



Myanmar Pulses Sector Development Strategy



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The Myanmar Pulses Sector Development Strategy is an official document of the Government of the Republic of the Union of Myanmar.

For any queries about the Strategy, please contact:

The Department of Agricultural Research, Ministry of Agriculture, Livestock and Irrigation

Yezin, Nay Pyi Yaw, Myanmar

Phone: + 95 67 416531 Ext. 333 (off), Ext 380 (Res)

E-mail: dtunshwe@gmail.com

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The Myanmar Pulses Sector Development Strategy was developed with the basis of the process, methodology and technical assistance of a number of contributors. The views expressed herein do not reflect the official opinion of any of these contributors.

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Foreword

Agriculture remains the most important economic and social sector in Myanmar, especially in rural and peri-urban areas. Agriculture contributed approximately 37% of GDP, 25-30% of export earnings and employs 70% of the labour force (FAO 2017). The pulses sector is an important sector within agriculture. Pulses production in Myanmar has grown at an incredible pace since the country liberalised economic policies in 1988. In 2016, pulses production was 6 million tonnes. Myanmar is an important global exporter of pulses, exporting approximately 1 million tonnes each year valued at about US\$1 billion. Pulses are the largest exported agricultural commodity from Myanmar, and are a significant component of domestic consumption. As pulses are an important contributor to national accounts, smallholder livelihoods and national nutrition, the Government of Myanmar has developed this Myanmar Pulses Sector Development Strategy to ensure the orderly modernization of the sector with maximised and equitable benefits.

The development of this Strategy has been led by Dr Tun Shwe, Director of Oilseeds and Pulses Crops Division of the Department of Agricultural Research (DAR), Ministry of Agriculture, Livestock and Irrigation (MOALI), Myanmar. Financial assistance has been provided by the Australian Centre for International Agricultural Research (ACIAR), and technical assistance has been provided by ACIAR and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). This Strategy complements existing policies and strategies, including the *National Export Strategy for Beans, Pulses and Oilseeds*, the *Myanmar Climate-Smart Agriculture Strategy*, and the *Ministry of Agriculture, Livestock and Irrigation Second Short Term Five Year Agriculture Policies and Strategic Thrusts*.

The vision of this Strategy is an inclusive, regionally and globally competitive, sustainable and adaptable pulses sector contributing to the socio-economic well-being of all members of the pulses supply chain and contributing to development of Myanmar's national economy. I am sure it will be an effective catalyst to achieving this vision. I am delighted to present this draft for public comment.



Dr Tin Htut
Permanent Secretary
Ministry of Agriculture, Livestock and Irrigation

Contributors and acknowledgements

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Ministry of Agriculture, Livestock and Irrigation, Nay Pyi Taw, Myanmar

- U Naing Kyi Win, Director General, Department of Agricultural Research
- Dr Tun Shwe, Director, Oilseeds and Pulses Crops Division, Department of Agricultural Research
- Dr Mar Mar Win, Assistant Research Officer, Food Legumes Section, Department of Agricultural Research
- Ms Khin Lay Kyu, Senior Research Assistant, Food Legumes Section, Department of Agricultural Research
- Numerous contributors who helped with the farmer, processor and trader surveys.

International Consultants

- Dr Elizabeth Petersen (Liz), Principal Applied Economist, Advanced Choice Economics Pty Ltd
- Dr Tin Maung Aye, International Consultant in Agriculture and Rural Development

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

- Dr Pooran M. Gaur, Principal Scientist (Chickpea Breeding) and Theme Leader, Crop Improvement
- Dr Anthony Whitbread, Research Program Director, Innovation Systems for the Drylands
- Dr Kumara Charyulu Deevi, Senior Scientist, Agricultural Economics Policy and Impact, Asia Program.

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- Mr Hla Myint Aung Department of Agriculture, MOALI
- Mr Soe Aung Myanmar Trade Promotion Organization, Ministry of Commerce
- Ms Htwe Htwe Aung Golden Plain
- Mr Ross Bray Australian Trade and Investment Commission
- Ms Marleen Brouwer Myanmar ICCO Cooperation
- Ms Khin Mar Cho Nyaung U Agriculture Research Farm, DAR, Mandalay Region, MOALI
- Dr Raymond Clark IFDC, Dr Zone Agro-Input and Farm Services Project
- Mr Nick Goddard Pulse Australia
- Mr Mya Han Myanmar Livestock Federation
- Dr David Herridge University of New England, Australia
- Dr Thaug Htun Moat Thone Rural Development Foundation
- Mr Min Ko Ko Myanmar Pulses, Beans and Sesame Seeds Merchants Association
- Dr Myo Aung Kyaw Myanmar Rice Federation
- Mr Hla Kyaw MOALI
- Dr Htet Kyu GRET Myanmar & Technical Alliance for Farmers
- Dr Myo Kywe Yazin Agriculture University, MOALI
- Dr Rod Lefroy Freelance Consultant
- U Yan Lin Agriculture, Livestock & Rural Development Committee, Parliament
- Mr Kyaw Swe Lin Department of Planning, MOALI
- Dr Thet Lin Yezin Agriculture University, MOALI
- Mr Soe Win Maung Myanmar Pulses, Beans and Sesame Seeds Merchants Association
- Ms Myat Nwe Nwe Food Legume section, Yezin, DAR, MOALI
- Mr Sai Ba Nyan Myanmar Pulses, Beans and Sesame Seeds Merchants Association
- Dr Zaw Oo Center for Economic and Social Development

- Mr Tin Htut Oo Agribusiness and Rural Development Consultants
- Mr Aung Shwe Myanmar Edible Oil Millers Association
- Dr Than Than Sein Moat Thone Rural Development Foundation
- Mr Myint Soe Zaloke Agriculture Research Farm, DAR, Sagaing Region, MOALI
- Dr Tin Maung Than Center for Economic and Social Development
- Dr Myo Thet UMFCCI
- Mr Myo Thu Myanmar Trade Promotion Organization, Ministry of Commerce
- Dr Hlaing Myat Thu Department of Medical Research Ministry of Health and Sports
- Mr Zaw Min Win UMFCCI
- Dr Kyaw Win Myanmar Pulses, Beans and Sesame Seeds Merchants Association
- Dr San Shway Wynn Health and Sports Development Committee, Parliament
- Dr Khin Zaw Livestock and Fishery, MOALI
- Dr Min Zaw Myanmar Pulses, Beans and Sesame Seeds Merchants Association

Executive Summary

Pulses, defined as edible legumes including dry beans, peas and lentils, are an important source of nutrition, and household and national income earnings, and play a key role in reducing poverty in Myanmar. Pulses are Myanmar's largest export (by value and volume), and are the second most important crop for domestic consumption. They provide dietary protein and fibre, and are a significant source of vitamins and minerals (such as iron, zinc, folate and magnesium). In addition to their food value, pulses also play an important role in cropping systems because of their ability to fix nitrogen in symbiosis with rhizobia, a soil bacterium, and thereby enrich the soil.

There is strong potential for growth in Myanmar's pulses sector. Myanmar's significant land resources and proximity to large markets, particularly India, are significant competitive advantages. There are other sizable growing international markets for pulses, such as Italy, Germany, France, China, Pakistan and Turkey, to which Myanmar could export with feasible adjustment to the type and quality of pulses produced. The area sown to pulses in Myanmar still has room to expand and there is strong potential for productivity growth.

The purpose of this Strategy is to determine a vision for Myanmar's pulses sector, and develop a medium-term (5 to 10 years) strategy for achieving this vision. It includes a vision statement, strategic objectives, and an implementation plan that includes suggestions for resourcing, monitoring and evaluating progress against the strategic objectives. The Strategy is based on a comprehensive review of the pulses sector in its current form. This review draws from an extensive literature review, semi-structured interviews with 22 Myanmar-based and international stakeholders, and surveys of 120 pulse producers, 11 local traders and 7 processors conducted in July and August 2017. The information in the review is summarised in a Pulses Sector SWOT Analysis. Key points of the SWOT analysis are provided below, as well as the vision statement for the Myanmar pulses sector and a description of the strategic objectives.

Strengths of Myanmar's pulses sector

Myanmar produces more than 20 types of pulse crops in diverse and flexible rotation systems. It is the second largest producer of pulses in the world, producing 6 million tonnes in 2016. Pulse yields are high compared with other pulse-producing Asian countries. Myanmar exports are currently approximately 1 million tonnes (valued at US\$ 1 billion) - 12% of total global exports of pulses by volume, and 19% by value. Myanmar's *Agricultural Sector Policy and Thrusts for Second Five Year Short Term Plan* outlines the current landscape of the agriculture sector in Myanmar, a policy vision, mission and set of goals and objectives. This set of policies is comprehensive with minimal distortional domestic support subsidies. The focus is on technical support to agriculture through better research and extension services.

Weaknesses of Myanmar's pulses sector

There are significant constraints in the availability of improved pulse varieties. Domestic varieties are not diffused and international germplasm is under-utilised. Farmer-saved seed, as well as much of the commercially-available seed, are traditional varieties or old-released varieties with limited genetic resources. Almost all seed production, multiplication, extension and distribution are handled by MOALI which faces acute funding constraints. Seed inoculation rates are low, and implementation of the Seed Law and the related National Seed Policy has been slow.

Considerable uncertainty remains regarding tenure for agricultural land in Myanmar as full documentation of rights has not been issued. Mechanisation has been slow to progress in Myanmar, although strong progress has been made in recent years largely driven by labour shortages. Fertiliser consumption is low in Myanmar compared with other countries due to lack of clear advice, mistrust of fertiliser quality and credit shortages.

The processing of pulses is minimal and simple in Myanmar. Most pulses are sold in their raw state to local traders at discounted prices. Market information is sourced almost exclusively from wholesalers exporting to Indian markets, with little knowledge of other markets.

Quality of Myanmar exports are generally low (especially in terms of foreign material) resulting in price discounts and reduced access to some markets.

Standards and quality of pulses in Myanmar is hampered by a lack of nationally-agreed standards and systematically implemented control system which is constraining the export of Myanmar-produced pulses to higher-value markets. There are difficulties with international monetary transfers.

Interests of members of the pulses value chain are not represented by one industry group with strong vision, but by a number of disperse groups. The private sector has yet to engage in research, development and extension in a meaningful way. There are some deficiencies in rule of law, contract enforcement and protection of property rights in Myanmar that are significant stumbling blocks to pulses sector development.

Opportunities for Myanmar's pulses sector

Myanmar shares borders with some of Asia's fastest growing economies and largest consumers of pulses. It has favourable growing conditions for many pulse crops. Myanmar produces a diverse range of pulse crops, providing an opportunity to reach into niche export markets and/or for increased specialisation of pulse types to better target export market demand. There is significant potential to continue to expand the area sown to pulses in Myanmar.

Poor availability of improved pulse varieties could be addressed by supporting implementation of the seed law and policy, developing public-private partnerships, increasing government funding to MOALI, and security of long-term property rights to address credit shortages. The issue of insecure land rights can be reconciled reasonably simply through providing documentation of land use rights, and enforcing these rights. This will have significant flow-on effects for affordability of seed, mechanisation, input market development and efficient use of inputs.

Better access to export market information is likely to lead to expansion of pulses processing. Other incentives that could encourage confidence and interest in the processing sector include providing financial support to prospective processing companies, encouraging MOAI and the Myanmar Investment Commission to fast-track investment applications, providing attractive and long-term lease agreements for processing sites and facilities, and building the market for processing through better access to credit.

Myanmar could diversify its export markets into Europe (Italy, Germany, France), China, Pakistan and Turkey as these countries are sizable pulse markets. Expanding into these markets will require a restructure of Myanmar's pulse production (growing less black and green gram and more kidney beans, lentils and peas). It is expected that Myanmar will be able to make this restructure relatively easily with appropriate investment in market research, improving seed varieties and crop management. Full and ongoing market analysis by industry in Myanmar will provide a clear understand of different consumer's requirements through time. Nationally-agreed standards and a systematically implemented control system is likely to lead to higher pulses prices in existing markets and greater market access to higher-value export markets.

Significant increases in the value of exports could also be captured through increasing the quality of current production, especially reducing the amount of foreign material in the grain (e.g. straw and sticks). Strong leadership by one industry group could make quality standards clear and provide representation of various members of the sector in policy debates.

Increased investment in research, development and extension is likely to reap strong economic benefits for Myanmar farmers. There is significant opportunity for public sector investment in research, development and extension.

Threats faced by Myanmar's pulses sector

Just over 70% of Myanmar's pulses exports go to India, the remaining spread across another 40 countries, none with more than 5% of export share. India will probably remain Myanmar's largest pulse export destination as they are the dominant global importer of pulses. The unpredictability of government policies, particularly those related to trade, is of concern to agribusiness. Unexpected export restrictions and, in some cases, land control measures have restricted development of the sector over the past decade.

Climate change in Myanmar will almost certainly result in an increase in average temperatures and changing rainfall patterns leading to higher volatility and increased flooding and drought. Producer prices of pulses have been falling since 2009 (in real terms). Surveyed pulse growers perceive that a low selling price is the biggest challenge/difficulty faced by their farm business. Fertiliser

use is clouded by concern for fake or adulterated fertiliser and lack of advice about how to optimise fertiliser inputs. Pesticides are exclusively imported, with significant informal imports not subject to controls, meaning that dangerous and banned substances find their way into the market.

Myanmar pulses sector vision: An inclusive, regionally and globally competitive, sustainable and adaptable pulses sector contributing to the socio-economic well-being of all members of the pulses supply chain and contributing to development of Myanmar's national economy.

Strategic objectives

Three strategic objectives are presented that are considered necessary to realise the Myanmar pulses sector vision:

1. Foster a demand-driven, rather than supply-driven, pulses sector

This can be achieved by improving export market intelligence, developing a nationally-standardised set of quality requirements, developing a Myanmar pulses brand, setting up a standardised system for testing all pulses exports, encouraging industry leadership with clear vision, and encouraging industry funding to support development of the sector.

2. Increase productivity in the production and processing of pulses in Myanmar

This can be done by strengthening governance, lobbying government to secure land tenure, increasing funding for research and development of pulses, and increasing extension for good agricultural practices for pulses production.

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

This can be done by considering options for linking small and medium-sized enterprises to the market, simplifying and clarifying policies relating to foreign direct investment and foreign currency flow, considering options for crop, increasing capacity in market forecasting, holding annual crop outlook conferences with information available on a website and other information and communication technology platforms.

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Introduction

Pulses, defined as edible legumes including dry beans, peas and lentils¹, are an important source of nutrition, and household and national income earnings, and play a key role in reducing poverty in Myanmar. Pulses are Myanmar's largest export (by value and volume), and are the second most important crop for domestic consumption. They provide dietary protein and fibre, and are a significant source of vitamins and minerals (such as iron, zinc, folate and magnesium) (Mudryi *et al.* 2014). In addition to their food value, pulses also play an important role in cropping systems because of their ability to fix nitrogen in symbiosis with rhizobia, a soil bacterium, and thereby enrich the soil.

Myanmar is a top five world producer for three key pulse crops (mung bean, pigeon peas and chick peas). It has strong competitive advantage in pulses production due to extensive land, water and labour resources, as well as proximity to fast-growing markets such as India, China and ASEAN (Raitzer *et al.* 2015)

The growth of Myanmar's pulses sector started with the economic reforms of 1988. Prior to this (between 1962 and 1988), Myanmar was a command and control socialist economy under military rule with strict foreign exchange controls. Crop production and trade were governed by the government-controlled agricultural marketing system, and major crops were procured at fixed prices by state-controlled trading companies with monopoly powers over imports and exports (Aye *et al.* 2013). From 1988-2011, Myanmar experienced a period of market-oriented economic reforms under military rule which has led to staggering growth in Myanmar's production and trade in pulses. In quick succession, the government dropped production quotas on pulses, liberalized domestic marketing and opened export marketing to private traders. While production quotas on paddy continued until 2003, pulses became the first major agricultural commodity to face a completely liberalized production and marketing environment. At the same time, a large pulses market opened up in neighbouring India. India's green revolution propelled a major expansion of rice

¹ We use the UN's definition for pulses and their derived products. This definition includes vegetable crops harvested solely for dry grain, thereby excluding crops harvested green for food such as green beans and green peas. It also excludes crops used mainly for oil extraction (e.g. soybean and ground nuts) and leguminous crops that are used exclusively for sowing purposes (such as clover and alfalfa). A full definition is provided in the Appendix.

and wheat production at the expense of pulses, and with trade liberalization after 1991, India's market was opened to international suppliers (Haggblade 2014). Myanmar is currently experiencing a period of economic liberalisation under a military-backed civilian government.

There is strong potential for growth in Myanmar's pulses sector. Myanmar's significant land resources and proximity to large markets, particularly India, are a significant competitive advantage. There are other sizable growing international markets for pulses, such as Italy, Germany, France, China, Pakistan and Turkey, to which Myanmar could export with feasible adjustment to the type and quality of pulses produced. The area sown to pulses still has room to expand and there is strong potential for productivity growth, allowing the potential for production to keep growing in Myanmar.

The purpose of this Strategy is to determine a vision for Myanmar's Pulses Sector, and develop a medium-term (5 to 10 years) strategy for achieving this vision. The Strategy is presented in two sections. The first section is titled "Where we are now". It is a comprehensive review of the pulses sector in its current form. This section is based on extensive literature review, semi-structured interviews with 22 Myanmar-based and international stakeholders, and surveys of 120 pulse producers, 11 local traders and 7 processors conducted in July and August 2017. It includes a Pulses Sector SWOT Analysis, which summarises the Strengths, Weaknesses, Opportunities and Threats as identified in this section of the Strategy. The SWOT Analysis is used as the basis for developing the rest of the Strategy.

The second section of the strategy is titled "Where we want to go and how to get there". It sets out a vision for Myanmar's pulses sector into the medium-term, and develops three key strategic objectives for getting there. It includes an implementation strategy and suggestions for resourcing, monitoring and evaluating the success of the Strategy.

WHERE WE ARE NOW

This section is a comprehensive review of the pulses sector in its current form. This section is based on extensive literature review, semi-structured interviews with 22 Myanmar-based and international stakeholders, and surveys of 120 pulse producers, 11 local traders and 7 processors conducted in July and August 2017.² The review includes 6 subsections describing aspects of geography and cropping systems, value chain assessment, research, development and extension, market information, standards and quality management, and the policy and institutional environment. This information is summarised in a Pulses Sector SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis.

Overview of geography and crop systems

Myanmar has an area of 653,080 km² and a population of approximately 52million (2014 census). It shares borders with some of Asia's fastest growing economies and largest consumers of pulses – India, China, Bangladesh, Thailand and Laos (Figure 1 and Table 1). Almost 80% of Myanmar's area is under forest or non-agricultural land uses, with 15% under temporary crops such as rice and pulses (approximately 10 million hectares). In 2015/16, 6% of Myanmar's land area was sown to pulses (4.4 million hectares). Myanmar produces over 20 types of pulse crops. Black gram (or Matpe), green gram (or mung bean), pigeon peas and chickpeas are the four main pulse crops grown in Myanmar. Cowpea, butter beans, red kidney beans, and rice bean are also commonly grown pulse crops in Myanmar (Figure 2).

Myanmar has a diversity of agro-ecological conditions which are shaped by dramatic differences in rainfall, temperatures, elevations, soil types, and other factors. Regions in Myanmar can be characterised into three agro-ecological zones – the Hilly Zone, the Central Dry Zone and the Coastal Zone (Figure 3). Pulses are mostly produced in the Central Dry Zone and the Ayeyarwady and Yangon Deltas (termed the Delta Zone in this report) (Haggblade *et al.* 2014).

² All farmers, local traders and processor were personally interviewed using a structured questionnaire available on request. All survey respondents were randomly selected from within different regions of Myanmar. Farmer surveys were conducted in Magway (30), Yangon (10), Mandalay (20), Sagaing (20), Bago (20) and Ayeyarwaddy (20). Local trader surveys were conducted in Mandalay (4), Sagaing (5) and Ayeyarwaddy (2). Processor surveys were conducted in Mandalay (4), Sagaing (1) and Ayeyarwaddy (2).

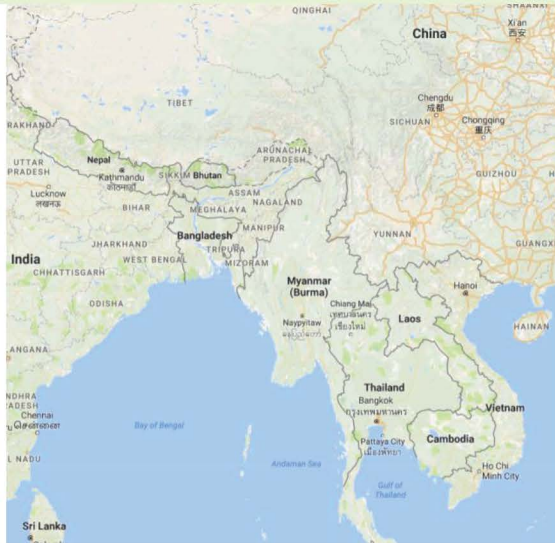


Figure 1: Map of Myanmar showing proximity to neighbouring countries

Table 1: Border length of Myanmar’s neighbouring countries and domestic pulse consumption

Country	Border length (km)	Gross Domestic Product growth (%, 2016)	Domestic pulse consumption (million tonnes, 2014)	Per capita pulse consumption for food (kg/capita/year, 2014)
Myanmar		6.5	3.70	14.0*
Thailand	2,416	3.2	0.24	3.3
China	2,129	6.7	0.20	0.7
India	1,468	7.1	19.86	13.1
Bangladesh	271	7.1	0.67	4.0
Laos	238	7.0	0.02	3.0
Total	6,522		22.99	

Source: World Development Indicators, FAOSTAT

*Estimate based on official production and export figures. There is uncertainty about yield estimate.



Figure 2: Main pulse crops grown in Myanmar (Source: Aye *et al.* 2013)

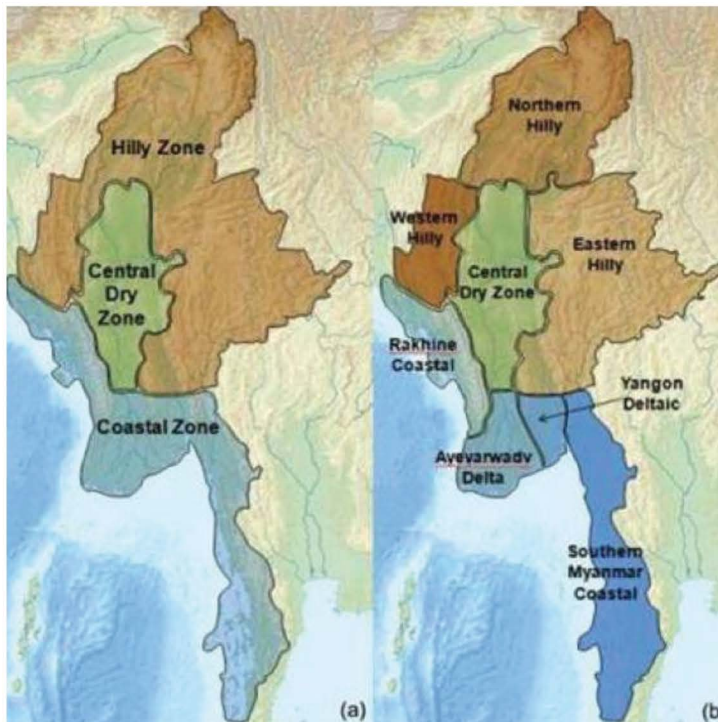


Figure 3: Map of Myanmar's agro-ecological zones (a) and the eco-physiographic zones (b) (MoAI 2015)

Approximately 68% of pulses production occurs in the post-monsoon winter season (October to January), the remaining 32% is produced during the monsoon season (June to September) (Department of Agricultural Research (DAR) data). The average production period is 3-4 months which is short compared with rice (3-5 months).

Pulses are grown in different seasons in the different agro-ecological zones. Almost all black gram is produced in the Delta Zone or southern regions of the Central Dry Zone (Table 2) during the winter season. Chickpeas and pigeon peas are grown almost exclusively in the Central Dry Zone; pigeon peas in the monsoon season and chickpeas in the winter season. Green gram has the largest diversity in cropping practices, with equal production in the monsoon and winter season, mainly in the Central Dry Zone and northern Delta Zone.

Table 2: Proportion of area sown, seasonality, consumption uses and export market of various pulse crops in Myanmar

	Black gram	Green gram	Pigeonpeas	Chickpeas
% of area sown				
Dry Zone	10	56	92	96
Delta Zone	90	44	8	4
Consumption uses	Sold primarily to India for making dahl	Mostly milled for Dahl. 5-10% absorbed by Myanmar's domestic market		Significant domestic consumption, used for Dahl or flour used for making vermicelli noodles
Export market	Yangon → India	Dry Zone: Mandalay → China Delta Zone: Yangon → India	Yangon → India	Yangon → India

Source: Adapted from Haggblade *et al.* (2014)

Myanmar farmers use a wide range of rotations that include pulses. The most common include rice-black gram and rice-green gram rotations (farmer survey results). Approximately 40% of farmer's intercrop pulses with a different crop, the most commonly intercropped combinations being pigeon peas with groundnut, pigeon peas with sesame, and pigeon peas with green gram (farmer survey results).

While current growing conditions in Myanmar are very favourable to pulses production, most studies of climate change in Myanmar suggest that in the coming decades, average temperatures will increase along with aggregate rainfall although rains may become more sporadic, leading to higher volatility and increased flooding and drought (RIMES 2011, World Bank 2012). Research, development and extension into varieties and cropping systems to adapt and mitigate the impacts of climate change is needed to reduce the vulnerability of Myanmar producers to climate change.

Key messages – Geography and crop systems

- Myanmar shares borders with some of Asia's fastest growing economies and largest consumers of pulses – India, China, Bangladesh, Thailand and Laos.
- In 2015/16, 6% of Myanmar's land area was sown to pulses (4.4 million hectares).
- Myanmar produces over 20 types of pulse crops with a diverse and flexible array of rotations. Intercropping pulses with other pulses or non-pulses is common.
- Black gram (or Matpe), green gram (or mung bean), pigeon peas and chickpeas are the four main pulse crops grown in Myanmar.
- Pulses are mostly produced in two distinct agro-ecological zones: the Central Dry Zone and the Delta Zone.
- Approximately 68% of pulses production occurs in the post-monsoon winter season (October to January), the remaining 32% is produced during the monsoon season (June to September):
 - Black gram – Delta Zone and southern regions of the Central Dry Zone during the winter season
 - Green gram – Central Dry Zone and northern Delta Zone with equal production in monsoon and winter season
 - Chickpeas – Central Dry Zone during the winter season
 - Pigeonpeas – Central Dry Zone during the monsoon season.
- While current growing conditions in Myanmar are very favourable to pulses production, most studies of climate change in Myanmar suggest that in the coming decades, average temperatures will increase along with aggregate rainfall although rains may become more sporadic, leading to higher volatility and increased flooding and drought.

Value chain assessment

The value chain for pulses in Myanmar is pictured in Figure 4. Very simply, farm production of pulses is taken by collectors to Regional Crop Exchange Centres, where large traders purchase pulses for sale to large wholesalers. Large wholesalers are the main handlers of export. They buy from traders through commodity exchange centres such as Bayinthaung Market, or directly from the traders themselves. Processing of pulses may occur before or after the pulses are handled by large wholesalers. Most trade occurs through Yangon.

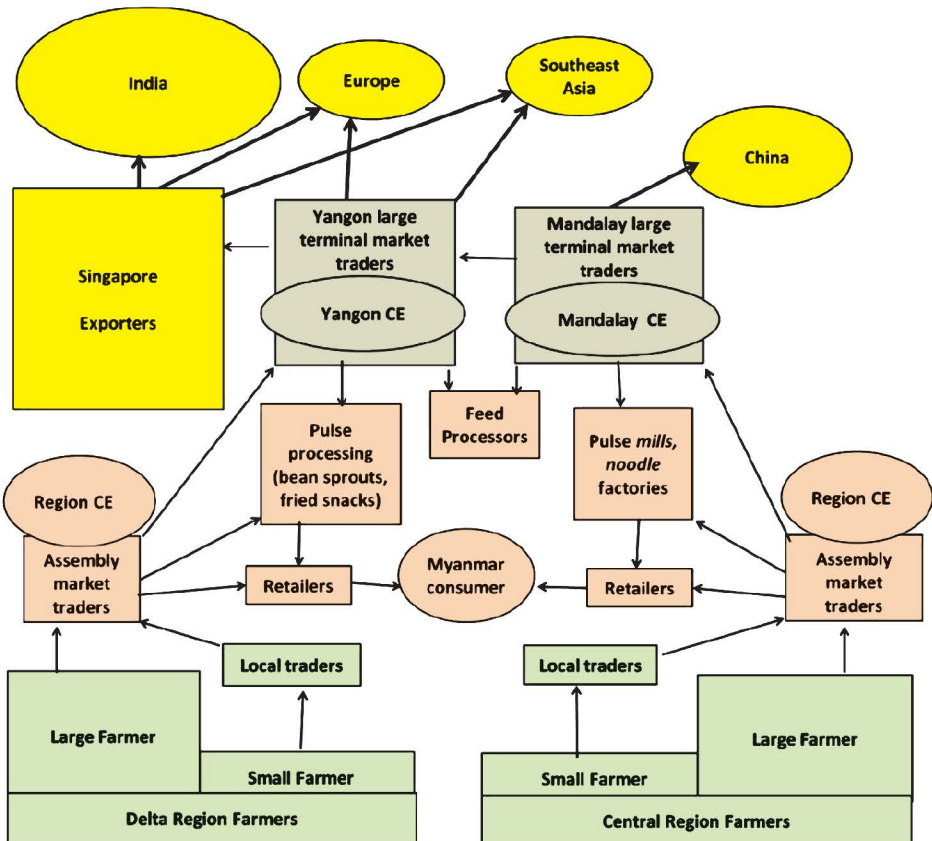


Figure 4: Pulse value chain organisation in Myanmar (Haggblade *et al.* 2014)

Note: CE = Commodity Exchange

Each node in the supply chain - including production, inputs to production, processing, domestic consumption, imports, and exports - are described and assessed in subsequent subsections.

Production

Myanmar is a significant producer of pulses. In 2014, the country was the second largest producer of pulses in the world, behind India (Figure 5). It is estimated that in 2014, Myanmar produced almost 6 million tonnes, 7% of global production of pulses (India produces 25% of global production). This increased to 6.4 million tonnes in 2016. Aggregated together, pulses are Myanmar's second largest crop group in terms of value of production at US\$ 3.6 billion (Figure 6).

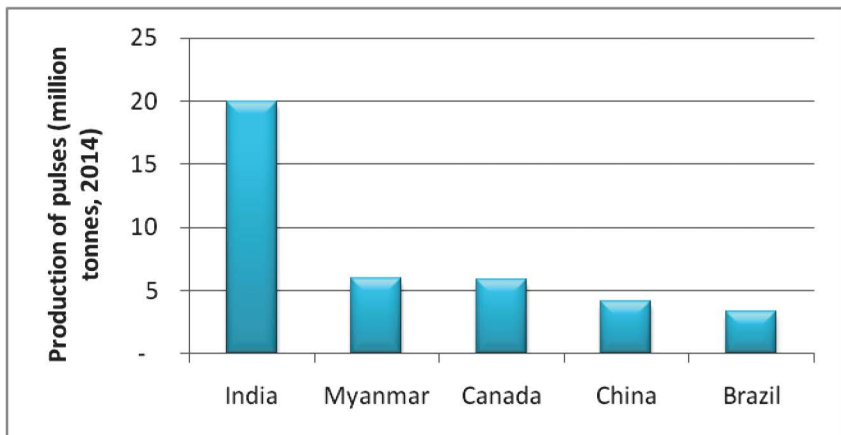


Figure 5: Production of pulses by the five largest producers in the world (million tonnes, 2014)

Source: FAOSTAT

The production of pulses in Myanmar has grown quickly since 1988 when the government liberalised the planned economic policies and introduced market-oriented policies (Figure 7). In 2016, pulses were harvested from almost 5 million hectares, 26% of total crop area harvested (Figure 8). Since 1989, the growth in production has averaged 12%/year and growth in area harvested has averaged 9%/year.

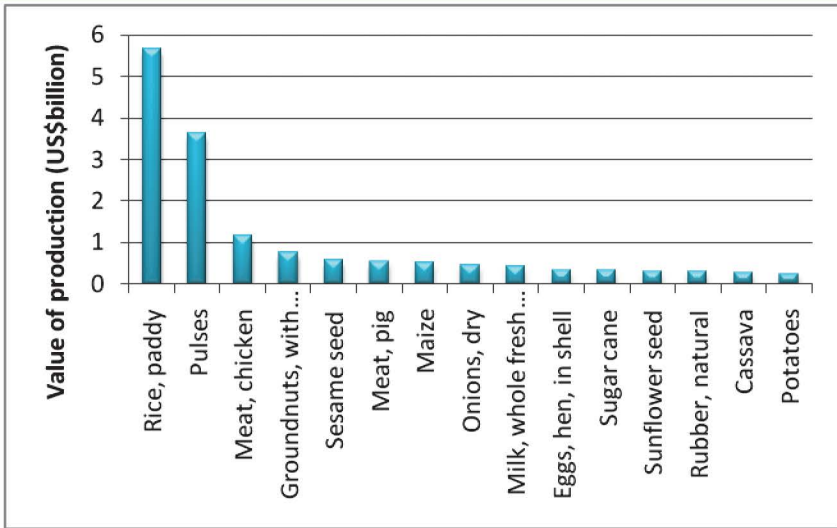


Figure 6: Value of production for 15 largest commodities, 2014 (US\$ billion)
Source: FAOSTAT

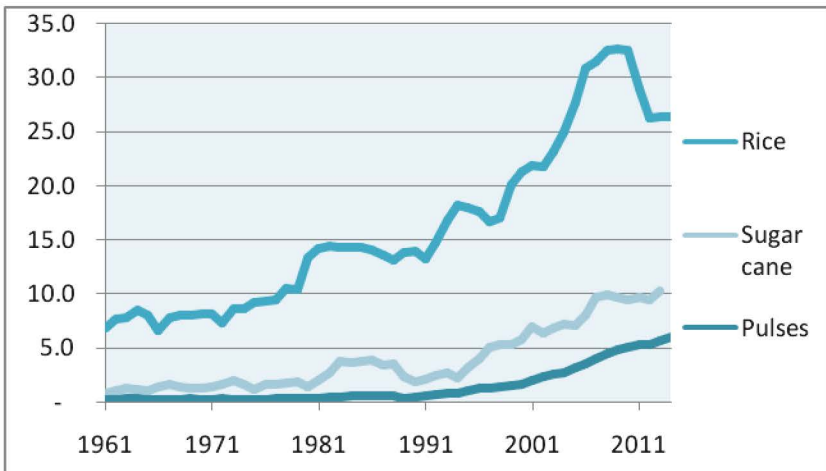


Figure 7: Production of the three highest producing crops in Myanmar (million tonnes)
Source: FAOSTAT

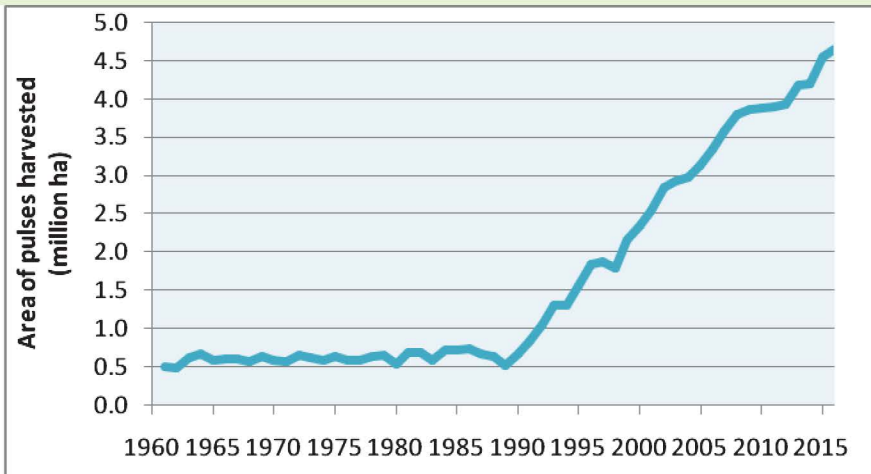


Figure 8: Area of pulses harvested in Myanmar (ha)
 Source: FAOSTAT (1960 – 2014), DAR (2014-2016)

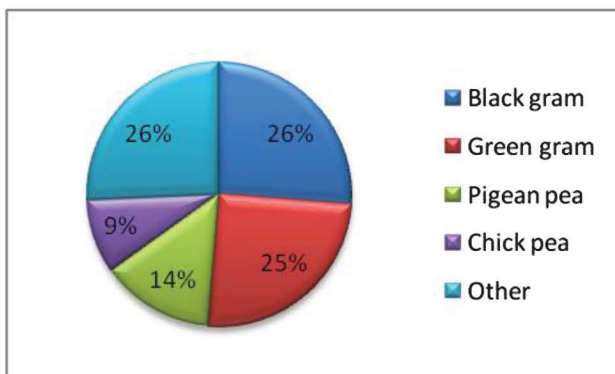


Figure 9: Pulses crops share of production (%), 2016
 Source: DAR, Myanmar

Black and green gram are the dominant pulse species in Myanmar in terms of production (Figure 9) and area sown (Figure 10), followed by pigeon peas and chickpeas. However, pulse crops other than the four dominant crops are grown on 1.3 million hectares. This is a testament to the diversity of pulse crops grown in Myanmar, presenting an opportunity for reaching currently unexploited niche export markets, and/or better specialising production to meet export market demand.

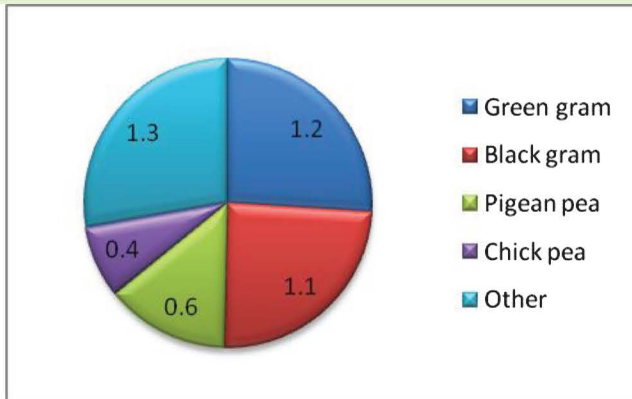


Figure 10: Pulses area sown to pulses, by pulse crop (million ha, 2016)

Source: DAR, Myanmar

Despite the rapidly growing area of pulses harvested, Gumma *et al.* (2017) argue there is significant potential to continue to expand this area. They map cropland fallows for the major cropping seasons in Myanmar, determine suitable cropland fallow areas where short duration legumes can be grown, and assess the economic potential of these areas. They identify that of a potential area of 19.5 Mha of cropland fallows in two seasons (November-February, March-May), a total of about 10 Mha of cropland fallows, has sufficient moisture (as rainfall or stored soil water content) to grow short season pulses. This is mainly in the Sagaing, Mandalay, Magway and Ayeyarwaddy regions of Myanmar. They argue that the economics of pulses production is favourable compared with cereals (Table 3), and they estimate that growing pulses on these fallow lands could bring an additional net income of about US\$2.5 billion to farmers in Myanmar each year.

Table 3: Economics of pulses cost and yield vis-à-vis cereals cultivation in Myanmar, 2013

Crop	Cost of production (kyats/ha)	Yield (t/ha)	Price (kyats/t)	Net margin (kyats/ha)	Net margin (USD/ha)
Pigeonpea	352,600	1.31	542,600	358,100	358
Groundnut	501,600	1.59	921,300	963,200	963
Black gram	315,800	1.40	470,300	342,600	342
Green gram	399,300	1.28	568,100	327,800	327
Chickpeas	400,000	1.45	500,000	325,000	325
Other pulses	393,900	1.41	600,400	452,700	358
Paddy	604,200	3.84	243,500	330,800	330
Maize	543,600	3.64	293,200	523,600	523

Source: Myanmar Agriculture at a Glance, 2013 (cited in Gumma *et al.* 2017)

The increase in the production of pulses in Myanmar is not only driven by area harvested, but by yield, which has also shown significant growth since 1989 (Figure 11). Current yields' average is approximately 1.4 t/ha. This reported yield is high compared with other pulse-producing Asian countries, second only to China (Figure 12). Black gram and green gram are also the highest yielding pulse crops in Myanmar (Figure 13).

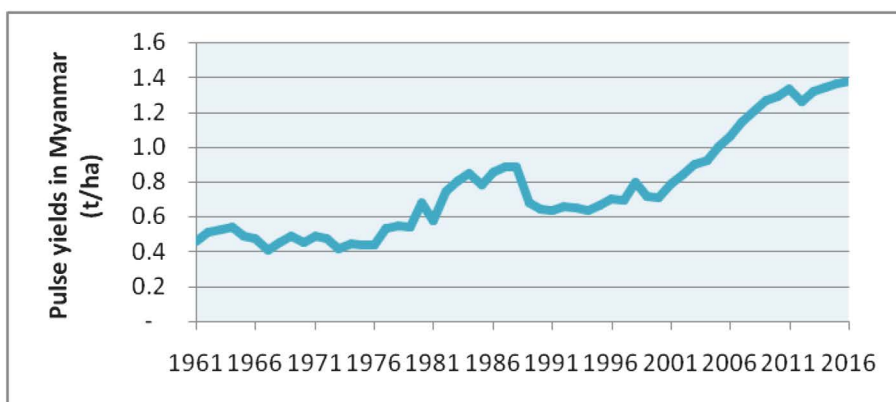


Figure 11: Yields of pulses in Myanmar (t/ha)

Source: FAOSTAT

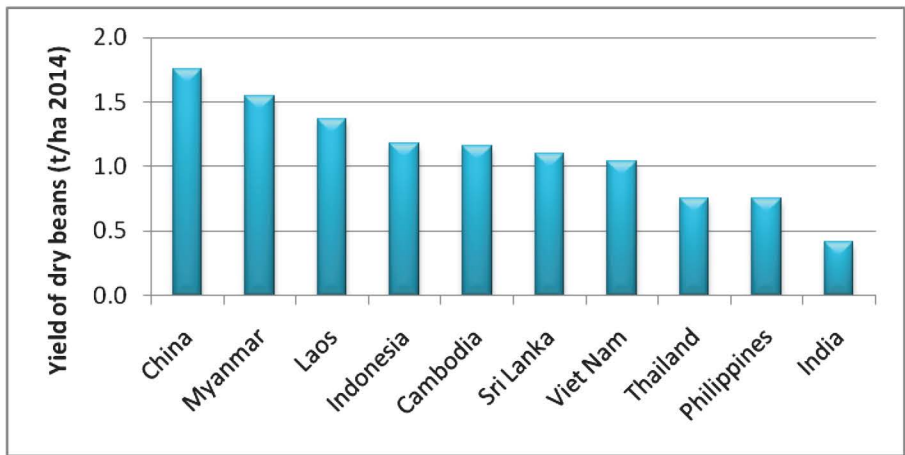


Figure 12: Comparative yields of pulses in Asian countries, 2014
 Source: FAOSTAT

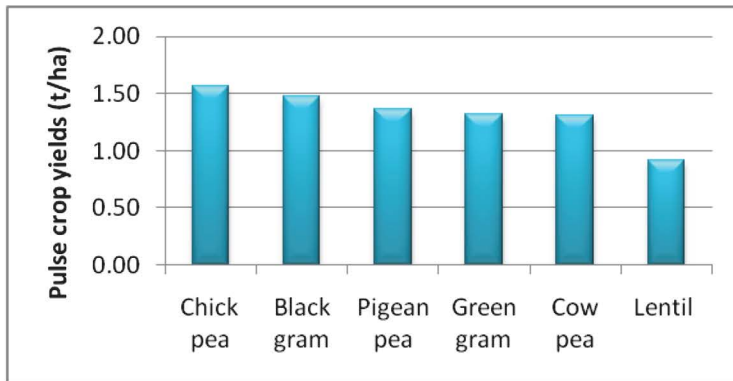


Figure 13: Pulses yields by crop (t/ha, 2016)
 Source: DAR, Myanmar

Despite high production and yields compared with other countries in the region, the cost of producing black and green gram in Myanmar is significantly higher than other countries (Figure 14), although the cost of production for other pulse crops is significantly lower than that of black and green gram (Figure 15). High production costs of black and green gram are due to higher labour costs (significantly more time is required for hand harvesting compared with other pulse crops) and use of inputs (fertilisers, pesticides and insecticides) compared with other pulse crops in Myanmar (farmer survey results).

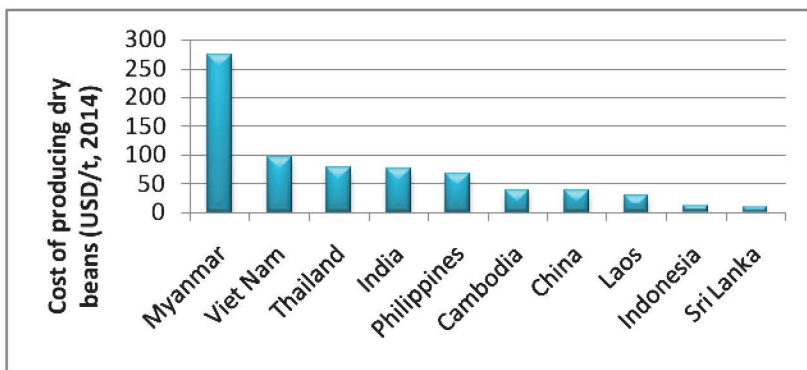


Figure 14: Cost of production by country for dry beans (black gram and green gram), (USD/t, 2014)

Source: FAOSTAT

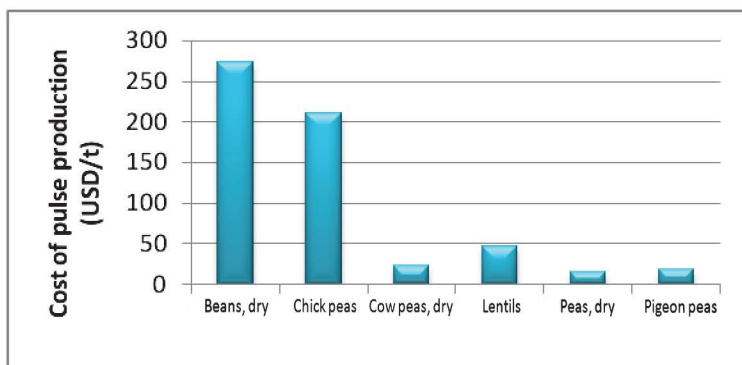


Figure 15: Cost of production in Myanmar by pulse type (USD/t, 2014)

Source: FAOSTAT

Prices of pulses are higher than that of rice (Figure 16). Pulse prices have been following a long-term increasing trend since 1961 whereas that of rice has been stagnant, although pulse prices have followed a falling medium-term trend since 2009. Farmer's perceive that a low selling price is the biggest challenge/difficulty their farm business faces (farmer survey data). There is moderate variation in prices across pulse types (Figure 17).

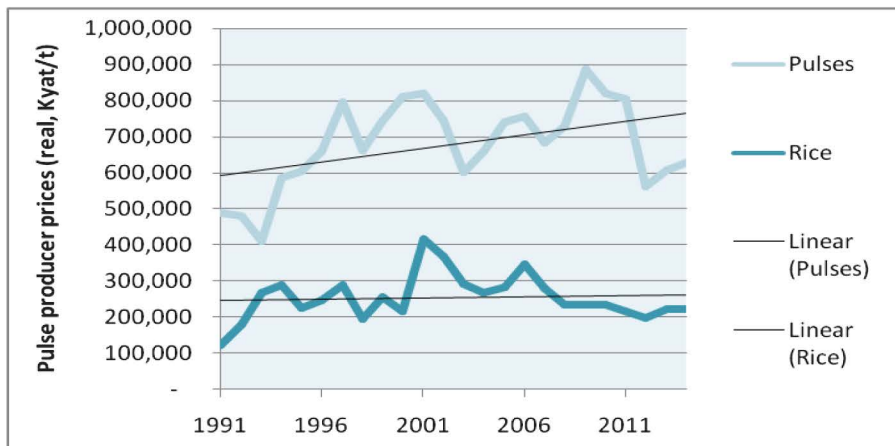


Figure 16: Producer prices for pulses and rice (real Kyat/t)

Source: FAOSTAT

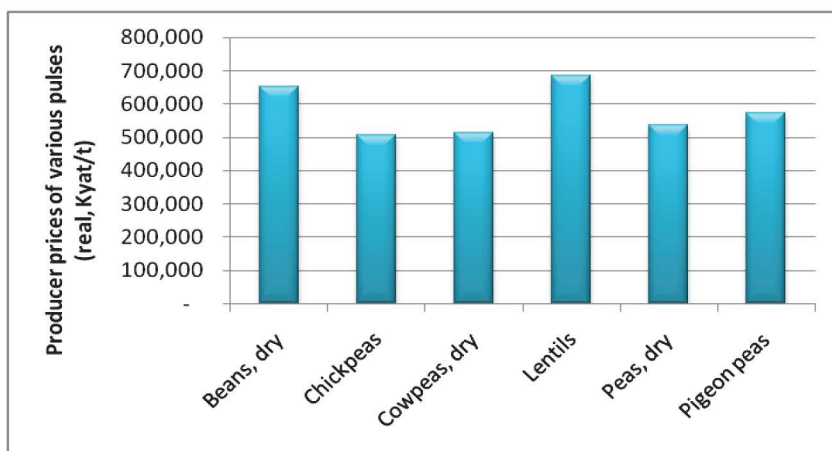


Figure 17: Producer prices for various pulses (real Kyat/t, 2014)

Source: FAOSTAT

Key messages – Production

- Myanmar is the second largest producer of pulses in the world, producing approximately 6 million tonnes in 2016.
- Pulses are Myanmar's second largest crop group by value at US\$ 3.6 billion/year (rice has the highest value of production at US\$ 5.7 billion/year).
- In 2016, pulses were harvested on over 4.7 million hectares, 26% of total crop area harvested.
- Black and green gram are the dominant pulse species in Myanmar in terms of production and area sown, followed by pigeonpeas and chickpeas.
- 16 other types of pulse crops are grown on 1.3 million hectares each year - a testament to the diversity of pulse crops grown in Myanmar.
- There is significant potential to continue to expand this area, especially into suitable cropland fallow areas.
- Pulse yields are high compared with other pulse-producing Asian countries.
- The cost of production of black and green gram is high compared with other countries due to high labour requirements and fertiliser, pesticide and insecticide use.
- Producer prices for pulses have been following an increasing trend in real terms since 1961 but have fallen since 2009 (in real terms).
- Surveyed pulse growers perceive that a low selling price is the biggest challenge/difficulty facing their farm business.

Inputs to production

Production of any agricultural commodity is dependent on availability of affordable and reliable supply of inputs. Key inputs to pulses production are seed, land, capital, fertiliser and pesticides. Each of these inputs is discussed separately in this section.

Seed

The main source of pulse seed for farmers in Myanmar is farmer-saved seed. This seed, as well as much of the commercially-available seed, are traditional varieties or old-released varieties with limited genetic resources. The shortage of good quality seed is frequently identified as a major constraint to increasing pulses productivity in Myanmar. Growers perceive that their greatest weakness in terms of pulses production is availability of improved pulse varieties (mentioned by 40% of respondents, farmer survey results).

At present, almost all seed breeding is conducted by DAR and certification, registration, and distribution is handled by the Department of Agriculture (DoA) of the Ministry of Agriculture, Livestock and Irrigation (MoALI), with a limited amount of private sector involvement. There are small-scale imports of pulses seed from Thailand and China that make up the shortfall in local public-sector seed production. Acute funding constraints within MOAI have limited the DoA's capacity to supply cleaned, certified seed to farmers, and there is little collaboration between DoA's Seed Division and DAR. The extension service responsible for seed distribution also lacks capacity - there is not enough staff to reach all farmers. Although pulses are self-pollinators, resulting in no genetic loss from recycled seed, many bacterial and fungal diseases are transmitted on seed coatings. As a result, agronomists recommend that farmers purchase clean, certified seed roughly every five years to maintain yields. Given DoA's limited capacity in this area, private traders have largely served this role of seed suppliers to Myanmar's pulse farmers. Seed supplied by traders is neither certified nor based on known genetic qualities – most seed is simply commercial crop with desirable size and colour that is correctly stored. Domestic varieties are not diffused and international germplasm is under-utilised.

Use of rhizobium inoculants in production to increase nodulation, grain and biomass yield, nitrogen fixation and soil nitrate levels is also low. Approximately 25% of farmers use rhizobium inoculants in pulses (farmer survey results). Lack

of availability of good quality inoculants is the main reason for poor adoption of inoculants in Myanmar (Herridge *et al.* 2016). A review of current inoculations practices by region, changes to inoculant production protocols, implementation of quality assurance systems, and development of efficient production distribution networks are needed to address this constraint.

Implementation of the Seed Law (2011) and the related *National Seed Policy* have been slow. There is significant opportunity for mobilization/involvement of the private sector in bulk seed multiplication, cleaning, extension and distribution. The interest of private sector involvement is low in pulses sector compared with rice and maize due to a highly volatile market. Incentives could be created to encourage private sector confidence and interest; including providing financial support to prospective seed companies (challenge funds and advanced-market commitments), encouraging MOAI and the Myanmar Investment Commission (MIC) to fast-track investment applications, providing attractive and long-term lease agreements for MOAI facilities, and building the market for seed through better access to credit and agricultural micro-insurance (Syngenta 2016).

Availability of good quality seed of improved pulse varieties at affordable prices can be improved by providing support for seed policy implementation, developing public-private partnerships (especially in seed multiplication, distribution, extension and cleaning), increasing government funding for breeding, and securing long-term property rights to address credit shortages (seed costs are approximately 25% of pulse grower's cost of production (farmer survey results)).

Land

Reflecting high land area to population size, the average size of farm holdings in Myanmar is high compared with other developing Asian countries (Figure 18), even though a large share of Myanmar's workforce is in agriculture (70%). Pulse farmers have a higher farm size than average for agricultural holdings, at 6.3hectares (farmer survey results). 92% of this land used for pulse production is 'owned' by the land-holder (rather than leased from other land-holders). Agricultural land in Myanmar has remained under state ownership since it was nationalised in 1953 (at which time transfers were made illegal and farmers were issued cultivation rights). In the liberalisation years (1988-2010), state

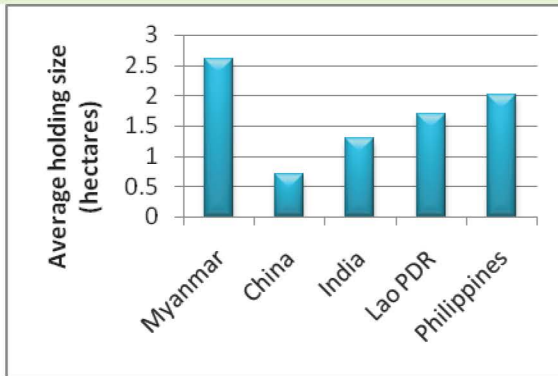


Figure 18: Average farm size in selected Asian countries (Source: Raitzer *et al.* 2015)

ownership of land continued and transfers remained illegal, but informal land transfers began due to increased profitability of deregulated crops. The Farmland Law (2012) and Vacant, Virgin and Fallow Lands Management Law (2012) kept the state ownership of all land but transfers and mortgages are legalized and farmers can contest land confiscation in court. Considerable uncertainty remains regarding land tenure as no documentation of rights have been issued. Rights can be revoked by the authorities at any time and farmers receive little compensation (Oberndorf 2012).

Property rights, both in terms of physical property (for example, land and assets) and intellectual property (such as patents or written text), are an institution essential for economic growth and development. Private property rights, or rights that are designed to provide similar incentives as private property rights (such as transparent and enforced long-term security of rights) lead to significant changes to behaviour of right-holders (Besley and Ghatak 2010).³

³ Security of land rights leads to trading of land (facilitating the allocation of land to uses that have the greatest value attached to the land), investment in capital (allowing economies of scale and scope, mechanisation and therefore reduced costs of production), provision of collateral for credit, encouragement of sustainable agricultural practices (as holders act in their medium to long-term interests, rather than short-term interests), and generosity (people cannot be generous if they don't have anything to give away) (Petersen 2017).

Insecure land rights is a leading cause of credit deficiency, constrained use of inputs (as farmers can't afford up-front costs of fertilizer and other inputs), poor input market development, and slow uptake of mechanisation in Myanmar.

The issue of lack of security of long-term property rights can be reconciled simply through providing documentation of rights, and enforcing these rights. This will greatly enhance the fairness and predictability of tenure designations and enable landholders to confidently make investments in capital and inputs for better productivity (Raitzer *et al.* 2015, APCTT 2016).

Capital

Credit constraints and high interest rates (which reflect high repayment risk) are stifling development of the pulses sector. Approximately 75% of pulse growers borrow money to finance their pulses production (farmer survey results). The average interest rate is 1.6%/month, and is higher when finance is borrowed from friends or neighbours (3.3%/month) compared with banks (0.9%/month) or family members (0.7%/month) (farmer survey results). 8% of pulse farmers reported accessibility to affordable credit to be a constraint to their farm business, the fourth biggest perceived difficulty or constraint faced by farm businesses (after low selling prices, price instability and lack of market information) (farmer survey results). Availability of seasonal, medium and long-term loans from the banking sector in Myanmar is lacking.

Local traders who purchase pulses from growers sometimes offer to support farmers through small loans and use of machinery. This causes complications when farmers come to rely on the traders for financial and technical support. Traders determine prices leaving room for exploitation and farmers often need to sell their stocks quickly in order to pay off debts as soon as possible. This prevents farmers benefiting from storing stocks in order to wait until traders offer higher prices.⁴The development of contract farming practices and vertical integration along the value chain between producers, processors and exports are options for addressing these problems.

⁴ 62% of farmers reported storing grain to wait for higher prices. Those who store grain, store approximately 74 baskets of grain for an average of 5 months (farmer survey results).

Regulations on international financial transactions and the Ministry of Commerce's (MOC's) prevention of direct Kyat-denominated purchases of pulses on the domestic market have forced international firms to procure through local Myanmar-based traders. Because local traders have very limited access to capital from the local banking system, international firms often have to make advance payment to local firms, exposing them to additional risks. Costly defaults on the part of local traders led to the recent formation of Overseas Agro Traders Association of Myanmar (OATAM) to lobby for financial reparation in the case of fraud.

The Myanmar Agricultural Development Bank and the Myanmar Livestock and Fisheries Development Bank offer subsidized credit rates to farmers. Other innovative ways to procure credit are in their infancy and are worth pursuing (such as the warehouse receipt financing - also known as inventory credits or warrants - whereby the crop itself acts as an asset to provide collateral (Raitzer *et al.* 2015)). However, this is managing the problem, without addressing the causes of the problem. Securing land rights will allow improved use of land as collateral for credit and will allow mechanisation and input use to increase as businesses will have increased certainty of future land ownership. Improving capacity of the private sector to apply for credit from banks is another opportunity to improve credit availability.

Mechanisation has been slow to progress in Myanmar, although strong progress has been made in recent years driven by labour shortages. Most pulse producers use 4-wheeled tractors (approximately 80%, with 20% of farmers using hand-tractors) to till the soil, although these are often used in conjunction with buffalo or cattle-drawn ploughs (used by 52% of farmers) (farmer survey results). Sixty-five percent of pulse farmers use mechanical threshers after harvest (farmer survey results). Improving mechanisation beyond land preparation to seeding, tillage, spraying and harvesting is required. The major source of grain loss during and after harvest is reported to be during harvest, and to a lesser extent, during threshing (farmer survey results). Increased mechanisation may reduce these losses.

Fertiliser

Fertiliser consumption is low in Myanmar compared with other countries (Figure 19). Approximately 75% of pulse farmers apply fertilisers, mostly during land preparation, which accounts for approximately 20% of their cost of production (farmer survey results). Farmers understand that fertiliser is required to replace nutrients removed with crop harvest, but the question of using more fertiliser to improve crop yields is clouded by lack of clear advice on how much to apply, by concern for fake or adulterated fertiliser, and by the need to borrow money to buy the fertiliser and the terms of repayment (Farquharson *et al.* 2017). Improved use of inputs could be fast-tracked by improved extension services to diffuse knowledge on how to use equipment and best farming practices (including pH and fertiliser ratios, soil management, rhizobium application, green manuring and composting practices).

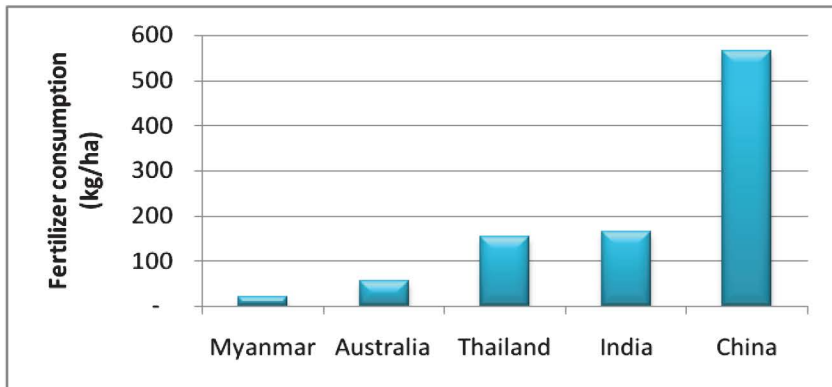


Figure 19: Consumption of fertilizer by select countries, 2014

Source: World Development Indicators

In 2014, Myanmar produced 166,000 tonnes of urea and imported 76,000 tonnes. It relies on imports for all other fertiliser (mostly NPK). Official supply of imported fertilisers has declined dramatically due in part to restrictive import laws. Informal imports from Bangladesh, India, Thailand and China have filled the gap, accounting for at least 1 million tonnes/year – the vast majority of Myanmar supply (MOC 2015).

Pesticides

There has traditionally been very little use of pesticides (Figure 20), although this is changing with pesticide rates coming close to that of other countries in the region. Approximately 85% of pulse farmers use pesticides, which contribute the largest proportion of costs of production (30%) (farmer survey results).

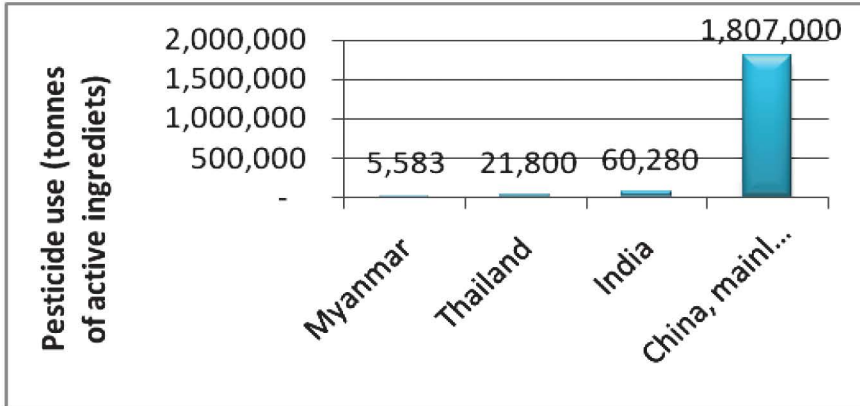


Figure 20: Pesticide use by select countries, 2014

Source: FAOSTAT

Pesticides were produced locally by the Plant Protection Division (PPD) until 2000. Since this time pesticides have been exclusively imported with some regulation from the PPD. A number of local private companies are reformulating and re-packing imported pesticides in Myanmar. However, there are significant informal imports not subject to PPD controls, meaning that dangerous and banned substances find their way into the market (MOC 2015).

Key messages – Inputs to production

- Farmer-saved seed, as well as much of the commercially-available seed, are traditional varieties or old-released varieties with limited genetic resources.
- Farmer's perceive that their greatest weakness in terms of pulses production is availability of improved pulse varieties. Domestic varieties are not diffused and international germplasm is under-utilised.
- Almost all seed production, multiplication, extension and distribution is handled by MOALI which faces acute funding constraints.
- Implementation of the Seed Law (2011) and the related *National Seed Policy* have been slow.
- There is significant opportunity for mobilization/involvement of the private sector in bulk seed multiplication, cleaning, extension and distribution.
- Availability of good quality seed of improved pulse varieties can be improved by providing support for seed policy implementation, developing public-private partnerships, increasing government funding to MOALI, and securing long-term property rights to address credit shortages.
- Low adoption rates of inoculants need to be addressed through changes to inoculant production protocols, implementation of quality assurance systems, and development of efficient production distribution networks.
- Agricultural land in Myanmar is under state ownership but transfers and mortgages are legalized and farmers can contest land confiscation in court. Considerable uncertainty remains regarding land tenure as no documentation of rights have been issued. Rights can be revoked by the authorities at any time and farmers receive little compensation.
- Insecure land rights is a leading cause of credit deficiency, constrained use of inputs, poor input market development, and slow uptake of mechanisation in Myanmar.
- Mechanisation has been slow to progress in Myanmar, although strong progress has been made in recent years driven by labour shortages.

- The issue of insecure land rights can be reconciled simply through providing documentation of rights, and enforcing these rights.
- Fertiliser consumption is low in Myanmar compared with other countries, and decisions regarding fertiliser use are clouded by lack of clear advice on how much to apply, by concern for fake or adulterated fertiliser, and by the need to borrow money to buy the fertiliser and the terms of repayment.
- There has traditionally been very little use of pesticides, although this is changing with pesticide rates coming close to that of other countries in the region. Pesticides are exclusively imported, with significant informal imports not subject to controls, meaning that dangerous and banned substances find their way into the market.

Box 1: Local traders

Local traders are those who purchase seed predominantly from farmers (and to a lesser extent collectors, wholesalers and farmer associations) and on-sell to wholesalers, exporters, other domestic collectors or processors. These traders perceive their sector to be very competitive. They indicated that their clients sold pulses to them predominantly due to established long-term business partners (82% of respondents), and also as they offer credit (73%) and better prices than their competitors (64%).

The main source of market information for local traders is the wholesaler (78% of respondents), followed by the internet (22% of respondents). Quality of pulses produced in Myanmar was perceived to be a constraint to export by only 30% of local traders surveyed. When asked what they would like to happen to improve local pulses trading in Myanmar, respondents indicated stabilising price (82% of respondents) and producing higher-yielding varieties (73%).

Source: Trader survey results

Processing

The processing of pulses is minimal and simple in Myanmar. It usually involves two steps. Primary processing consists of cleaning and sorting seeds for quality. Processors indicated that only 20% of pulse grain they buy are fully cleaned (40% are partially cleaned and the remaining 40% are not cleaned at all) and 50% are sorted for quality (processors survey results).

Secondary processing consists of preparing seeds for consumer use and can include dry packaging, canning, soup production, powder production, and flour production. Secondary processing in Myanmar is minimal. It includes production of bagged pulses (whole and split), animal feeds and ground pulse flours (Figure 21). There is some production of extruded pulses (pastas, and meat substitutes) but little processing to produce products of ground pulses, whole processed pulses and their productions, and fractionated pulses. Factories have been quick to adopt high-quality colour sorting machines to minimise labour costs. However, only 5-10% of exported pulses undergo any processing. Farmers conduct some cleaning and sorting, but this is limited due to lack of funding and technological support. Small-scale machinery that is used is outdated and expensive to upgrade. Hence, many of the beans and pulses are sold in their raw state to local traders at discounted prices. Most processing occurs instead by large wholesalers in processing factories just before export (Aye *et al.* 2013).

Processors in Myanmar perceive that the processing sector is moderately competitive (in contrast to traders who perceive their sector to be very competitive); with the two processors and two traders surveyed in the Ayeyarwaddy region indicating they were the only processors/traders in their area (processor and trader survey results). Most processors buy pulses from collectors or direct from farmers (Figure 22). Processors indicated that the single biggest reason why pulses are sold to these processors rather than other processors is long-term business partner connections (100% of respondents), ahead of high prices offered (43% of respondents) and offers of credit (also 43% of respondents).

All processor respondents indicated that they would like to increase their capacity. Market information was sourced almost exclusively from wholesalers exporting to Indian markets (rather than internet, TV or radio that could provide

information about other export markets), and 83% indicated they need to adhere to government regulations to meet food safety and chemical safety regulations.

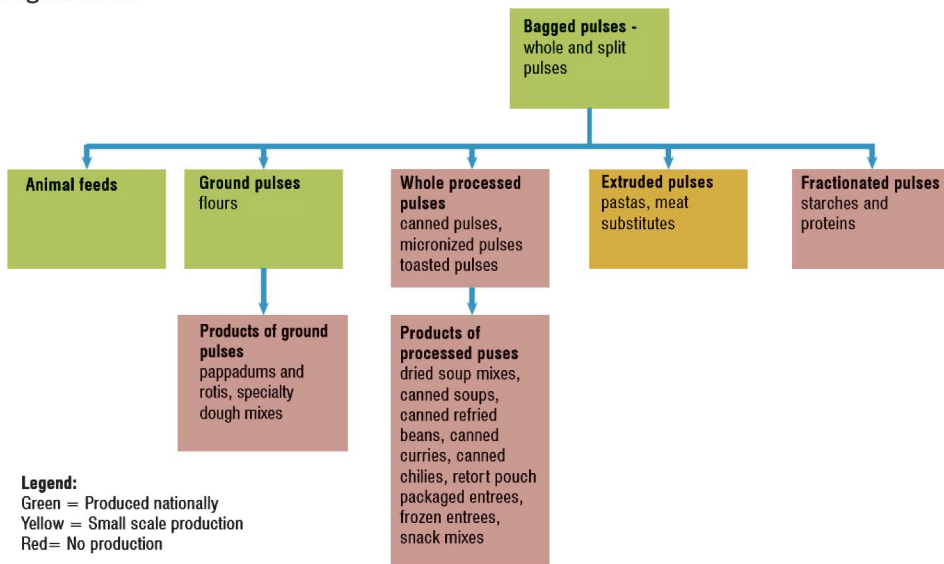


Figure 21: Pulses product map (Source: MOC (2015))

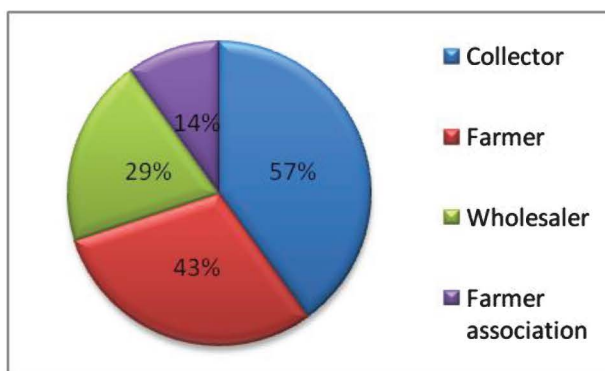


Figure 22: Sources of pulses purchased by processors (processor survey results)

Respondents perceive that quality of processed pulse products was not a constraint for export. All processor respondents indicated that there was strong demand for their product, and that their products were easy to collect, store, maintain and supply. Too many processors and price fluctuations were the major constraints to their business. Surveyed processors indicated that to improve pulse processing, priority should be given to improving processing technology and reducing transaction costs.

To expand processing in Myanmar, it will be important for processors to access information about potential export markets from sources other than wholesalers exporting to India. A review of pulses consumption domestically and internationally, including the demand for different types of processed pulses, would provide important information to current and potential processing companies. Additionally, the same incentives that could encourage private sector confidence and interest in the seed sector could encourage the same confidence and interest in the processing sector. This includes providing financial support to prospective processing companies, encouraging MOAI and MIC to fast-track investment applications, providing attractive and long-term lease agreements for processing sites and facilities, and building the market for processing through better access to credit.

Key messages – Processing

- The processing of pulses is minimal and simple in Myanmar. Most pulses are sold in their raw state to local traders at discounted prices.
- Only 20% of pulses bought by processors are fully cleaned, and 50% are sorted for quality. This is limited due to lack of funds and technical knowledge.
- Approximate 5-10% of pulses undergo secondary processing. This includes bagged pulses, animal feeds and ground pulses with some production of extruded pulses. There is very little production of whole processed pulses and their products, fractionated pulses or products of ground pulses.
- Most processing occurs instead by large wholesalers in processing factories just before export.
- Factories have been quick to adopt high-quality colour sorting machines to minimise labour costs.
- Market information was sourced almost exclusively from wholesalers exporting to Indian markets, with little knowledge of other markets.
- Incentives that could encourage confidence and interest in the processing sector could include encouraging potential processors to access information from sources other than wholesalers exporting to India, providing financial support to prospective processing companies, encouraging MOAI and MIC to fast-track investment applications, providing attractive and long-term lease agreements for processing sites and facilities, and building the market for processing through better access to credit.

Domestic consumption

Consumption of pulses in Myanmar has grown fast since economic liberalisation in 1989 (Figure 23). Myanmar is now the third largest consumer of pulses in the world at 4 million tonnes in 2013 (5% of global consumption). India is by far the largest consumer of pulses at 22 million tonnes in 2013 (20% of global consumption) (Figure 24).

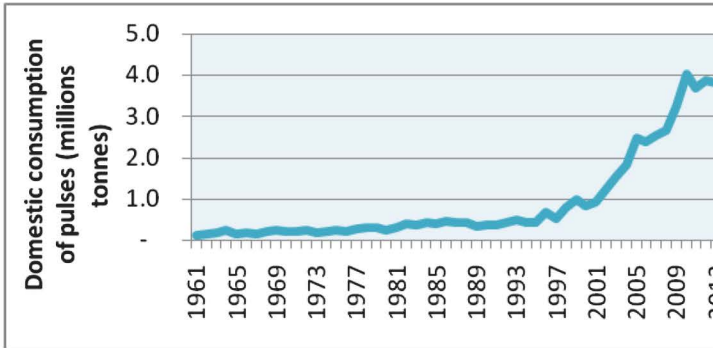


Figure 23: Domestic consumption of pulses (including animal feed, human food, and seed (millions tonnes/year)

Source: FAO Food Balance Sheets

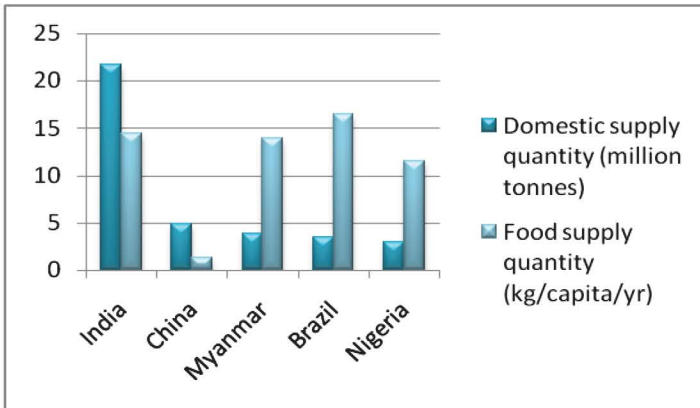


Figure 24: Five countries with the highest total consumption of pulses in 2013; total pulses consumption (including food, feed, seed, waste and other sources) and per capita pulses food consumption

Source: FAOSTAT Food Balance Sheets

Almost all pulses consumed in Myanmar are produced domestically. There is very little formal import of pulses, although small quantities have started to be imported over the last two years (Figure 25). Unofficial or informal border trade may be occurring and should be investigated. Farmers keep between 5 and 15% of their production for seed (depending on the type of pulse crop), selling the remainder (Figure 26). Approximately 30% of domestic production of pulses is exported, and the remaining 70% is consumed domestically as animal feed, human food, seed or other purposes.

Little is known about the detail of domestic consumption and utilisation of pulses in Myanmar. A review of consumption patterns by pulse type across state and regions, including an understanding of how raw and processed pulses are used in cooking, would be useful to understand current and future trends in consumption and the potential for processing of pulses in Myanmar to meet domestic demand.

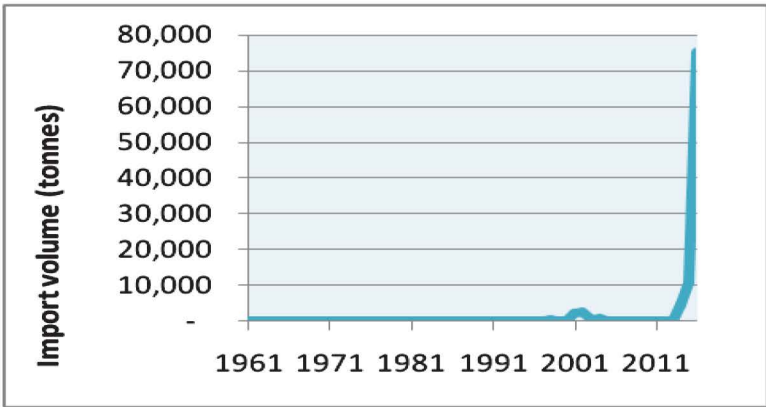


Figure 25: Imports of pulses in Myanmar (t/year)

Source: FAOSTAT 1960-2013, UNCOMTRADE 2014-16

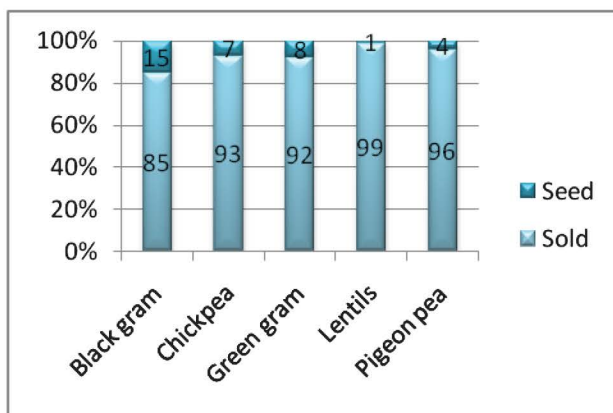


Figure 26: Percentage of production saved for seed or sold, for various pulse crops, 2017

Source: Farmer survey results

Key messages – Consumption

- Consumption of pulses in Myanmar has grown fast since economic liberalisation in 1989.
- Myanmar is now the third largest consumer of pulses in the world. India is by far the biggest consumer of pulses in the world.
- Approximately 30% of domestic production of pulses is exported, and the remaining 70% is consumed domestically as animal feed, human food, seed or other purposes.
- Almost all pulses consumed in Myanmar are produced domestically. There is very little import of pulses, although small quantities have started to be imported over the last two years.
- Little is known about the detail of domestic consumption and utilisation of pulses in Myanmar. A review of consumption patterns by pulse type across state and regions, including an understanding of how raw and processed pulses are used in cooking, would be useful to understand current and future trends in consumption and the potential for processing of pulses in Myanmar to meet domestic demand.

Exports

In 2013, Myanmar produced more than 4 times more rice (26 million tonnes), and almost 2 times more sugarcane (10 million tonnes), than pulses (6 million tonnes). However, the value of pulses exports in the same year (US\$ 1,060 million) far exceeded that of rice (US\$ 158 million) and all sugar products (US\$ 2 million) (Figure 27). Myanmar exports are currently approximately 12% of total global exports of pulses by volume, and 19% by value.

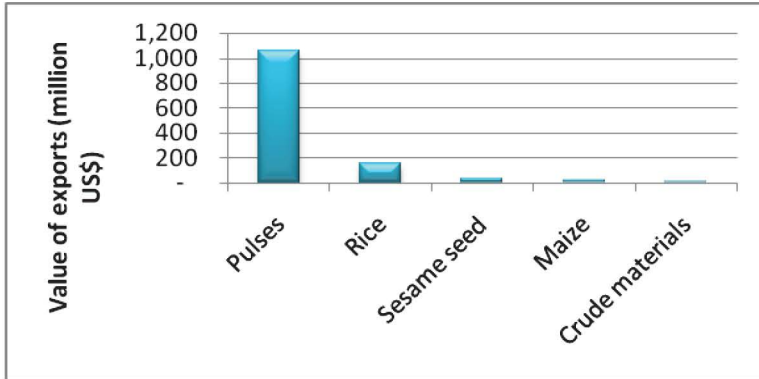


Figure 27: Top five export commodities from Myanmar by value, 2013 (million US\$)

Source: FAOSTAT

Exports of pulses from Myanmar were almost negligible prior to the 1989 economic reforms. Since then, on average, both export volume and value have grown at a staggering 30 and %/year (Figure28). Exports are currently approximately 1million tonnes valued at approximately US\$ 1 billion. Export prices increased in the mid-2000s and have remained high since (Figure 29).

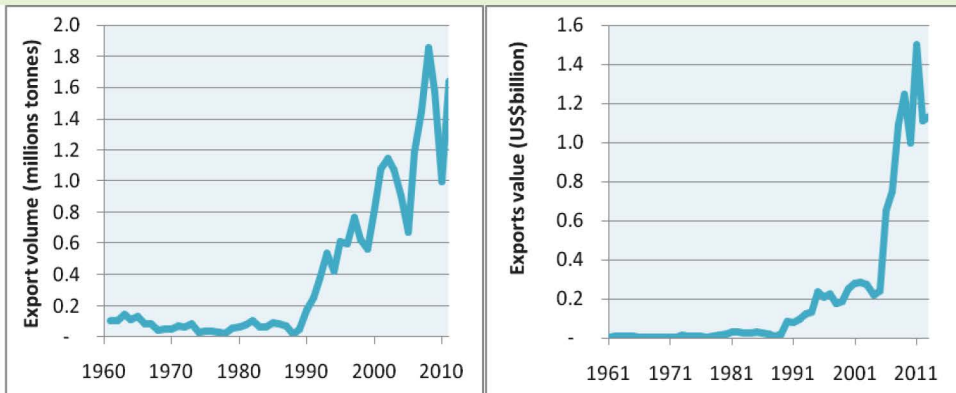


Figure 28: Export volume (left) and value (right) of pulses from Myanmar
Source: FAOSTAT

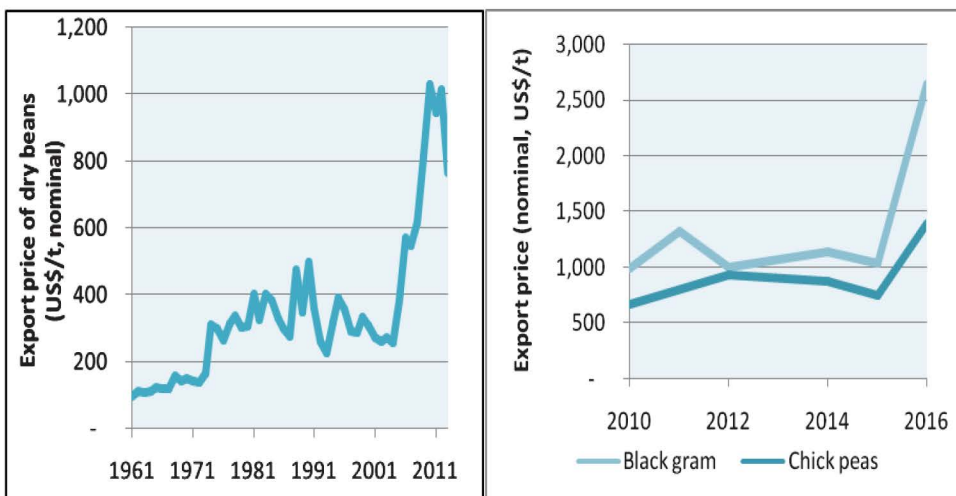


Figure 29: Export prices of dry beans (black gram and green gram) (1961 to 2013) and black gram and chickpeas (2010 to 2016)
Sources: Dry beans (black gram and green gram) -FAOSTAT; Black gram and chickpeas - UNCOMTRADE

Just over 70% of Myanmar’s pulse exports are going to India (Figure 30). This reliance on the Indian export market has been steady over the last five years, with the percentage of exports varying from 72 – 74% over this time period. The remaining 30% of exports are spread across another 40 countries, none with more than 5% of export share.

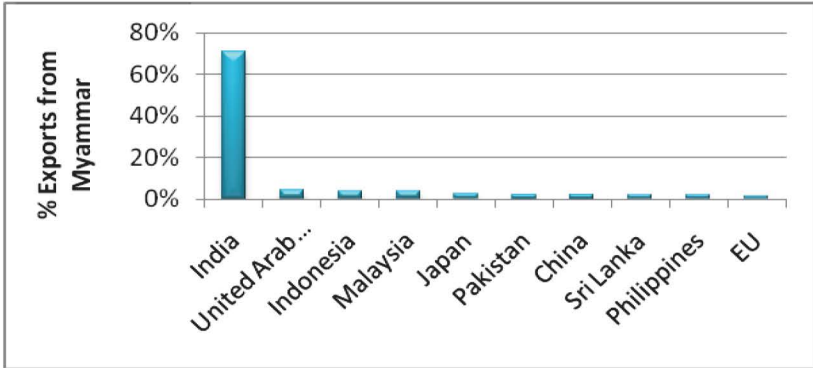


Figure 30: Percentage of pulse exports from Myanmar by destination, 2016
Source: UNCOMTRADE

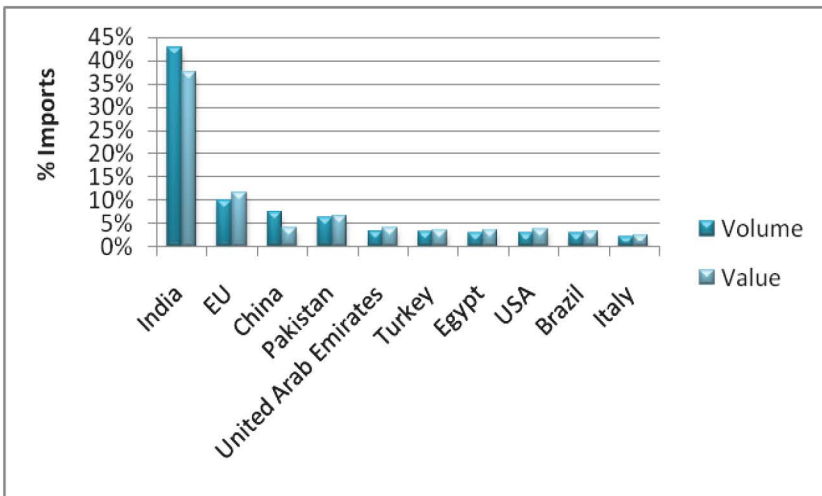


Figure 31: Percentage of pulse imports by top 10 pulse importing nations, 2016
Source: UNCOMTRADE. Note that Italy is also included within the EU.

This reliance on the Indian market for exports to some extent reflects trends in global exports. Figure 31 shows the percent of pulse imports by the top 10 pulse importing nations in 2016. By volume, 43% of global exports of pulses went to India (37% by value). The EU imports 10% of global pulse trade. China and Pakistan were the only other importers of pulses with greater than 5% of global imports by volume.

Not only does India have by far the greatest share of global imports of pulses, but it also has by far the greatest growth in the value of imports (Figure 32). Pakistan, the United Arab Emirates, Turkey and Sri Lanka have the next highest growth in the value of imports.

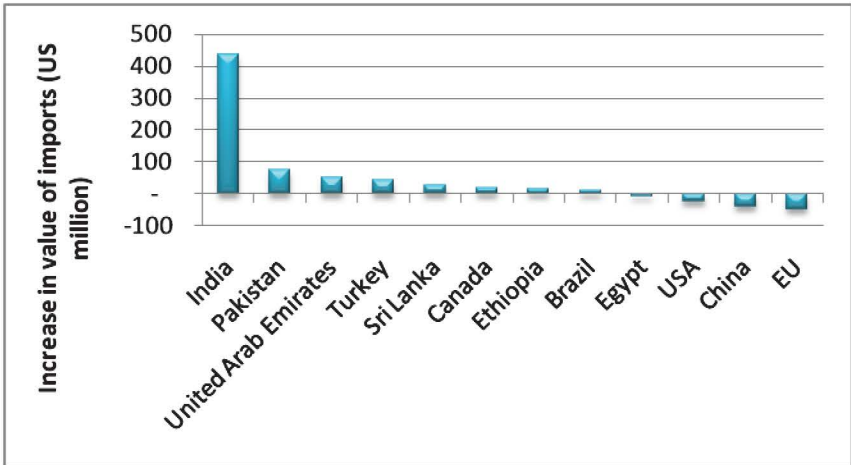


Figure 32: Increase in the value of pulse imports, by top 10 countries in terms of growth in value of imports, as well as China, USA and Egypt (average 2013-2016, US \$millions/year)

Source: UNCOMTRADE

India purchases pulses on a needs basis. With a growing population and often unfavourable seasonal conditions, the country’s production regularly falls short of its consumption needs requiring it to import significant quantities of pulses. However, during favourable seasonal conditions, their export needs are diminished. Taking an almost monopsony role, India is able to highly influence prices of the pulses trade and Myanmar is heavily dependent on the country’s

import decisions. An example of this is a decision by India in August 2017 to put an import quota on pulse imports from a number of countries. This decision amounted to a 20% decrease in green gram and a 4% decrease in pigeon pea imports from Myanmar. With already low producer prices and a heavy reliance on India for exports, this is likely to have a significant impact on the livelihoods of Myanmar pulse producers.

India will probably remain Myanmar's largest pulse export destination given India's dominance in global imports of pulses as well as import growth. However, to reduce the risk associated with relying on one export market, Myanmar could also focus on expanding their pulse export markets into Europe, China, Pakistan and Turkey as these countries are also sizable pulse markets. Some caution should be taken when expanding export markets to China as the value of their imports has seen negative growth over the last 5 years.

Diversifying export markets will require a restructure of Myanmar's pulse production. For example, 54% of Myanmar's exports are mung bean. The major importers of mung bean are India, and to a far lesser extent Malaysia, Indonesia and Sri Lanka. Currently, 1% of Myanmar's exports go to Europe, which imports 10% of pulses globally. Italy, Germany and France are the nations with significant pulse imports and where imports of pulses are growing rapidly. These countries are largely importing kidney beans, lentils and peas for human consumption. To increase access to the EU market, Myanmar will have to shift from production of green gram and black gram to these types of pulses. It is expected that Myanmar will be able to make this restructure relatively easily. Approximately 20 different types pulse crops are already produced in Myanmar, with pigeon peas already contributing 24% of pulse exports. A full market analysis will help identify these types of opportunities for Myanmar, as well as clarifying consumer requirements. The production and economic environments of destination countries change through time, hence this type of market analysis needs to be ongoing to allow the sector to be flexible to meet changing demands.

Significant increases in the value of exports could also be captured through increasing the quality of current production. Myanmar produces pulses in three quality grades: first quality (FQ), special quality (SQ), and fair average quality (FAQ). The majority of FAQ beans are sent to India with most FQ and SQ beans

sent to higher quality demanding markets such as Korea, Japan and China. The largest quality issue with Myanmar pulses is the amount of foreign material in the grain (e.g. straw and sticks). Clear quality standards and traceability needs to be available to all actors in the value chain; from exporters to producers. This may require producers to invest in different pulse crops, or varieties of pulse crops (e.g. those that produce pods higher above the ground to allow mechanical harvesting) or processing equipment. Testing of these standards at point of export should be made on all shipments with rigour to ensure quality standards are maintained.

A number of associations serve to organize the traders, exporters and millers. The Myanmar Bean and Pulse Trader's Association represent domestic Myanmar traders. The Myanmar Pulses, Beans and Sesame Seeds Merchants Association (MPBSSMA) represents domestic exporters. OATAM represents the interests of foreign-based pulse exporters with corporate representation in Myanmar. The Bayintnaung Market Peas and Beans Association represents the interests of domestic traders using the Bayintnaung Market. These trading organizations share common interests in growing pulse export volumes. However, their interests diverge in determining a fair share of the export price paid to local traders and farmers. The roughly 3 million farmers growing pulses in Myanmar remain largely unrepresented in policy debates. Strong leadership by these associations is required to make standards transparent along the value-chain and to provide clear information about import requirements from overseas markets (see Box 2 for a case study of Pulse Australia's leadership in Australia).

Key messages – Exports

- Myanmar exports are approximately 12% of total global exports of pulses by volume, and 19% by value.
- Exports of pulses far exceed that of any other agricultural commodity.
- Export volume has grown at a staggering rate since economic liberalisation in 1989 and is currently approximately 1 million tonnes (valued at approximately US\$ 1 billion).
- Just over 70% of Myanmar's pulses exports go to India, the rest are spread across another 40 countries, none with more than 5% of export share.
- India will probably remain Myanmar's largest pulse export destination being the dominant global importer of pulses.
- However, Myanmar should diversify its export markets into Europe, China, Pakistan and Turkey as these countries are also sizable pulse markets.
- Expanding into these markets will also require a restructure of Myanmar's pulse production (growing less black and green gram and more kidney beans, lentils and peas). It is expected that Myanmar will be able to make this restructure relatively easily.
- Full and ongoing market analysis by industry in Myanmar will provide a clear understand of different consumers requirements through time.
- Significant increases in the value of exports could also be captured through increasing the quality of current production, especially reducing the amount of foreign material (e.g. straw and sticks) in the grain.
- Clear quality standards need to be available to all actors in the value chain; from exporters to producers.
- Testing of these standards at point of export should be made on all shipments with rigour to ensure quality standards are maintained.
- A number of industry associations represent the needs of traders, exporters and millers with little representation by producers. Strong industry leadership by one organisation is needed to make standards clear and to provide representation for all players in the pulses value chain in policy debates.

Box 2: Industry leadership – Pulse Australia

“Pulse Australia is a peak industry body that represents all sectors of the pulse industry in Australia, from growers and agronomists through to researchers, merchants, traders and exporters. It is unique in that it is an independent, non-political and whole of industry organisation, which acts as a catalyst for the development of the pulse industry.

Our charter is to provide coordinated leadership to the Australian pulse industry and to facilitate activities that will achieve improved profitability for all sectors of the industry. Pulse Australia's broad long-term goals are to:

- Distinguish Australian pulse products in the international market place.
- Develop and maintain existing and new markets.
- Address any weak links in the pulse value chain.
- Provide coordinated leadership and planning.
- Encourage world's best practice throughout the whole industry.
- Foster and maintain grower confidence.
- Ensure a reliable production base of consistent and safe pulse crops that meet customer requirements.

Pulse Australia takes a three-pronged approach to ensure that the overall objectives are met in all areas of the industry”

Crop support: Qualified field staff provide the catalyst for coordination or information across state and institutional boundaries-actively supporting farmers to ensure confidence, sustainability and consistency of pulse production.

Industry support: Fundamentally about filling the gaps. That is, the provision of the means to create essential linkages along the value chain.

Market support: Providing a single voice for industry in the areas of market access and development, negotiating with governments and other industry bodies both domestically and internationally.”

Source: www.pulseaus.com.au

Pulse Australia is principally funded by traders through an AUD 0.10/tonne levy on all pulses traded. This was voluntarily agreed upon by traders and enforced through legislation.

Research, development and extension

DoA is responsible for extension and seed distribution while DAR is the focal point of research and development in Myanmar's agricultural sector. DAR aims to improve crop production through the enhancement of seed quality, crop management capacities and crop protection techniques. They have strong research linkages with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to collaborate on their plant breeding program. This program is focussed on chickpeas and pigeonpeas generally at the exclusion of black and green gram (which make up 51% of Myanmar's production), as these are not mandate pulses for ICRISAT. This focus may be appropriate given that chickpeas and pigeon peas are higher-value crops more likely to be exported to high-value markets. Having noted that, a new research collaboration with the World Vegetable Center and ICRISAT has been established with a focus on black and green gram.

Research, development and extension is under-resourced (Table 4). Stads and Kam (2007) and MOC (2015) note that expenditure on agricultural research, development and extension has been stagnant despite an increase in staff through the turn of the century. There is only a small percentage of research, development and extension staff with postgraduate degrees, and salaries in the civil service are insufficient to attract large number of qualified researchers. This is constraining Myanmar's agricultural potential. The private sector has yet to engage in research, development and extension in a meaningful way.

Table 4: Agricultural research spending in various regions of the world compared with Myanmar

Location	Agricultural research spending (\$ per \$100 in agricultural output)
Developed world	2.40
Sub-Saharan Africa	0.72
Developing world	0.53
Asia	0.41
Myanmar (2003)	0.06

Source: Stads and Kam (2007)

Capacity building of DAR needs to be given high priority so that DAR can effectively develop and promote improved crop varieties and technologies required for sustainable increase in the productivity of pulses. DAR needs to have required human and infrastructure capabilities for integrating novel tools and techniques in breeding programs for development of high yielding varieties of pulses, which are climate resilient, well adapted to different geographies and cropping systems, facilitate mechanization and have improved nutritional quality and market preferred grain quality. The research capabilities for development of Integrated crop management (ICM) practices (integrated management of soil, water, nutrient, weeds, insects-pests, diseases, etc) need to be enhanced, so that full potential of improved varieties can be harnessed by promoting matching ICM practices.

Government seed farms are underfunded and understaffed, and cannot meet demand for many crops, especially pulses (Syngenta 2016). The severe lack of access to quality seed of new varieties creates high variability in the quality and value of commercial products sold in domestic and export markets. This results in added costs, reduced incomes, and lost value and opportunities across the seed and commercial crop value chains.

An effective seed system is needed for making available quality seed of new improved varieties to farmers at the local level and affordable price. Enhancing adoption of varieties and technologies require an effective extension system. The capabilities of DoA need to be enhanced in adopting modern tools and techniques in extension activities. Increased investment in research, development and extension by government, as well as through public-private partnerships, is likely to reap strong economic benefits for Myanmar farmers.

Key messages – Research, development and extension

- DoA is responsible for extension and seed distribution while DAR is the focal point of research and development in Myanmar's agricultural sector.
- DAR strong collaborative links with ICRISAT for their plant breeding program largely focussed on chickpeas and pigeon peas– relatively high-value crops compared with black and green gram.
- Expenditure on agricultural research, development and extension has been stagnant despite an increase in staff through the turn of the century.
- Government seed farms are underfunded and understaffed, and cannot meet demand for many crops, especially pulses.
- There is only a small percentage of research, development and extension staff with postgraduate degrees, and salaries in the civil service are insufficient to attract large number of qualified researchers.
- The private sector has yet to engage in research, development and extension in a meaningful way.
- Increased investment in research, development and extension is likely to reap strong economic benefits for Myanmar farmers.

Market information

Pulse farmers in Myanmar perceive that low selling price, price instability and lack of market information to be the three biggest challenges or difficulties faced by their farm business (farmer survey data). Crop Exchange Centres (CEXCs) (see Box 2) are the main source of market information for pulses in Myanmar. A second source is the government's Market Information System which, with support from the FAO, collects prices on various crops on a daily or weekly basis depending on location. Weekly prices are then distributed to the private sector through local Myanmar Agricultural Services offices and the Agriculture Business News journal. The National Export Strategy notes that delays in releasing this price information diminish its usefulness to the private sector (MOC 2015). The Market Information System could be strengthened by capacity building, increased resourcing and entering into partnership with non-government organisations and private sector platforms. Providing timely information about domestic, Indian and other international pulses markets coupled with market research by agricultural economists in Yezin Agricultural University and DAR, is likely to be of benefit to all the stakeholders in Myanmar's pulses industry.

The private sector has been engaging in e-trade since 2003. Customers of these services are provided with regular updates of CEXC prices through instant messages to their mobile phones. Price information and trends can be accessed via the e-trade website.⁵ Additionally, the service's roughly 2,000 customers gain access to intelligence on important markets such as the pulse market in Mumbai. Prices for this service vary depending on the level of information desired by a customer, and the instant messaging service is priced between 5,000 and 25,000 kyats per month (MOC 2015).

⁵www.etrademyanmar.com.mm

Key messages – Market information

- Pulse farmers in Myanmar perceive that, low selling price, price instability and lack of market information to be the three biggest challenges or difficulties their farm business faces.
- Crop Exchange Centres (CEXCs) (see Box 3) are the main source of market information for pulses in Myanmar.
- A second source is the government’s Market Information System. This System could be strengthened by capacity building, increased resourcing and entering into partnership with non-government organisations and private sector platforms. This is likely to reduce delays in releasing price information and could facilitate improvements in market research.

Box 3: Crop Exchange Centres

Crop Exchange Centres (CEXCs) are voluntary membership associations whose role is to facilitate business transactions, mainly for pulses, beans and oil crops. While members display samples of their products, buyers negotiate and transaction prices are displayed publicly in order to stimulate a more open and efficient market. Up to 400 copies of price records are sold daily within the premises, information is distributed to marketing centres throughout the country, and traders communicate market information via cell phone and e-trade services. Although the CEXC in Mandalay is the most important, and therefore the price setter, there are 44 CEXC including Yangon, Patheingyi, Monywa, Pakokku, Magway, Myingyan, Pyi, Hinthada, Aungmye, and Taunggyi.

CEXCs also offer dispute resolution services for on-premises transactions. Resolutions are facilitated by a working group investigation, whose analysis may be confirmed or amended by the executive committee. Non-compliance with decisions results in a member’s removal from the association. Despite CEXC involvement in arbitration, as well as Republic of Union of Myanmar Federation of Chambers of Commerce and Industry (RUMFCCI) intervention, both the limited knowledge of contractual arrangements and the frequent use of informal agreements make fair conflict resolution difficult to attain.

Source: MOC (2015)

Standards and quality management

The quality of pulses in Myanmar is hampered by lack of nationally-agreed standards and a systematically implemented control system. As a result, there are an assortment of quality measurement systems which vary according to commodity type, geography and stage of the value chain (MOC 2015). This lack of nationally-agreed standards also means that information about domestic and international client standard and quality requirements is not being passed along the value chain to processors, traders and producers.

Since 2009, it has been a requirement that all domestic and international transactions under the MPBSSMA be conducted through the Bayintnaung Market CEXC. Thus, the market has become central to the trade, handling thousands of transactions daily (Aye *et al.* 2013). Existing standards are implemented on a largely volunteer-basis, are linked to individual associations and are based on physically observable characteristics. Some CEXCs introduced standards such as limits to the amount of foreign matter, physical characteristics, variety and origin. However, the effectiveness of these specific standards is diminished as they are not standardised across regions of Myanmar, and they do not include other important factors such as moisture content, protein content, contamination and food safety control measures.

Most processors do not have in-house laboratories to conduct regular quality controls and sometimes do not have a clear understanding of client requirements. Significant onus is placed on exporters to assure their products conform to client requirements. There are some private certification enterprises who help exporters conform to specifications of a contract, such as SGS46 (MOC 2015). However, a lack of systematically implemented controls down the value chain means that poor quality standards is leading to price discounts and constraining the export of Myanmar-produced pulses to higher-value markets.

The Food and Drug Administration (FDA) under the Ministry of Health (MOH) has responsibility of food quality and safety. Their Food Quality Control Lab (FQCL) is able to perform micro and chemical analysis. They use the FAO/WHO Food Standards Program's Codex standards, guidelines and codes of practices and test every three to six months in the Yangon wholesale markets, the hub of pulses exports. However, the tests are not done in other cities and the lack of

systematically implemented control systems means that product adulteration is widespread (MOC 2015).

A number of other government bodies are involved in quality management. MOC is tasked with testing pulses for chemical composition, pesticides and mycotoxins in its Commodity Testing and Quality Management (CTQM) laboratory. However, inadequate equipment means that it does not have the capacity to complete the complete suite of analyses needed. The Myanmar Inspection and Testing Services Ltd (MITS) is a recognized enterprise providing commodity inspection service under MOC. It is accredited to ISO 9001-2008 quality systems and provides pre-export and import inspections, sampling, testing and agro-product fumigation services. It does not operate its own laboratories but leverages those of other agencies. Despite testing capability within the MOALI and Ministry of Science and Technology (MOST) that has adequately facilitated the domestic market, increased operating laboratories capabilities will be required to expand exports to higher-value markets.

Key messages – Standards and quality management

- The quality of pulses in Myanmar is hampered by lack of nationally-agreed standards and a systematically implemented control system constraining the export of Myanmar-produced pulses to high-value markets.
- Information about domestic and international client standards and quality requirements is not being passed along the value chain to processors, traders and producers.
- Existing standards are implemented on a largely volunteer-basis, are linked to individual associations and are based on physically observable characteristics.
- Most processors do not have in-house laboratories to conduct regular quality controls and sometimes do not have a clear understanding of client requirements.
- The Food and Drug Administration (FDA) under the Ministry of Health (MOH) has responsibility for food quality and safety. Lack of systematically implemented control systems means that product adulteration is widespread.

Policy and institutional environment

Pulse production and export has grown at a staggering pace since the liberalization of trade policy in 1988, when exports by the private sector were allowed and restrictions on production and marketing were eased (Raitzer *et al.* 2015). Growth of the pulses sector occurred largely in the absence of government policy (Fujita and Okamoto 2006). Production of other crops (e.g. rice and edible oils) that were identified as having potential for development showed sluggish growth due to policy constraints (e.g. procurement and planning systems) (Takahashi 2001). The government showed relatively less interest in the pulses sector, and the sector's expansion has been led almost exclusively by the private sector. The government appreciated the sector's success in later years and introduced a procurement system at the end of the 1990s which was not successful (Fujita and Okamoto 2006). We recommend that Myanmar's government refrain from being tempted to use price support mechanisms (e.g. crop procurement systems) or trade restrictions which lead to market distortions and inefficiencies.

The export tax on pulses has been reduced from 10% in 1988-2010 to 2% in 2011. The export tax is levied as income tax paid by exporters on their export income. An export licencing requirement was lifted in February 2013 (Wong and Wai 2013). Pulse production is exempt from commercial tax, as is most agricultural production.

Myanmar's Agricultural Sector Policy and Thrusts for Second Five Year Short Term Plan outlines the current landscape of the agriculture sector in Myanmar, a policy vision, mission and set of goals and objectives. It articulates the following policies:

- a. Land Use and Management Policy
- b. Water Use and Management Policy
- c. Agricultural financing Policy
- d. Agricultural Mechanization and Input Policy
- e. Cooperative Enterprise and Cooperative System Development Policy
- f. Rural Infrastructure Development Policy
- g. Research, Development and Extension Policy
- h. Marketing, Value-added Processing and Export Policy
- i. Governance, Institutional and Human Resource Development Policy
- j. Environmental Conservation and Climate Change Resilience Policy.

This set of policies is comprehensive with minimal distortional domestic support subsidies. The focus is on technical support to agriculture through better research and extension services.

The government of Myanmar is entering into an increasing number of international agreements and investment treaties. It is a member of ASEAN and is therefore part of the ASEAN Free Trade Area and is party to a wide range of multilateral trade related agreements and initiatives. These include, among others, the ASEAN-Australia-New Zealand Free Trade Area and the EU-ASEAN Cooperation Agreement. ASEAN has signed, or is negotiating, varying forms of free trade arrangements with China, Japan, India the Republic of Korea and Hong Kong.

Myanmar is party to a number of other strategies or agreements. It is part of the Bay of Bengal Initiative for Multi-Sector Technical and Economic Cooperation which aims to establish a free trade area among Bangladesh, Bhutan, India, Nepal, Sri Lanka and Thailand. The Ayeyarwaddy – Chao Phraya – Mekong Economic Cooperation Strategy aims to bridge the economic gap between Cambodia, Lao, Myanmar, Thailand and Vietnam, and other ASEAN member nations. The members of the Asian Clearing Union have agreed to facilitate easier settlement of international payments for intra-regional transactions of international trade among the participating central banks.

Myanmar was among the twenty-three original signatories to the General Agreement on Tariffs and Trade in 1948 and has been a member of the World Trade Organization (WTO) since 1995. However, due to the isolationist policies pursued by the military regime, Myanmar's contribution and commitment to the WTO have been limited. Of latter years, Myanmar has become a more active participant. Accordingly, during the past decade, major policy reforms and measures covering the agricultural sector have been put in place. Much of this has related to the rice sector, but also indirectly relates to the pulses sector. This includes a series of regulatory laws (a plant pest quarantine law in 1990, a fertilizer law in 2000, a pesticide law in 1993, Seed Law in 2012, Farm Land Law in 2012, Vacant, Fallow and Virgin (VFV) Land Law in 2012, and Plant Variety Protection Law in 2016), construction of a large number of irrigation and rehabilitation schemes by World Bank in 2016, land consolidation work, increased access to agriculture production credit provided by Myanmar

Agriculture Development Bank, and provision of pumping equipment to farmers (Kyi 2016).

The unpredictability of government policies, particularly those related to trade, is of concern to agribusiness. Unexpected export restrictions and, in some cases, land control measures have restricted development of the sector during the past decade (Kyi 2016). Moreover, actual policy practice has not matched the declared reform with the continuing neglect of rural infrastructure evidenced in the poor state of rural roads and rural electrification. Government spending in agricultural development is far below required levels. Promoting agricultural growth will require enhanced budgetary allocations and strengthening of key agricultural institutions. It is also necessary to promote private sector involvement in production, processing and marketing (Kyi 2016).

Public-private partnerships have developed in recent years to address some of the constraints to credit, input access, innovation, processing and milling of agriculture output for select groups of farmers (Raitzer *et al.* 2015). However, they do not benefit all farmers and they carry risks. In the absence of fair legal redress and a regulatory framework, potential exists for contract abuse, and to empower business interests rather than farmers. Contract farming arrangements increase efficiency and minimise transaction costs, but engage larger and wealthier farmers who are less risk averse, exacerbating inequality. Effective agribusiness partnerships have the potential to address constraints, but competent regulation is needed to truly harness inclusive growth. Agribusiness cannot fully substitute for essential services and public goods needed to be provided by the public sector.

Strong agricultural policy does not try to be prescriptive about land allocation to different crops or try to facilitate the supply of a country's food needs domestically. Rather, strong agricultural policy seeks to build a sustainable and adaptive agricultural sector in which private agents can seek out what they can produce relatively best, allowing a diverse source of imports to cater for unmet consumption needs. A government's overwhelming responsibility is not to determine and invest in products or services in which they have comparative advantage, but to create an institutional environment in which private enterprise can seek and search out an economy's changing comparative advantage. This institutional environment can be created through strengthening rule of law, contract enforcement and the protection of property rights.

Key messages – Policy and institutional environment

- Pulse production and export has grown at a staggering pace since the liberalization of trade policy in 1988, when exports by the private sector were allowed and restrictions on production and marketing were eased.
- The government has historically showed relatively less interest in the pulses sector compared with other agricultural sectors (e.g. rice and sugar), and its expansion has been led almost exclusively by the private sector.
- We recommend that Myanmar's government refrain from being tempted to use price support mechanisms (e.g. crop procurement systems) or trade restrictions which lead to market distortions and inefficiencies.
- Myanmar's *Agricultural Sector Policy and Thrusts for Second Five Year Short Term Plan (2016)* outlines the current landscape of the agricultural sector in Myanmar, a policy vision, mission and set of goals and objectives. This set of policies is comprehensive with minimal distortional domestic support subsidies. The focus is on technical support to agriculture through better research and extension services.
- The government of Myanmar is entering into an increasing number of international agreements and investment treaties.
- Historically, Myanmar's contribution and commitment to the World Trade Organization has been limited due to the isolationist policies pursued by the military regime. Of latter year, Myanmar has become a more active participant.
- The unpredictability of government policies, particularly those related to trade, is of concern to agribusiness. Unexpected export restrictions and, in some cases, land control measures have restricted development of the sector over the past decade.
- Public-private partnerships have developed in recent years to address some of the constraints to credit, input access, innovation, processing and milling of agriculture output for select groups of farmers. However, they do not benefit all farmers and they carry risks.
- Effective agribusiness partnerships have the potential to address constraints, but competent regulation is needed to truly harness inclusive growth.
- A government's overwhelming responsibility is not to determine and invest in products or services in which they have comparative advantage, but to create an institutional environment in which private enterprise can seek and search out an economy's changing comparative advantage (by strengthening rule of law, contract enforcement and the protection of property rights).

Pulses Sector SWOT Analysis

The information presented earlier in this section called “Where we are now” is summarised in the following SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis.

Strengths

Geography and crop systems

- Myanmar produces over 20 types of pulse crops with a diverse and flexible rotation system.

Production

- Myanmar is the second largest producer of pulses in the world, producing 6 million tonnes in 2016.
- Pulse yields are high compared with other pulse-producing Asian countries.

Domestic consumption

- Myanmar is now the third largest consumer of pulses in the world, to India and China.

Exports

- Myanmar exports are approximately 12% of total global exports of pulses by volume, and 19% by value.
- Pulse exports are currently approximately 1 million tonnes (valued at US\$ 1 billion).

Research, development and extension

- MOALI has strong collaborative links with ICRISAT for their plant breeding program focussed on chickpeas and pigeon peas – relatively high-value crops compared with black and green gram.

Market information

- There are a number of different sources of market information in Myanmar, including CEXCs and the government’s Market Information System.

Policy and institutional environment

- Pulse production and export has grown at a staggering pace since the liberalization of trade policy in 1988, when exports by the private sector were allowed and restrictions on production and marketing were eased.
- Myanmar’s *Agricultural Sector Policy and Thrusts for Second Five Year Short Term Plan* outlines the current landscape of the agriculture sector in Myanmar, a policy vision, mission and set of goals and objectives. This set of policies is comprehensive with minimal distortional domestic support subsidies. The focus is on technical support to agriculture through better research and extension services.

Weaknesses

Production

- The cost of producing black gram and green gram is high compared with other countries due to high labour, fertiliser, pesticide and insecticide costs.

Inputs to production

- Farmer-saved seed, as well as much of the commercially-available seed, are traditional varieties or old-released varieties with limited genetic resources.
- There are significant constraints in the availability of improved pulse varieties. Domestic varieties are not diffused and international germplasm is under-utilised.
- Almost all seed production, multiplication, extension and distribution is handled by MOALI which faces acute funding constraints.
- Implementation of the Seed Law (2011 and the related National Seed Policy has been slow.
- Adoption of seed Inoculation is low.
- Considerable uncertainty remains regarding land tenure as no documentation of rights have been issued. Rights can be revoked by the authorities at any time and farmers receive little compensation.
- Difficulties exist with international monetary transfers.
- Mechanisation has been slow to progress in Myanmar, although strong progress has been made in recent years.
- Fertiliser consumption is low in Myanmar compared with other countries due to lack of clear advice, mistrust of fertiliser quality and credit shortages.

Consumption

- Little is known about the detail of domestic consumption and utilisation of pulses in Myanmar.

Processing

- The processing of pulses is minimal and simple in Myanmar. Most pulses are sold in their raw state to local traders at discounted prices.
- Market information is sourced almost exclusively from wholesalers exporting to Indian markets, with little knowledge of other markets.
- Most processors do not have in-house laboratories to conduct regular quality controls and sometimes do not have a clear understanding of client requirements.

Exports

- Quality of Myanmar exports are generally low (especially in terms of foreign material) resulting in price discounts and reduced access to some markets.
- Quality requirements by export markets are not standardised in Myanmar, or made readily available to all participants in the value chain.
- Interests of members of the pulses value chain are not represented by one industry group with strong vision, but by a number of groups.

Research, development and extension

- Expenditure on agricultural research, development and extension has been stagnant despite an increase in staff through the turn of the century.
- Government seed farms are underfunded and understaffed, and cannot meet demand.
- The private sector has yet to engage in research, development and extension in a meaningful way.

Market information

- Pulse farmers in Myanmar perceive that, low selling price, price instability and lack of market information to be the three biggest challenges or difficulties faced by their farm business.
- Market information is reliant on Indian wholesalers, with little knowledge of other markets by members of the pulses value chain.

Standards and quality management

- Standards and quality of pulses in Myanmar is hampered by lack nationally-agreed standards and a systematically implemented control system constraining the export of Myanmar-produced pulses to higher-value markets.
- Information about domestic and international client standard and quality requirements is not being passed along the value chain to farmers, traders and processors.

Policy and institutional environment

- There are deficiencies in rule of law, contract enforcement and protection of property rights in Myanmar that are significant stumbling blocks to the pulses sector.
- Actual policy practice does not always match the declared reform and measures for agricultural development.

Opportunities

Geography and crop systems

- Myanmar shares borders with some of Asia's fastest growing economies and largest consumers of pulses.
- Myanmar has favourable growing conditions for many pulse crops.

Production

- Myanmar produce's a diverse range of pulse crops, providing an opportunity to reach into niche export markets and/or for increased specialisation of pulse types to better target export market demand.
- There is significant potential to continue to expand the area sown to pulses in Myanmar.

Inputs to production

- Poor availability of improved pulse varieties could be addressed by supporting implementation of the seed law and policy, developing public-private partnerships, increasing government funding to MOALI, and security long-term property rights to address credit shortages.
- Low adoption rates of inoculants could be addressed through changes to inoculant production protocols, implementation of quality assurance systems, and development of efficient production distribution networks.
- The issue of insecure land rights can be reconciled simply through providing documentation of land use rights, and enforcing these rights. This will have significant flow-on effects for affordability of seed, mechanisation, input market development and efficient use of inputs.

Processing

- Better access to information in India and alternative export markets is likely to lead to expansion of pulses processing.
- Other incentives that could encourage confidence and interest in the processing sector include providing financial support to prospective processing companies, encouraging MOAI and MIC to fast-track investment applications, providing attractive and long-term lease agreements for processing sites and facilities, and building the market for processing through better access to credit.

Domestic consumption

- Consumption of pulses in Myanmar has grown fast since economic liberalisation in 1989, and domestic demand is expected to continue to increase.
- A review of consumption patterns by pulse type across state and regions, including an understanding of how raw and processed pulses are used in cooking, would be useful to understand current and future trends in consumption and the potential for processing of pulses in Myanmar to meet domestic demand.

Exports

- Myanmar could diversify its export markets into Europe (Italy, Germany, France), China, Pakistan and Turkey as these countries are also sizable pulse markets.
- Expanding into these markets will require a restructure of Myanmar's pulse industry (growing less black and green gram and more kidney beans, lentils and peas for human consumption). It is expected that Myanmar will be able to make this restructure relatively easily.
- Full and ongoing market analysis by industry in Myanmar will provide a clear understand of different consumer's requirements through time.
- Significant increases in the value of exports could also be captured through increasing the quality of current production, especially reducing the amount of foreign material in the grain (e.g. straw and sticks).
- Strong leadership by one industry group could make quality standards clear and provide representation of various members of the sector in policy debates.

Research, development and extension

- Increased investment in research, development and extension is likely to reap strong economic benefits for Myanmar farmers.
- There is significant opportunity for public sector investment in research, development and extension.

Market information

- There is significant opportunity to broad information sources to export markets other than India.
- The government's Market Information System could be strengthened by capacity building, increased resourcing and entering into partnership with non-government organisations and private sector platforms.

Standards and quality management

- Nationally-agreed standards and a systematically implemented control system is likely to lead to higher pulses prices in existing markets and greater market access to higher-value export markets.
- Improving information flows within Myanmar's pulses value chain will provide all members of the chain with greater choice and therefore market access.

Policy and institutional environment

- The government of Myanmar is entering into an increasing number of international agreements and investment treaties.
- Public-private partnerships have developed in recent years to address some of the constraints to credit, input access, innovation, processing and milling of agriculture output for select groups of farmers. However, they do not benefit all farmers and they carry risks.
- Effective agribusiness partnerships have the potential to address constraints, but competent regulation is needed to truly harness inclusive growth.

Threats

Geography and crop systems

- Climate change in Myanmar may result in an increase in average temperatures and aggregate rainfall leading to higher volatility and increased flooding and drought.

Production

- Producer prices of pulses have been falling since 2009 (in real terms). Surveyed pulse growers perceive that a low selling price is the biggest challenge/difficulty faced by their farm business.

Inputs to production

- Fertiliser use is clouded by concern for fake or adulterated fertiliser.
- Pesticides are exclusively imported, with significant informal imports not subject to controls, meaning that dangerous and banned substances find their way into the market.

Exports

- Just over 70% of Myanmar's pulses exports go to India, the remaining spread across another 40 countries, none with more than 5% of export share.
- India will probably remain Myanmar's largest pulse export destination as they are the dominant global importer of pulses.

Policy and institutional environment

- The unpredictability of government policies, particularly those related to trade, is of concern to agribusiness. Unexpected export restrictions and, in some cases, land control measures have restricted development of the sector over the past decade.
- We recommend that Myanmar's government refrain from being tempted to use price support mechanisms (e.g. crop procurement systems) or trade restrictions which lead to market distortions and inefficiencies.

WHERE WE WANT TO GO AND HOW TO GET THERE

Vision

An inclusive, regionally and globally competitive, sustainable and adaptable pulses sector contributing to the socio-economic well-being of all members of the pulses supply chain and contributing to development of Myanmar's national economy.⁶

Strategic objectives

There are three strategic objectives considered necessary to realise this vision:

Strategy Objective 1: Foster a demand-driven, rather than supply-driven, pulses sector

This can be achieved by improving export market intelligence, developing a nationally-standardised set of quality requirements, developing a Myanmar pulses brand, setting up a standardised system for testing all pulses exports, encouraging industry leadership with clear vision, and encouraging industry funding to support development of the sector.

Strategy Objective 2: Increase productivity in the production and processing of pulses in Myanmar

This can be done by strengthening governance, lobbying government to secure land tenure, increasing funding for research and development of pulses, and increasing extension for good agricultural practices for pulses production.

Strategy Objective 3: Increase the value and reduce the risk of pulses production and processing in Myanmar

This can be done by considering options for linking small and medium-sized enterprises to the market, simplifying and clarifying policies relating to foreign direct investment and foreign currency flow, considering options for crop, increasing capacity in market forecasting, holding annual crop outlook conferences with information available on a website and other information and communication technology platforms.

⁶ This vision is based on the vision of the Myanmar's *Agriculture Policy 2016* tailored to the pulses sector. The *Agriculture Policy 2016* vision is "An inclusive, competitive, food and nutrition secured and sustainable agricultural system contributing to the socio-economic wellbeing of farmers and rural people and further development of the national economy."

Implementation plan

An implementation plan for achieving these objectives is summarised below for each objective under the themes of (1) market development, (2) governance and institutions, and (3) research, development and extension.

Strategy Objective 1: Foster a demand-driven, rather than supply-driven, pulses sector

THEME 1: MARKET DEVELOPMENT

- A. Improve export market intelligence in the short-term by conducting a quick (1 year) analysis of domestic and export markets to understand the type and quality of pulses consumed locally as well as internationally. It is suggested that this be done by a qualified Market Analyst.
- B. Develop a nationally-standardised set of quality requirements for different grades of pulse exports and make them clear and transparent for all actors in the value chain. Publish them on the web⁷, and
- C. Develop a Myanmar pulses brand certifying different quality of Myanmar pulse products. We suggest this be led by DAR initially, to be transferred to the lead industry group in time.

THEME 2: GOVERNANCE AND INSTITUTIONS

- D. Set up standardised system for testing all pulse exports for quality (especially foreign material) sold under this brand. We suggest this be led by DAR initially with third party inspection, to be transferred to the lead industry group in time. This should be done drawing from the experience of other exporting countries.
- E. Encourage industry leadership with clear vision. Identify one industry group to lead:
 - i. On-going market intelligence,
 - ii. Updates to the nationally-standardised quality requirements,
 - iii. Advice for government research funding, and
 - iv. Government lobbying regarding policies relating to pulses.
- F. Encourage industry funding to support development of the pulses sector by suggesting a system for levying all products exported under

⁷ Information on Australian standards can be found at the following two websites:

- www.graintrade.org.au/commodity_standards
- www.agriculture.gov.au/ag-farm-food/food/nrs

the Myanmar pulses brand (e.g. 1% levy). Advice can be taken from Pulse Australia as are funded by a similar levy (see Box 2 for case study on leadership by Pulse Australia). The levy could be paid to the lead industry group to fund:

- i. On-going market intelligence,
- ii. Updates to the nationally-standardised quality requirements,
- iii. The Myanmar pulses brand,
- iv. Testing pulses traded domestically and internationally, and
- v. Product promotion.

Strategic Objective 2: Increase productivity in the production and processing of pulses in Myanmar

THEME 2: GOVERNANCE AND INSTITUTIONS

- A. Strengthen governance, especially with regard to enforcing rule of law, adherence to contractual obligations and protection of property rights.
- B. Lobby government to secure land tenure by providing documentation of 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 and mechanisation).
- C. Increase funding into research and development of pulses, especially with respect to the diffusion of locally-adapted improved varieties, marketing information services and processing. This increased funding into agricultural research and development could be a staged increase to 0.4% of GDP - commensurate to other Asian countries. Given that pulses represent approximately 20% of the value of agricultural production in Myanmar, approximately 20% should be targeted to pulses.

Increased funding could be used to:

- i. Improve capacity by offering incentives to attract qualified researchers,
- ii. Explore opportunities for training and capacity building,
- iii. Conduct a comprehensive statistical review and analysis of production and consumption data of pulses in Myanmar at the state and regional level,

- iv. 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,
- v. Capitalise on use of international germplasm for locally-adapted pulse varieties,
- vi. Align plant breeding, and seed and inoculant multiplication and distribution activities of DAR and DoA,
- vii. Strengthening the capacity, timeliness and breadth of the current market Information System, and
- viii. Seek project funding for improving pulses processing in Myanmar.

THEME 3: RESEARCH, DEVELOPMENT AND EXTENSION

- D. Increase extension for pulses, especially with respect to Good Agricultural Practices through public-private partnerships with fertiliser and chemical companies (align with implementation plan of the Fertiliser Strategy).

Strategy Objective 3: Increase the value and reduce the risk of pulses production and processing in Myanmar

THEME 1: MARKET DEVELOPMENT

- A. Consider options to linking small and medium-sized enterprises to the market to help growers and processors 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.

THEME 2: GOVERNANCE AND INSTITUTIONS

- B. Simplify and clarify policies relating to foreign direct investment and foreign currency flow.
- C. Consider options for crop insurance.

THEME 3: RESEARCH, DEVELOPMENT AND EXTENSION

- D. 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.

- E. Hold annual crop outlook conferences providing information to growers, grower organisations and processors about global trends in crop production and price forecasts.⁸
- F. Make crop outlook information available on a website and other information and communication technology platforms.

Resourcing, monitoring and evaluation

The following tables include a plan for implementing, resourcing, monitoring and evaluating each strategic objective. Resourcing of this plan is expected to be beyond the current technical and financial capacity of MOALI. Additional technical and financial assistance will be required by the international community to set some of these activities into practice. It is anticipated that this assistance will be required for a limited period of time, after which the Myanmar government and industry will be able to perform activities without assistance.

⁸ ACIAR project ADP/2016/140 “Policy analysis of food safety and trade in Vietnam” includes collaboration between the Australian Bureau of Agricultural and Resources Economics and Sciences (ABARES), who hosts regular Outlook Conferences in Australia, and the Vietnamese Government to build capacity of current Vietnam Outlook Conferences. Similar collaboration with Myanmar would help develop capacity for developing Myanmar Outlook Conferences.

Strategic objective 1: Foster a demand-driven, rather than supply-driven, pulses sector

Implementation strategy	Resourcing	Monitoring and evaluation
THEME 1: MARKET DEVELOPMENT		
A. <u>Improve export market intelligence</u> in the short-term by conducting a quick (1 year) analysis of domestic and export markets to understand the type and quality of pulses consumed locally as well as internationally. It is suggested that this be done by a qualified Market Analyst.	US\$ 150,000 The analysis could be funded by the Government of Myanmar or partial funding could be sought from World Bank, ADB, FAO or ACIAR (Small Research Activity).	Export market analysis complete: December 2019
B. <u>Develop a nationally-standardised set of quality requirements</u> for different grades of pulse exports and make them clear and transparent for all actors in the value chain. Publish them on the web. ⁹	0.2 full-time equivalent (FTE) from DAR	a. Allocation of FTE: January 2019 b. Development of a working group including government, industry and other stakeholders: March 2019 c. Draft set of standards developed by working group published on a website for public comment: September 2019 d. Nationally-standardised set of standards published on a website: December 2020
C. <u>Develop a Myanmar pulses brand</u> certifying different quality of Myanmar pulse products. We suggest this be led by DAR initially, to be transferred to the lead industry group in time.	0.1 FTE from DAR	a. Allocation of FTE: January 2019 b. Establish a certification brand for quality grades determined in draft set of standards with associated logo: November 2019 c. Work with lead industry group to begin adoption of the certification system by Myanmar traders/exporters: December 2020
THEME 2: GOVERNANCE AND INSTITUTIONS		
D. <u>Set up standardised system for testing all pulse exports</u> for quality (especially foreign material) sold under this brand. We suggest this be led by DAR initially with third party inspection, to be transferred to the lead industry group in time. This should be done drawing from the experience of other exporting countries.	0.3 FTE from DAR	a. Establish pilot study for small quantity of exports out of Yangon: March 2020 b. Expand pilot studies to Mandalay and Monywa: September 2020 c. Expansion beyond pilot studies: December 2020
E. <u>Encourage industry leadership with clear vision.</u> Identify one industry group to lead:	0.1 FTE from DAR	a. Allocation of FTE: January 2019 b. Seek training/mentoring advice from Pulse Australia: March

⁹Information on Australian standards can be found at the following two websites:

- www.graintrade.org.au/commodity_standards
- www.agriculture.gov.au/ag-farm-food/food/nrs

Strategic objective 1: Foster a demand-driven, rather than supply-driven, pulses sector		
Implementation strategy	Resourcing	Monitoring and evaluation
<ul style="list-style-type: none"> i. On-going market intelligence, ii. Updates to the nationally-standardised quality requirements, iii. Advice for government research funding, and iv. Government lobbying regarding policies relating to pulses. 		<p>2019</p> <ul style="list-style-type: none"> c. Development of a working group including all members of existing industry groups¹⁰ to discuss models for developing vision and leadership (e.g. one existing group takes lead, or a new group is established to represent all current groups): March 2019 d. Industry leadership model established: June 2020
<p>F. <u>Encourage industry funding to support development of the pulses sector</u> by suggesting a system for levying all products exported under the Myanmar pulses brand (e.g. 1% levy). Advice can be taken from Pulse Australia which is/are funded by a similar levy (see Box 2 for case study on leadership by Pulse Australia). The levy could be paid to the lead industry group to fund:</p> <ul style="list-style-type: none"> i. On-going market intelligence, ii. Updates to the nationally-standardised quality requirements, iii. The Myanmar pulses brand, iv. Testing pulses traded domestically and internationally, and v. Product promotion. 	No additional resources	<ul style="list-style-type: none"> a. Provide initial information about this to industry groups at forums and encourage discussion: March 2019 b. Encourage continued discussion through time

¹⁰Existing industry groups may include, amongst others, the Myanmar Bean and Pulse Trader's Association, the Myanmar Pulses, Beans and Sesame Seeds Merchants Association, the Overseas Agro Traders Association of Myanmar, and the Bayintnaung Market Peas and Beans Association.

Strategic objective 2: Increase productivity in the production and processing of pulses in Myanmar

Implementation plan	Resourcing	Monitoring and evaluation
THEME 2: GOVERNANCE AND INSTITUTIONS		
A. <u>Strengthen governance</u> , especially with regard to enforcing rule of law, adherence to contractual obligations and protection of property rights.	No additional resource	Lobbying the Government of Myanmar at any opportunity.
B. <u>Lobby government to secure land tenure</u> by providing documentation of 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 and mechanisation).	No additional resources	a. Quarterly meetings with Land Core Group Myanmar and other groups encouraging security of land tenure to encourage their activities and monitor progress b. Lobbying government at any opportunity
C. <u>Increase funding into research and development of pulses</u> , especially with respect to the diffusion of locally-adapted improved varieties, marketing information services and processing. This increased funding into agricultural research and development could be a staged increase to 0.4% of GDP - commensurate to other Asian countries. Given that pulses represent approximately 20% of the value of agricultural production in Myanmar, approximately 20% should be targeted to pulses. Increased funding could be used to: <ul style="list-style-type: none"> i. Improve capacity by offering incentives to attract qualified researchers, ii. Explore opportunities for training and capacity building, iii. Conduct a comprehensive statistical review and analysis of production and consumption data of pulses in Myanmar at the state and regional level, iv. 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, v. Capitalise on use of international germplasm for locally-adapted pulse varieties, vi. Align plant breeding, and seed and inoculant multiplication and distribution activities of DAR and DoA, vii. Increase efforts in sustainable intensification of cropping systems (including mechanization, conservation agriculture, integrated plant protection and soil fertility management) viii. Strengthening the capacity, timeliness and breadth of the current market Information System, and ix. Seek project funding for improving pulses processing in Myanmar. 	No additional resources	a. Lobby government for staged increase in funding: ongoing b. Benchmark current funding in research and development of pulses: May 2019 c. Conduct annual measurement of funding of research and development of pulses: Annually

Strategic objective 2: Increase productivity in the production and processing of pulses in Myanmar

Implementation plan	Resourcing	Monitoring and evaluation
THEME 3: RESEARCH, DEVELOPMENT AND EXTENSION		
D. <u>Increase extension</u> for pulses, especially with respect to Good Agricultural Practices through public-private partnerships with fertiliser and chemical companies (align with implementation plan of the Fertiliser Strategy).	No additional resources	a. Staff of DoA and DAR to meet with agrochemical and fertiliser companies to consider options for PPP: May 2019 b. Start progressing plans (or progressing existing initiatives) for implementing PPPs: December 2019

Strategic objective 3: Increase the value and reduce the risk of pulses production and processing in Myanmar		
Implementation strategy	Resourcing	Monitoring and evaluation
THEME 1: MARKET DEVELOPMENT		
A. <u>Consider options to linking small and medium-sized enterprises to the market</u> to help growers and processors 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.	Project funding required	Potential donors approached: June 2019
THEME 2: GOVERNANCE AND INSTITUTIONS		
B. <u>Simplify and clarify policies relating to foreign direct investment and foreign currency flow.</u>	0.1 FTE from DAR	a. Review FDI and foreign currency flow impacts on the pulses sector and identify opportunities for policy reform and public-private partnerships: June 2019 a. MOALI (as a member of the high-level Economic Committee) to lobby Myanmar Investment Commission to influence government policy for appropriate policy reform: August 2019 and onwards
C. <u>Consider options for crop insurance.</u>	0.1 FTE from DAR	a. Review how crop insurance works in neighbouring countries and how it could work in Myanmar: June 2019 b. Develop an implementation plan, if appropriate, for developing crop insurance systems in Myanmar: September 2019
THEME 3: RESEARCH, DEVELOPMENT AND EXTENSION		
D. <u>Increase capacity in market forecasting</u> 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.	Funded through increased allocation to R,D&E	c. Establish links with MOC to share market outlook information: May 2019 d. Initial market outlook for pulses: May 2020 e. Annual market outlooks complete from then on
E. <u>Hold annual crop outlook conferences</u> providing information to growers, grower organisations and processors about global trends in crop production and price forecasts. ¹¹	0.1 FTE from DAR Seek ACIAR/ABARES assistance to establish Myanmar Outlook Conferences	First Annual Outlook Conference: May 2020
F. <u>Make crop outlook information available</u> on a website and other information and communication technology platforms.	No additional resources required	First set of crop outlook information available on a website: May 2020

¹¹ ACIAR project ADP/2016/140 "Policy analysis of food safety and trade in Vietnam" includes collaboration between the Australian Bureau of Agricultural and Resources Economics and Sciences (ABARES), who hosts regular Outlook Conferences in Australia (see www.agriculture.gov.au/abares/outlook), and the Vietnamese Government to build capacity of current Vietnam Outlook Conferences. Similar collaboration with Myanmar would help develop capacity for developing Myanmar Outlook Conferences.

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Appendix: UN's definition of pulses and derived products

PULSES are annual leguminous crops yielding from 1 to 12 grains or seeds of variable size, shape and colour within a pod. They are used for both food and feed.

The term "pulses" is limited to crops harvested solely for dry grain, thereby excluding crops harvested green for food (green peas, green beans, etc.) which are classified as vegetable crops. Also excluded are those crops used mainly for oil extraction (e.g. soybean and groundnuts) and leguminous crops (e.g. seeds of clover and alfalfa) that are used exclusively for sowing purposes.

COMMODITY	DEFINITIONS, COVERAGE, REMARKS
BEANS, DRY <i>Phaseolus spp.</i> : kidney, haricot bean (<i>Ph. vulgaris</i>); lima, butter bean (<i>Ph. lunatus</i>); adzuki bean (<i>Ph. angularis</i>); mungo bean, golden, green gram (<i>Ph. aureus</i>); black gram, urd (<i>Ph. mungo</i>); scarlet runner bean (<i>Ph. coccineus</i>); rice bean (<i>Ph. calcaratus</i>); moth bean (<i>Ph. aconitifolius</i>); tepary bean (<i>Ph. acutifolius</i>)	Only species of <i>Phaseolus</i> should be included, though several countries also include certain types of beans. Commonly classified as <i>Vigna</i> (<i>angularis</i> , <i>mungo</i> , <i>radiata</i> , <i>aconitifolia</i>). In the past, these species were also classified as <i>Phaseolus</i> .
BROAD BEANS, DRY <i>Vicia faba</i> : horse-bean (<i>var. equina</i>); broad bean (<i>var. major</i>); field bean (<i>var. minor</i>)	
PEAS, DRY garden pea (<i>Pisum sativum</i>); field pea (<i>P. arvense</i>)	
CHICK-PEAS chickpea, Bengal gram, garbanzos (<i>Cicer arietinum</i>)	
COW PEAS, DRY cowpea, blackeye pea/bean (<i>Vigna sinensis</i> ; <i>Dolichos sinensis</i>)	
PIGEON PEAS pigeon pea, cajan pea, Congo bean (<i>Cajanus cajan</i>)	
LENTILS (<i>Lens esculenta</i> ; <i>Ervum lens</i>)	
BAMBARA BEANS bambara groundnut, earth pea (<i>Voandzeia subterranea</i>)	These beans are grown underground in a similar way to groundnuts.
VETCHES spring/common vetch (<i>Vicia sativa</i>)	Used mainly for animal feed.
LUPINS (<i>Lupinus spp.</i>)	Used primarily for feed, though in some parts of Africa and in Latin America some varieties are cultivated for human food.
PULSES NES Including inter alia: lablab or hyacinth bean (<i>Dolichos spp.</i>); jack or sword bean (<i>Canavalia spp.</i>); winged bean (<i>Psophocarpus tetragonolobus</i>); guar bean (<i>Cyamopsis tetragonoloba</i>); velvet bean (<i>Stizolobium spp.</i>); yam bean (<i>Pachyrrhizus erosus</i>); Flour of Pulses	<i>Vigna</i> spp. other than those included in 0176 and 0195 Other pulses that are not identified separately because of their minor relevance at the international level. Because of their limited local importance, some countries report pulses under this heading that are classified individually by FAO. Produced through milling or grinding of pulses. This heading also includes meal.
Bran of Pulses	

Source: www.fao.org/es/faodef/fdef04e.htm

