research and development, strengthening all-inclusive national agriculture research system (DAR, DOA, DOP, YAU, and relevant departments under MoALI as well as under other line ministries and private sector) i.e., increasing capacity of individual researcher as well as allocation of funding for research and	• Series of training program with effective curricula and syllabus for short term and long- term trainings (Degree and non-degree training, on-the- job training),	✓ MoALI, MoCRD, MoC, MoPF	2023-2027
	allocation of funding for research and	• Inclusive National Agriculture Research System reorganized with certain formalities,	✓ MoALI	2023-2027

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	development on pulses with special emphasis on pulses varietal development and maintenance breeding of released varieties (Producing early generation seeds),	<ul style="list-style-type: none"> Concrete plan for strengthening human resources on pulses breeding and seed science and technology, agronomy, and other related fields required for supporting pulses sector, 	✓ MoALI	2022-2027
	4) Setting up pulse's knowledge management mechanism/ establishing pulses knowledge bank,	<ul style="list-style-type: none"> Well-coordinated functional pulses seed network, 	✓ MoALI	2022-2027
	5) Creating pulses seed network including public, private sector and farmers for producing more amount of early generation seeds such as breeder seeds, foundation seeds, registered seeds to produce more certified seeds and encouraging informal quality seed sector,	<ul style="list-style-type: none"> Sustainable Pulses Seed System (SPSS) with concrete plan developed and emerging functional pulses seed market and value chain, 	✓ MoALI, MPBMSMA	2022-2027
		<ul style="list-style-type: none"> Series of well written farmers primers/ manual/ guideline on pulses GAP (3 musts and 4 reductions program*) and organic farming in local language even publish in newspaper, 	✓ MoALI, MoC, MPBMSMA	2022-2027
	6) Devising an extended plan for availability of good quality seeds in terms of extended seed production and distribution system at least certified seeds to ensure quality products	<ul style="list-style-type: none"> Education program for the use of social media and pulses social media page developed, 	✓ MoALI	2022-2027
		<ul style="list-style-type: none"> Interactive mobile apps for pulses developed, 	✓ MoALI, MPBMSMA	2022-2027

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	through the Sustainable Pulses Seed System (SPSS) along with seed saving technology, encouraging	• Pulses knowledge bank constructed,	✓ MoALI, MPBMSMA	2022-2027
	mainstreaming and streamlining of both formal seed system and informal seed system or other alternative seed systems,	• Extended planning and programs for pulses genetic resources conservation and utilization,	✓ MoALI	2022-2027
	7) Strengthening extension activities of DOA for Good Agricultural Practices (GAP) for pulses production specific to respective pulses and their farming system as well as organic pulses production for the niche markets,	• Annual conferences/ symposiums on pulses technological transfer,	✓ MoALI	2022-2027
	8) Promoting research and extension for promising underutilized pulses species for farming system diversification and organic pulses to access niche market domestically or internationally,	• Periodicals and annual reports on pulses sector development program,	✓ MoALI, & concerned private companies	2022-2027
	9) Promote linking research and extension system to production industries,	• Workable business model through private sector participation in supplementary, irrigation to pulses across farming system and updated water policy,	✓ MoALI	2022-2027

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	10) Enhancing yield of pulses by at least one or two supplementary irrigations through low lift and shallow tube well by possible private sector irrigation services under public-private partnership through water policy review and reform,	<ul style="list-style-type: none"> • Short term and long- term solutions for mechanized pulses farming system through model pilot project, 	✓ MoALI, MPBMSMA	2022-2027
		<ul style="list-style-type: none"> • Knowledge-based and knowledge intensive pulses value chain developed, 	✓ MoALI,	2022-2027
	11) Accelerating farm mechanization at various stages of cultural managements such as tilling, seeding, cultural operation, irrigation service, harvesting, drying and post harvesting for time and labor saving, and 12) Transforming current resource-based pulses farming system into knowledge-based pulses farming system.	<ul style="list-style-type: none"> • Pulses growing areas expanded, Yield increase and quality improvement of major exporting pulses 	✓ MoALI,	2022-2027

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Strategic Objective	Action	Key Deliverables	Implementing Agency	Time frame
<u>Strategic objective-3</u> Increase the value and reduce the risk of pulses production and processing in Myanmar	1) Considering options for linking pulses based small and medium-sized enterprises to the market (to help growers and processor, know which traders are selling to which export markets. This allows farmers to choose which trader/exporter to sell to rather than taking the opportunities available to them at the time), 2) Simplifying and clarifying policies relating to foreign direct investment and foreign currency flow for the purpose of attracting FDI, 3) Considering options for crop insurance and warehouse receipt and financing, 4) Promoting market access through better logistic supports by rethinking mass transportation through railways and	<ul style="list-style-type: none"> List of options for market linkage of pulses based small and medium enterprise, 	✓ MoALI, MoC, MPBMSMA	2023-2027
		<ul style="list-style-type: none"> Series of policy forums/ dialogues regarding increasing FDI and foreign currency flow, 	✓ MoALI, MoC, MPBMSMA, MIFER	2023-2027
		<ul style="list-style-type: none"> Pilot model testing for crop insurance, 	✓ MoALI	2022-2027
		<ul style="list-style-type: none"> A master plan for restoration of railways and water way for bulk transportation of agricultural commodities, 	✓ MoT, MoPF, MoALI & concerned ministries	2022-2027
		<ul style="list-style-type: none"> Market-led extension curriculum and syllabus developed and adopted in DOA extension division, 	✓ MoALI, MoC	2022-2027
		<ul style="list-style-type: none"> Series of crop outlook conferences and public reporting system established, and 	✓ MoALI	2022-2027

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	<p>water ways, facing the challenges of looming crisis of energy nexus,</p> <p>5) Provision of market-led extension service,</p> <p>6) Holding annual crop outlook conferences with information available on a website and other information and communication technology platforms, and</p> <p>7) Holding periodical talk-show for skill building and knowledge sharing.</p>	<ul style="list-style-type: none"> Series of talk shows on pulses crop and related matters using mass media and mobile technology. 	✓ MoALI	2022-2027
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5. CONCLUSION

Myanmar agricultural economy was significantly boosted by pulses export in *laissez-faire* approach after withdrawal of centralized economy. The pulses export sector become one-billion-dollar agribusiness due largely to private sector-led business growth and quick response of pulse farmers to emerging market. The most notable success factor for the growth was Myanmar's closeness to the two largest global pulses markets and the world most heavily populated countries with the largest pulses consuming countries like India and China.

Among over (40) species of pulses, black gram, green gram, chickpea, and pigeon pea are major export pulses. India largely imported black gram, pigeon pea, and chickpea where as China imported green gram through border trade. Only lesser amounts of pulses are imported from other Asian countries. However, Myanmar pulses export is largely supply driven and suffering from imposition of the buyer setting the rules. Such monopolistic nature of pulses trade may be eased by diversifying global markets through diversifying value-added pulses products and own brand.

During the last (10) years, Myanmar agricultural development received large amounts of attentions and interests by international development agencies. It has been the most studied area of Myanmar national economy. Among the studies, pulses sector was one of the most study areas in Myanmar. Considerable number of reports on pulses sector chiefly, value chain analysis is available in the web.

Based on these studies, the current exercise focused on seeking the opportunity to scale up existing pulses value chain amidst all the global atrocities of pandemic disease, looming energy crisis, higher input price, and global or local economic and political recession time under the concept of profit triangle depicted as 1) farm productivity, 2) intense research efforts for developing high yielding pulses varieties, and 3) expansion and diversification of markets.

The studies projected that Myanmar Pulses Value Chain is largely functional to grow up to the next level through the provision of the government political commitment and conducive policy support and environment.

The current roadmap is intended for scaling up the pulses value chain with the vision of

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"Progressive and productive pulses sector through a more inclusive, integrated, resilient, and globally competitive and recognized pulse value chain to contribute rural economic growth of Myanmar". This particular roadmap will be implemented with two important missions as 1) improve the socio-economic condition of smallholder pulses farmers by creating rural livelihood and income, reduce poverty incidence through pulses-based agribusiness, and 2) maintain Myanmar's position for being one of the largest exporters of pulses and to be a producer of the quality pulses thereby integration and widening global new market.

In order to realize the vision, the three strategic objectives were laid out as 1) foster a demand driven, rather than supply driven pulses sector through private-led and public-supported functional pulses value chain, 2) increase productivity in the production through modernization, diversification, intensification, and processing of pulses in Myanmar, and 3) increase the value and reduce the risk of pulses production and processing in Myanmar.

The operational roadmap of the actions to meet the three strategic objectives are planned under three thematic areas as 1) Market development, 2) Governance and Institution, and 3) Research and Extension. For the strategic objective-1, 12 actions will be operationalized under the three thematic areas where as 12 and 7 actions for the strategic objective-2 and strategic objective-3 will be operationalized under thematic area-2 and thematic area-3 and thematic area-1, 2, and 3 respectively.

It is well confident that if the action lines are operationalized in well-coordinated network activities with well allocated financial resources and political supports and commitments, the objectives will be achieved and Myanmar pulses sector will certainly enjoy the next wave of success through progressive, sustainable, inclusive, integrated, efficient and globally recognized pulses value chain.

6. REFERENCES

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Annex I

Myanmar Pulses Production

(a) by Variety (MT), 2011/12 – 2020/21

YEAR	Total PROD	Black gram	Bocate	Butter bean	Chick pea	Cow pea	Duffin bean	Garden pea	Green gram	Ground-nut	Krishna mung	Lablab bean	Lentil	Lima bean	Pigeon pea	Rice bean	Soy bean	Sultani	Sulta pya	Other pulses
2011-12	6919769	1374799	172837	80793	473106	168280	11745	68204	1344306	1399641	126237	135263	1403	15356	848832	56006	236914	15146	118384	272520
2012-13	7265710	1548469	164921	82130	525379	183767	12777	67790	1386952	1451341	127413	147433	1225	14994	803300	57471	237916	17038	133623	301770
2013-14	7506736	1574467	168491	84057	571194	187088	13506	71063	1451888	1488109	134522	151735	1286	15955	846841	57555	234918	19314	136289	298459
2014-15	7643750	1580105	168612	85909	579818	187730	13433	71273	1535690	1525359	140388	155098	1323	15159	841376	57559	228930	17606	135321	303064
2015-16	7883198	1671028	171759	91631	580633	191798	14191	73383	1594826	1547949	140890	159428	1577	13260	881243	59107	225842	19305	137229	308117
2016-17	7912189	1703285	165698	77208	568371	180939	13749	69084	1590318	1597657	131558	152424	1420	13565	918257	58200	218275	18881	127768	305534
2017-18	7360621	1377354	170274	66288	535223	181448	14044	61853	1577798	1608065	108581	127147	1165	11864	811510	47287	212832	17826	124662	305400
2018-19	6841929	1358904	160570	74850	543186	161719	13977	60303	1457680	1587518	69191	117891	1090	11604	524595	44483	210276	14301	130774	299019
2019-20	6833083	1355301	158048	81418	507457	153286	13487	59271	1471997	1641660	66699	118223	1072	12403	508486	44577	207674	14383	120670	296973
2020-21	6670753	1348683	158885	64738	489723	152900	13684	53176	1454294	1621450	55526	117269	1021	11588	468657	52788	197715	13737	115552	279368
Average	7283774	1489239	166009	78902	537409	174895	13459	65540	1486575	1546875	110100	138191	1258	13575	745310	53503	221129	16753	128027	297022
% Share	100.0%	20.4%	2.3%	1.1%	7.4%	2.4%	0.2%	0.9%	20.4%	21.2%	1.5%	1.9%	0.0%	0.2%	10.2%	0.7%	3.0%	0.2%	1.8%	4.1%
Growth	-0.4	-0.2	-0.9	-2.4	0.4	-1.1	1.7	-2.7	0.9	1.6	-8.7	-1.6	-3.5	-3.1	-6.4	-0.7	-2.0	-1.1	-0.3	0.3

(b) by Region/State (MT), 2011/12 – 2020/21

YEAR	Total PROD	AWD	BGO	CHN	KCN	KYH	KYN	MDY	MGW	MON	NPT	RKH	SGI	SHA	TNY	YGN
2011-12	6919769	859196	1175680	11908	68694	27277	87350	754925	1341749	45028	112179	113600	1793574	312059	243	216309
2012-13	7265710	935449	1350696	10543	57519	27580	94853	696456	1409965	41879	117390	103849	1897104	311286	174	210965
2013-14	7506736	976159	1376710	9815	51773	27919	102905	768124	1449648	44158	121225	104537	1952549	307005	118	214091
2014-15	7643750	1003169	1398657	10673	49990	28233	105289	784834	1496548	44328	127485	102472	1981801	291878	106	218287
2015-16	7883198	1023610	1474235	9114	51330	26556	106427	808769	1534982	47485	130112	100246	2056421	292771	106	221035
2016-17	7912189	981094	1499085	8366	49899	22170	108842	828120	1531889	45669	121156	99541	2113116	293265	251	209727
2017-18	7360621	948156	1428108	8916	48742	17494	109969	839877	1192462	43037	103481	77351	2055782	289545	317	197385
2018-19	6841929	927964	1414146	7276	50363	17872	116787	784327	802903	43810	103653	74957	2024968	277519	215	195169
2019-20	6833083	944439	1437527	6914	59326	16912	115062	781051	793073	41593	107024	72475	1987912	273575	165	196036
2020-21	6670753	946707	1433361	6196	55693	15656	115093	729632	761432	42028	102144	71800	1920085	271432	159	199335
Average	7283774	954594	1398821	8972	54333	22767	106258	777611	1231465	43901	114585	92083	1978331	292033	185	207834
% Share	100.0%	13.1%	19.2%	0.1%	0.7%	0.3%	1.5%	10.7%	16.9%	0.6%	1.6%	1.3%	27.2%	4.0%	0.0%	2.9%
Growth	-0.4	1.1	2.2	-7.0	-2.3	-6.0	3.1	-0.4	-6.1	-0.8	-1.0	-5.0	0.8	-1.5	-4.6	-0.9

Source: Ministry of Agriculture, Livestock and Irrigation

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Myanmar Pulses Export

(a) by Value (million USD), 2011/12 – 2020/21

YEAR	Grand Total	Black gram	Bocate	Butter bean	Chick pea	Cowpea	Duffin bean	Green gram	Ground-nut	Kidney bean	Lablab bean	Nylon Pe	Peni-gyar	Pigeon pea	Rice bean	Soy bean	Sulta-ni/pya	Other pulses
2011-12	1142.050	472.622	1.209	13.357	65.189	30.051	0.096	312.514	-	12.531	7.38	-	1.003	190.445	10.317	1.843	0.021	23.472
2012-13	1090.630	382.933	0.972	15.385	34.268	38.823	0.086	271.261	-	11.053	4.897	-	1.395	170.353	12.856	4.061	3.112	139.175
2013-14	949.670	376.425	0.598	16.574	2.662	22.316	0.178	306.965	59.447	12.566	5.638	1.644	2.890	114.562	7.954	4.702	4.072	10.477
2014-15	1200.097	469.580	7.845	14.396	9.046	27.712	0.148	359.579	67.566	12.291	5.536	0.412	3.332	207.546	7.601	2.227	3.104	2.176
2015-16	1214.991	498.369	4.765	10.919	19.502	15.261	0.018	332.789	60.445	14.563	2.35	0.512	2.277	229.802	7.608	2.200	2.226	11.385
2016-17	1398.905	672.289	7.247	10.187	28.608	16.847	0.158	349.802	114.267	16.2	3.75	0.672	3.295	159.788	9.981	0.993	2.643	2.178
2017-18	886.715	344.043	7.963	1.018	36.154	16.748	0.011	270.597	73.312	13.031	3.634	-	-	99.548	7.56	6.815	1.285	4.996
2018-19	1026.306	326.341	7.066	23.321	38.071	28.972	-	342.817	88.171	19.952	5.017	1.205	4.943	101.247	12.755	2.738	1.381	22.309
2019-20	1195.483	437.974	5.128	35.337	13.256	25.217	-	406.305	130.224	33.202	7.725	5.794	8.226	29.996	21.085	6.665	11.345	18.004
2020-21	1570.707	526.714	4.273	25.678	15.985	28.337	-	525.381	183.083	38.032	11.613	2.422	4.522	144.100	33.418	3.648	11.846	11.655
Average	1167.555	450.729	4.707	16.617	26.274	25.028	0.099	347.801	97.064	18.342	5.754	1.809	3.543	144.739	13.114	3.589	4.104	24.583
% Share	100.0%	38.6%	0.4%	1.4%	2.3%	2.1%	0.0%	29.8%	8.3%	1.6%	0.5%	0.2%	0.3%	12.4%	1.1%	0.3%	0.4%	2.1%
Growth	3.60	1.21	15.06	7.53	-14.46	-0.65	-100.00	5.94	17.43	13.13	5.17	5.69	18.21	-3.05	13.95	7.88	102.16	-7.48

(b) by Volume (MT), 2011/12 – 2020/21

YEAR	Grand Total	Black gram	Bocate	Butter bean	Chick pea	Cowpea	Duffin bean	Green gram	Ground-nut	Kidney bean	Lablab bean	Nylon Pe	Peni-gyar	Pigeon pea	Rice bean	Soy bean	Sulta-ni/pya	Other pulses
2011-12	1470378	599498	2237	16389	78704	35110	149	351707	-	17962	7546	-	1543	319573	18560	2710	33	18657
2012-13	1565461	658017	2073	24076	46756	45636	147	337219	-	12667	5220	-	2510	296124	28214	6136	4815	95851
2013-14	1369881	645698	843	24343	3767	35677	253	357304	47620	12425	5962	2269	4013	187820	14402	7650	6375	13459
2014-15	1497971	626387	15243	18553	17738	46572	233	354532	58685	14605	7436	490	4610	307805	13160	3613	5256	3053
2015-16	1242622	483153	8639	19475	35298	22556	24	330838	47508	21898	3509	608	4296	226751	16446	3961	4243	13420
2016-17	1424639	561766	11762	23327	35769	26688	351	407595	100426	25247	6412	800	6922	184610	23411	1758	4801	2994
2017-18	1317959	527964	11483	2021	43751	25281	12	350056	70317	17690	5837	-	-	225492	17425	12809	2349	5472
2018-19	1640062	616049	13307	30143	76801	55494	-	473822	72747	27463	7773	1434	10288	182169	24093	6386	2726	39368
2019-20	1606147	596657	9077	60429	23732	46157	-	534128	97372	44601	12784	6898	17463	53377	39609	15689	18227	29948
2020-21	2029696	677526	5170	45226	27213	49963	-	673123	150669	53863	19422	3346	9967	214092	61893	6176	18556	13492
Average	1516482	599272	7983	26398	38953	38913	167	417032	80668	24842	8190	2263	6846	219781	25721	6689	6738	23571
% Share	100.0%	39.5%	0.5%	1.7%	2.6%	2.6%	0.0%	27.5%	5.3%	1.6%	0.5%	0.1%	0.5%	14.5%	1.7%	0.4%	0.4%	1.6%
Growth	3.65	1.37	9.75	11.94	-11.13	4.00	-100.00	7.48	17.89	12.98	11.08	5.71	23.03	-4.35	14.32	9.58	102.09	-3.54

Source: Ministry of Commerce