

REPUBLIC OF THE UNION OF MYANMAR

NATIONAL EXPORT STRATEGY

RICE

SECTOR STRATEGY

2015-2019



Myanmar Ministry of Commerce



International
Trade
Centre

The National Export Strategy (NES) of Myanmar is an official document of the Government of the Republic of the Union of Myanmar.

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ACRONYMS

Comtrade	Commodity Trade Statistics Database
DICA	Directorate of Investment and Company Administration
FDI	Foreign Direct Investment
FY	Fiscal Year
GDP	Gross Domestic Product
HS	Harmonized System
HYV	High-Yielding Varieties
ITC	International Trade Centre
LDC	Least Developed Country
MADB	Myanmar Agricultural Development Bank
MAPCO	Myanmar Agribusiness Public Corporation
MIC	Myanmar Investment Commission
MoAI	Ministry of Agriculture and Irrigation
MOAG	Myanmar Organic Agriculture Group
MoC	Ministry of Commerce
MoEP	Ministry of Electrical Power
MoFR	Ministry of Finance and Revenue
MoRT	Ministry of Rail Transport
MoT	Ministry of Transport
MRF	Myanmar Rice Federation
MTDC	Myanmar Trade Development Committee
NES	National Export Strategy
PoA	Plan of Action
R&D	Research and Development
SSA	Sub-Saharan Africa
TSI	Trade Support Institution
TSN	Trade Support Network
UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry

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EXECUTIVE SUMMARY

CURRENT CONTEXT

Seventy per cent of the population of Myanmar depends on agriculture and natural environmental resources for their livelihood.¹ Rice is, by far, the country's most important agricultural product, accounting for about half of all cultivated land² and an estimated 13% of gross domestic product (GDP) in fiscal year (FY) 2012.^{3,4} At 190 kg per person per year, Myanmar also has the highest per capita consumption of rice in the world.⁵

The country has a perennial rice surplus of approximately one third of its total production (see Figure 1), or roughly 12 million tons in 2011. This surplus and the fact that Myanmar rice is US\$ 10 to US\$20 cheaper per ton than rice of comparable quality from Viet Nam, India or Pakistan⁶ allowed the sector to double its exports from 750,000 tons in FY 2012⁷ to 1.5 million tons in FY 2013⁸ without having to address its numerous and severe constraints to future growth.

The majority of output comes from small landholders and low-capacity mills. The small farms typically make little use of chemical fertilizers and pesticides and are largely

not mechanized, relying on human and animal labour for planting, harvesting, threshing and even transportation to mills. A lack of dryers, storage, modern milling and efficient transportation to market also contribute to high postharvest losses, which can reduce market prices.

EXPORT PERFORMANCE

About two-thirds of Myanmar's total rice production in 2011 was consumed domestically and one third was surplus, while only a little more than 2% was exported. The country's 790,800 tons of exported rice were handled by 61 companies. Three companies handled around 100,000 tons each and together accounted for 39% of the total, but the majority of rice traders handled less than 1,000 tons.

The low number of high-capacity traders has meant a high concentration of rice exports to a few big importing countries and many small shipments to smaller markets. According to Myanmar officials, the largest destination for the country's exported rice is China. This occurs via border trade that the Chinese Government considers illegal. The unofficial nature of this trade has apparently resulted in United Nations trade data underplaying the significance of China and total volume of Myanmar's rice exports.

According to the United Nations Commodity Trade Statistics Database (Comtrade), 96% of Myanmar's non-China exports of milled rice (HS 100630) went to eight countries in 2012, with 13 other countries making up the remaining 4% with small orders. Myanmar's broken rice (HS 100640) non-China exports are even more undiversified, with 80% going to two countries in 2012; Guinea and Burkina Faso, relatively small national markets for broken rice. A second tier of markets for Myanmar's broken rice includes three Asian net importers of rice (Indonesia, the Republic of Korea and Singapore), a neighbouring country (Thailand), Myanmar's largest non-Asian trading partner (the United Kingdom of Great Britain and Northern Ireland) and a major European trading hub (Belgium).

1. Food and Agriculture Organization of the United Nations (2008). Myanmar revised tropical cyclone Nargis flash appeal 2008, July 10. Available from www.fao.org/emergencies/appeals/detail/en/c/149345/.

2. Myanmar, Central Statistical Organization. (2011). *Statistical Yearbook*. Yangon: Central Statistical Organization.

3. Myanmar's fiscal year runs from April 1 to March 31.

4. Agriculture accounted for 26% of GDP. See Myanmar, Ministry of Agriculture and Irrigation, Department of Agricultural Planning (2013). *Myanmar Agriculture in Brief 2013*. Naypyidaw. Rice is thought to account for roughly half of that.

5. International Rice Research Institute (2012). Asia's next rice granary: Myanmar?, 20 November Available from www.eurekalert.org/pub_releases/2012-11/irri-anr112012.php

6. Chanjaroen, C. (2012). Myanmar seeks to restore status among top rice exporters, October 29. Available from www.bloomberg.com/news/2012-10-28/myanmar-seeks-to-regain-top-spot-in-rice-exports-southeast-asia.html.

7. Myanmar's fiscal year runs from April 1 to March 31.

8. Myanmar Rice Federation.

OPTIONS FOR FUTURE DEVELOPMENT

The strategy for future development is focused on increasing rice marketability, volume and quality in the following ways:

1. Get existing rice surpluses to market
2. Produce greater volumes of rice
3. Ensure that less rice is broken
4. Produce rice with greater control of marketable characteristics (whiteness, shape, chalkiness, amylose content, gel consistency, gel temperature and fragrance)
5. Grow a wider range of rice varieties tailored to the tastes of target markets
6. Produce vermicelli, sweet sticky paste and powder made from rice.

These are progressively difficult to achieve, and the products associated with each are suited to different markets. As Myanmar farmers and traders enjoy greater success, they should continue to expand their markets and diversify their products accordingly. Table 1 plots existing and potential markets according to their existing import volumes of Myanmar rice and their potential for growth. As the legend indicates, markets highlighted in blue are short-term targets and markets in red, purple and orange are long-term. The six markets marked in red are those which impose high tariffs on rice imported from Myanmar.

Table 1: Short- and long-term priorities for Myanmar milled and broken rice

		Existing rice import value from Myanmar		
		Low (under US\$1 million)	Medium (US\$1million – US\$5 million)	High (over US\$5 million)
Potential for rice import growth from Myanmar	High	United Kingdom (broken) France (broken)	Malaysia (milled) Indonesia (both) Singapore (milled)	China (milled and broken) Côte d'Ivoire (broken) Russian Federation (milled) Republic of Korea (milled)
		Saudi Arabia (milled) United Kingdom (milled) Iraq (milled) United Arab Emirates (milled) Japan (milled) France (milled) Germany (milled)		
	Medium	United States (broken) Germany (broken) Ghana (broken) Hong Kong, China (broken)	Senegal (broken) Belgium (broken) Netherlands (broken)	Burkina Faso (both) South Africa (milled)* Philippines (milled)
		Islamic Republic of Iran (milled) United States (milled) Yemen (milled) Hong Kong, China (milled) Canada (milled) Chinese Taipei (milled)		
	Low	Bulgaria (milled) Brazil (milled)	Thailand (both) Bangladesh (milled) Madagascar (milled) Benin (milled) Cameroon (milled)	Guinea (broken)
Colour legend				
	Short-term market development for both broken and milled rice		Long-term market penetration for milled rice	
			Maintain business	
	Short-term market penetration for broken rice		Non-priority	

* Based on Myanmar Customs Department data for FY12.

The sixth product focus (vermicelli, sweet sticky paste and powder made from rice) concerns processed rice products commonly produced for the domestic market and which have been exported in small quantities to China. These business relationships should be further developed in the hope of providing Myanmar manufacturers with enough demand to stimulate larger-scale production and experience with international trade.

ROAD MAP FOR SECTOR DEVELOPMENT

Stakeholders consulted in the process of developing the present strategy articulated the following vision for the rice sector.



“ High-quality and environmentally sustainable growth in rice production and export for rural development and income generation. ”

The sector strategy vision will be achieved through the implementation of the Plan of Action (PoA) for the sector. This PoA revolves around the following four strategic objectives; each spelling out specific sets of activities intended to address both challenges and opportunities facing the sector:

- Increase rice production and quality substantially
- Increase efficiency and reduce costs through expansion of sector infrastructure
- Diversify export products and export markets
- Grow the rice sector in a way that promotes health, equitable growth and environmental sustainability.

TARGETS

If the sector's PoA is fully implemented, the sector should expect to meet the following targets by 2020:

- Export 4 million tons of rice, becoming the world's fourth largest exporter of rice
- Increase the number of markets annually importing US\$5 million or more of Myanmar rice from 10 to 30
- Increase the percentage of milled rice (HS 100630) within total rice exports from 44% in 2012 to 67% (i.e. reduce the percentage of broken rice – HS 100640)
- Increase the number of Myanmar traders exporting more than 100,000 tons of rice per year from 3 to 15
- Triple the value of rice exports.

IMPLEMENTATION MANAGEMENT

The PoA calls for a range of activities to help achieve these ambitious targets through coordinated efforts from all relevant private and public stakeholders, as well as support from key financial and technical partners, donors and investors.

Several institutions are designated to play a leading role in the implementation of the sector PoA and bear the overall responsibility for successful execution of the strategy. They will be assisted by a range of support institutions that are active in the rice sector. Each institution mandated to support the sector's export development is clearly identified in the strategy PoA. Moreover, the Myanmar Trade Development Committee (MTDC) and its Executive Secretariat will play a coordinating and monitoring role in the implementation of the strategy in the overall framework of the NES. In particular, the MTDC will be tasked with coordinating the implementation of activities in order to optimize the allocation of both resources and efforts across the wide spectrum of stakeholders.

Box 1: Methodological note

The approach used by ITC in the strategy design process relies on a number of analytical elements such as value chain analysis, trade support network (TSN) analysis, problem tree and strategic options selection, all of which form major building blocks of this sector export strategy document.

Value chain analysis: A comprehensive analysis of the sector's value chain is an integral part of the strategy development process. This analysis results in the identification of all players, processes and linkages within the sector. The process served as the basis for analysing the current performance of the value chain and for deliberating on options for the future development of the sector.

TSN analysis: The TSN comprises the support services available to the primary value chain players discussed above. It is constituted of policy institutions, trade support organizations, business services providers and civil society. An analysis of the quality of service delivery and constraints affecting the constituent trade support institutions (TSIs) is an important input to highlight gaps in service delivery relative to specific sector needs. A second analysis of TSIs assessed their level of influence (i.e. their ability to influence public policy and other development drivers in the country and therefore make things happen or change) and their level of capacity to respond to the sector's needs.

Problem tree analysis: The problem tree analysis used is based on the principles of root causes analysis. The problem tree provides a deeper understanding of what is causing the sector's constraints and where solution-seeking activities should be directed. As a critical step in the analytical phase of the sector's performance, the problem tree guides the design of realistic activities in the strategy's PoA.

Strategic orientations: The strategic options for the development of the sector are reflected in the future value chain, which is the result of consultations, surveys and analysis conducted as part of the sector strategy design process. The future perspective has two components:

- A market-related component involving identification of key markets in the short and medium-to-long terms for Myanmar exporters;
- Structural changes to the value chain that result in either strengthening of linkages or introduction of new linkages.

Realistic and measurable PoA: The definition of recommendations and strategic directions for the development of the sector is essential to guide its development, but is not enough. It is important to clearly define the actions to be implemented to stimulate growth. The development of a detailed action plan, defining which activities need to be undertaken by sector stakeholders, is necessary to the effective implementation of the strategy. An action plan, developed with the support of ITC, includes performance indicators to ensure effective monitoring and evaluation of the strategy's implementation.

INTRODUCTION

Myanmar is an agricultural country. More than half of the population is directly employed in farming, and in 2012, 43% of GDP came from agriculture, livestock, fisheries and forestry.⁹ Rice is the country's most important agricultural product by far, accounting for about half of all cultivated land and 13% of GDP in FY 2012.^{10, 11} At 190 kg per person per year, Myanmar also has the highest per capita consumption of rice in the world.¹² Even as expectations for Myanmar's economic growth and industrialization rise, it is anticipated that the rice sector too will boom, with the Myanmar Agricultural Service stating that the sector has the capacity to double output.

HISTORICAL OVERVIEW

In 1934, under British colonial rule, Myanmar exported 3.4 million tons of rice,¹³ setting a world record at the time for rice exports. That quantity made it the world's largest rice exporter then, and even in today's globalized economy would make it the fourth or fifth largest. While that high level of productivity was achieved under British rule, it was maintained well beyond Myanmar's 1948 independence, with Myanmar remaining the world's leading exporter until 1963.¹⁴

9. World Bank. (2014). Myanmar overview. Available from www.worldbank.org/en/country/myanmar/overview.

10. Myanmar's fiscal year runs from April 1 to March 31.

11. Agriculture accounted for 26% of GDP. See Myanmar, Ministry of Agriculture and Irrigation, Department of Agricultural Planning (2013). *Myanmar Agriculture in Brief 2013*. Rice is thought to account for roughly half of that.

12. International Rice Research Institute (2012). Asia's next rice granary: Myanmar?, 20 November Available from www.eurekaalert.org/pub_releases/2012-11/irri-anr112012.php.

13. Khin Than Nwe, T. T. (2002). Breeding and Cultivation of Superior Quality Rice in Myanmar. In *Specialty Rices of the World: Breeding, Production, and Marketing* (p. 358). Ram C. Chaudhary, D. V. Tran and R. Duffy, eds. Enfield, New Hampshire: FAO in association with Science Publishers Inc.

14. Chanjaroen, C. (2012). Myanmar seeks to restore status among top rice exporters, October 29. Available from www.bloomberg.com/news/2012-10-28/myanmar-seeks-to-regain-top-spot-in-rice-exports-southeast-asia.html.

However, from 1962 to 2003 the sector was centrally planned by military governments and performance dropped precipitously, to the point of periodic domestic rice shortages. This includes a shortage in 1988 which is considered to be one precipitating factor of that year's violent civil unrest.¹⁵ During the period of central planning, the state provided seeds, produced fertilizers and pesticides, operated mills, set prices and procured rice for distribution to the public, with private exports being restricted. Despite the ostensible nationalization of land in 1953, 83% of land continued to be managed privately until 1963, when the Tenancy Act rescinded the right of landlords to choose tenants or what was grown on the land.¹⁶ That effectively ended the large rice-growing enterprises which had been central to Myanmar's past dominance of the sector. The resulting landscape, which continues today, comprises mostly small, family-operated rice farms. There is little public or collective investment to maintain or upgrade the infrastructure for irrigation, transportation, processing, quality assurance, or research and development (R&D), which the sector had possessed at its peak.

If central planning hindered Myanmar's international supply of rice, American and European sanctions dampened demand. Although Myanmar rice exports were not targeted by sanctions, confusion among would-be importers about the applicability of sanctions – especially as they applied to trade finance – further discouraged rice imports from Myanmar.

In 2003, the Government fully privatized the rice sector, as part of a larger trend towards market economics. Rice was one of the first sectors to be privatized in this way, an indication of the Government's confidence in the sector's high potential for growth.

15. Council on Foreign Relations (2013). *Understanding Myanmar*. Available from www.cfr.org/human-rights/understanding-myanmar/p14385.

16. Taylor, R. H. (2009). *The State in Myanmar*. Singapore: NUS Press.

WHERE WE ARE NOW

CURRENT CONTEXT

The country has a perennial rice surplus of approximately one-third of its total production (see Figure 1), or roughly 12 million tons in 2011. This surplus, and the fact that Myanmar rice is US\$ 10 to US\$20 cheaper per ton than rice of comparable quality from Viet Nam, India or Pakistan,¹⁷ allowed the sector to double its exports from 750,000 tons in FY 2012¹⁸ to 1.5 million tons in FY 2013¹⁹

17. Chanjaroen, C. (2012). Myanmar seeks to restore status among top rice exporters, October 29. Available from www.bloomberg.com/news/2012-10-28/myanmar-seeks-to-regain-top-spot-in-rice-exports-southeast-asia.html.

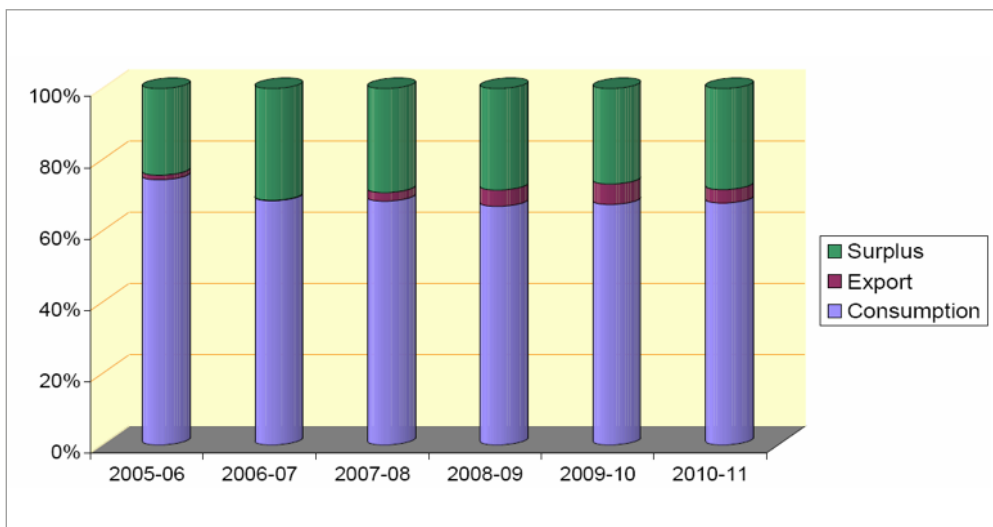
18. Myanmar's fiscal year runs from April 1 to March 31.

19. Myanmar Rice Federation.

without having to address its numerous and severe constraints to future growth.

Not all of this surplus is internationally marketable, and expanding exports much beyond current volumes will depend on substantial productivity gains throughout the sector. While those new capacities are being developed, the exportability of Myanmar's rice surplus may be maximized by better postharvest handling and by helping new or domestic-oriented traders understand foreign markets. If exports are to double to 3 million tons by 2017, as predicted by the Secretary-General of the Myanmar Rice Federation (MRF), the sector's numerous constraints will have to be addressed through national policy and public-private cooperation. These are described by the present strategy in the section on export competitiveness issues, and addressed by the PoA.

Figure 1: The relative size of Myanmar's rice surplus, 2005-2006 to 2010-2011



Source: Department of Agricultural Planning, MoAI.

The rice sector has been fully privatized since 2003, when the sector's transition from being centrally planned began. The Government appears to have recently opened the door to a degree of renewed intervention in procurement and price stabilization through the Farmer Rights Protection and Welfare Empowerment Bill of 2013, but the MRF – the leading private sector association – remains guardedly optimistic that the sector's development will proceed largely according to market dynamics.²⁰ The bill, which includes measures on quality awareness, credit insurance, crop insurance, warehouse financing and disaster relief, attempts to address many of the sector's weaknesses in finance, quality and risk management. However, the sector is without a single, unifying national rice policy or strategy.²¹

At the writing of this strategy, the people of Myanmar and much of the world regard the country's rapid development with a sense of inexorability. Its rapid pace of reforms, natural endowments, hopeful citizenry and strategic location among the booming economies of China, India and South-East Asia bode well. This positivity is rightly compounded in the rice sector by the fact that it is a staple for more than half the world's 7 billion people;²² by the

20. Aung, U. Y. (2013). *Rice Sector Development Strategy and Programme*. IRRI and MoAI.

21. Aung, U. Y. (2013). *The Role of the Private Sector in the Development of the Rice Industry*. Rice Sector Development Strategy and Programme.

22. International Rice Research Institute (2013). Increasing food security. Available from <http://irri.org/our-impact/increase-food-security>.

country's historical leadership in global export markets; and by the familiarity which comes with being the world's largest per capita consumer. These factors represent a significant opportunity for sector.

PRODUCTION

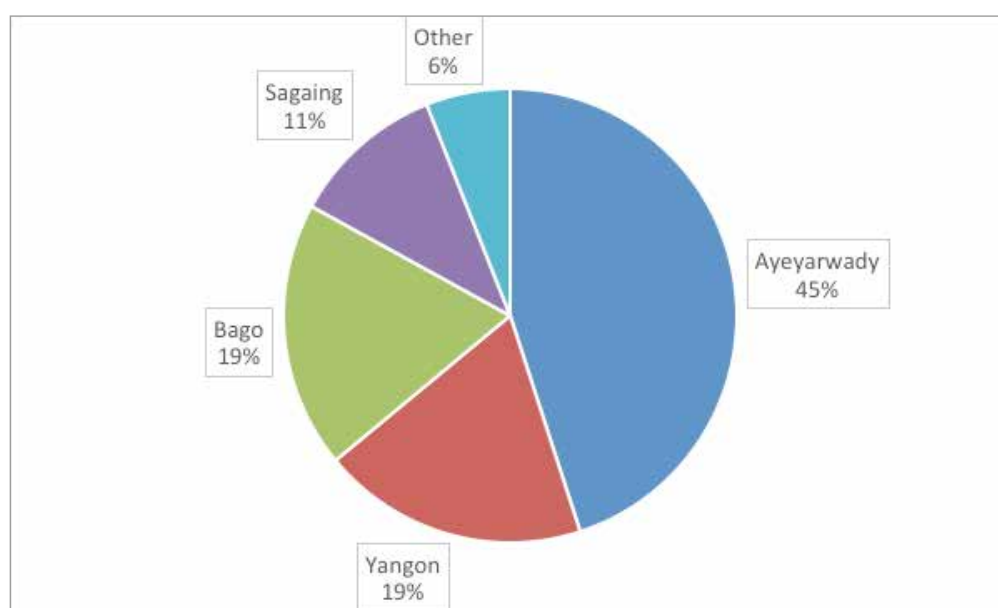
In 2011, Myanmar's 6 million paddy farmers and 16,800 rice mills²³ produced 33 million tons of paddy. Nearly all of this production (94%) is concentrated in the regions of Ayeyarwady, Yangon, Bago and Sagaing, which account for a quarter of the country's land area and nearly half of the country's population.

The majority of output comes from small landholders and low-capacity mills. The small farms typically make little use of chemical fertilizers and pesticides and are largely not mechanized, relying on human and animal labour for planting, harvesting, threshing and even transportation to mills. A lack of dryers, storage, modern milling and efficient transportation to market also contribute to high postharvest losses and rice contamination, which can reduce market price by 10% to 30%.²⁴

23. Ministry of Agriculture and Irrigation and Ministry of Commerce.

24. International Rice Research Institute (2013). Postharvest. Available from www.irri.org/index.php?option=com_k2&view=item&id=9968:p-ostharvest&lang=en.

Figure 2: Geographic concentration of Myanmar's rice sector



Source: Ministry of Agriculture and Irrigation.

Table 2: Breakdown of Myanmar's rice farming and milling capacity by acre and number of mills

Farm size (acres)	Sown acreage	Milling capacity	Number of mills
<5	5 838 471	<50 tons	15 472
5–10	4 715 125	>50 tons	1 365
>10	5 580 478	High quality	329
Total	16 134 074	Total	16 837

Source: Research, Development and Technology Extension, MoC.

Table 3: Crop intensity of Myanmar's regions

Particular	Ma y	Jun.	Jul	Aug	Sep.	Oct	Nov	Dec.	Jan.	Feb.	Mar	Apr	Ma y	Jun.	Jul.
Wet season paddy(Monsoon paddy)															
Lower Myanmar	S	S/G	S/G	S/G	S/G	G/H	G/H	H	H						
Central Myanmar			S	S/G	S/G	S/G	H	H	H						
Southern Shan		S	S	S/G	S/G	H	H	H							
Dry season paddy(Summer paddy)															
Lower Myanmar						S	S/G	S/G	S/G	H	H	H			
Central Myanmar									S	S/G	S/G	S/H	H	H	
Southern Shan											S	S	G	H	H

S: Sowing, G: Growing, H: Harvesting

Source: Jansonius, J. (1999). *Agricultural market information service in Myanmar: Consultancy Mission Report (TCP/MYA/8821)*. Bangkok: FAO; and Department of Agricultural Planning, Ministry of Agriculture and Irrigation.

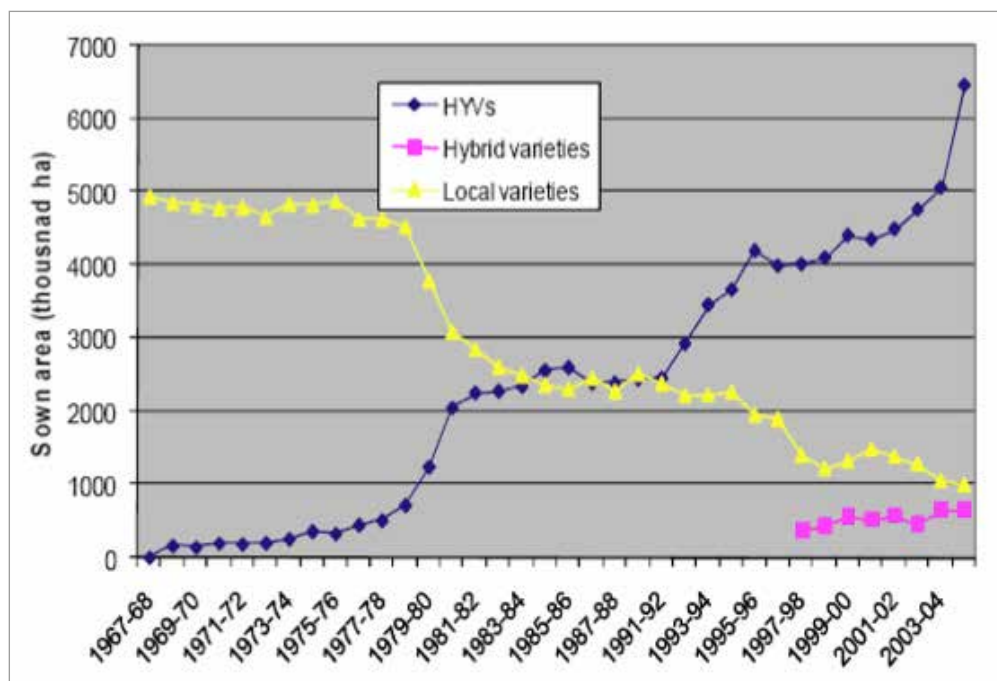
A monsoon season and the presence of the fertile Ayeyarwady Delta make Myanmar well-suited to rice farming. Between its monsoon crops and summer crops, some region of Myanmar is harvesting rice 10 months out of the year, making it a relatively stable source of rice (see Table 3).

However, production volume is far below potential. For example, crop intensity, or the number of harvests from a plot of land in one year, is typically only one, although farmers near rivers and streams may have two. It is expected that with good agricultural practices, modern inputs, and the right irrigation and drainage infrastructure, some Myanmar rice farmers could have up to 3.5 harvests per year.²⁵ It is in this context that the Myanmar Agriculture Service estimates that the country has the capacity to double output.

One of the most critical factors in rice farming productivity is the variety of seed used. Over the past two decades there has been a partial migration from traditional, low-yielding local varieties – which yield only 2-3 tons per hectare – to high-yielding varieties (HYV), which yield 4-5 tons per hectare. Today 65% of Myanmar farmers use HYV, while one third persist in their use of local varieties. Within both groups, however, there is little understanding of seed varieties and considerable mixing. This can reduce yields, as different varieties will respond differently to the particular conditions and cultivation to which they are exposed. It can also make it difficult to market rice based on particular value adding characteristics, as mixed rice will not consistently possess those characteristics.

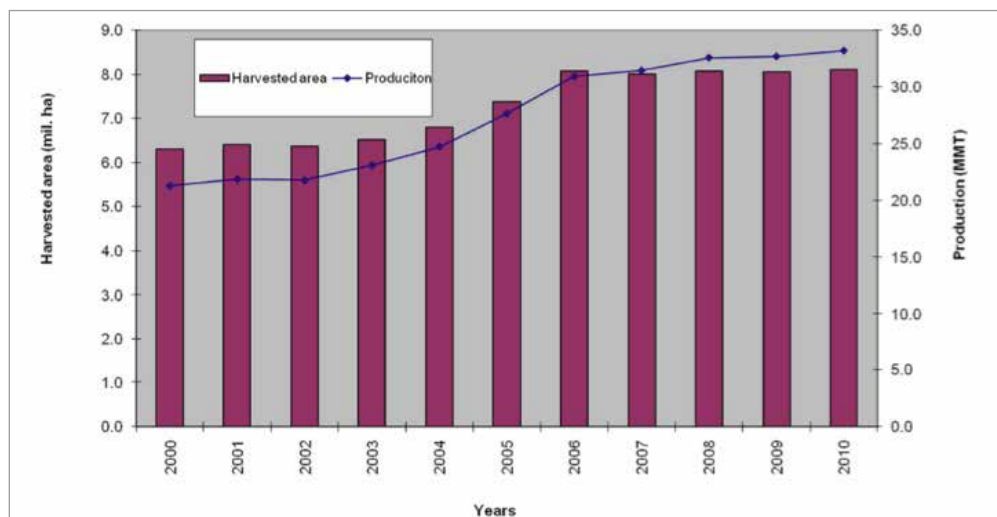
25. NES rice sector team (see Appendix 1).

Figure 3: Historical sown acreage by category of seed variety, Myanmar, 1967-1968 to 2003-2004



Source: Myanmar Agriculture Service.

Figure 4: Growth in Myanmar’s harvested area and production, 2000-2010



Source: Myanmar Agriculture Service, MoAI.

Myanmar farmers have traditionally focused on long-grain varieties (as opposed to medium-grain or short-grain). By definition, long-grain rice is that over six millimetres in length. Myanmar’s five historical, local varieties – Emata, Letywezin, Nga Sein, Medon and Byat – all had average

lengths of eight or nine millimetres or more.²⁶ When switching to HYV, Myanmar farmers have favoured similarly long varieties.²⁷

26. Young, K. B., Cramer, G. L. & Wailes, E.J. (1998). An economic assessment of the Myanmar rice sector: current developments and prospects. *Arkansas Agricultural Experiment Station, University of Arkansas Research Bulletin* No. 958, February. Fayetteville: University of Arkansas.
 27. NES rice sector team (see Appendix 1)

The mass transition from local varieties to HYV was facilitated by the fact that the rice sector was centrally planned. Yet today there is a need to transition farmers to a new category of seed variety; the hybrid, which exhibits yields of 10–15 tons per hectare. That is about triple the yield of most HYV and five times the yield of local varieties. Of the two million acres sown with rice in Myanmar, only 2% make use of hybrid seeds today.

The transition from a centrally planned sector to a free market, which began in 2003, came with quick, one-time boosts to the total area cultivated for rice and to rice production. Between 2003 and 2006, cultivated area increased 25% and rice production 37% (see Figure 4). However, production growth has since slowed, growing at a compound annual rate of 1.6% between 2006 and 2010.

PRODUCT MAP FOR THE SECTOR

The vast majority of Myanmar rice sold, both domestically and abroad, is consumed in the form of head rice; that is, unbroken grains of rice with the husk, bran and germ removed. Broken rice, rice bran and the husk are also sold, either for use as is or for additional processing. Processing adds value and creates new products, such as rice vermicelli, sweet sticky paste, rice powder, rice liquor and the range of high value added rice products given in Table 4. The basic product map for the rice sector is shown in Figure 5.

RICE HUSKS AND RICE BRAN

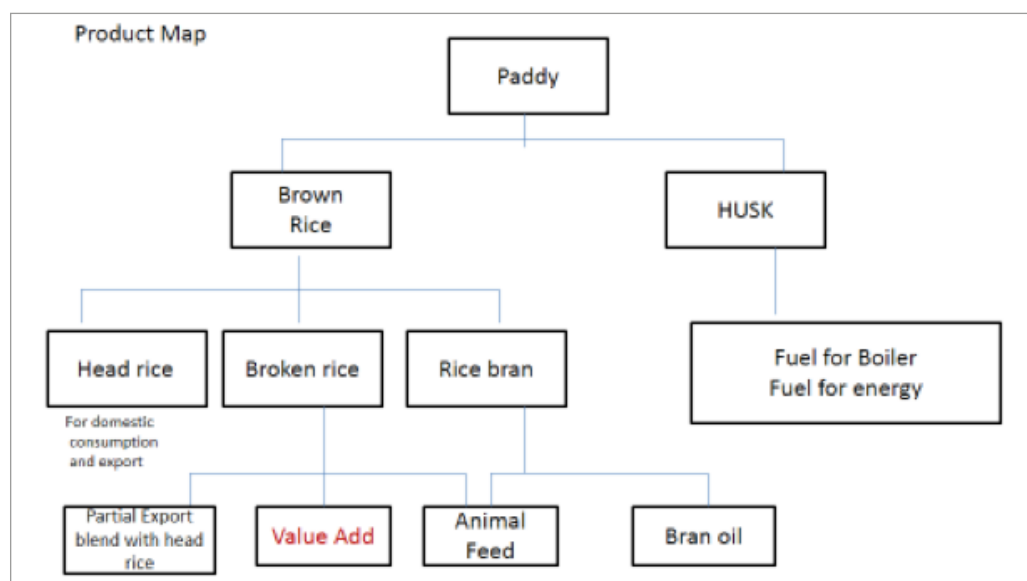
Electrification is very low in Myanmar, with a nationwide average access rate of 13% and close to nothing in rural areas.²⁸ Where there is electricity, it is of relatively low voltage and subject to frequent outages, forcing rice millers to power their operations with steam engines. Approximately 60% of rice husks are burned to produce the needed steam. As these husks come with the paddy they purchase from farmers, they are essentially a 'free' source of fuel, saving millers about 60% of the diesel fuel costs they would otherwise incur.²⁹

Rice bran has two major end uses. It may be mixed with animal feed as filler, or its oil may be extracted for use in cooking or, less commonly, the production of a less popular alternative to carnauba wax. Rice bran wax may be used in a diverse set of products, ranging from foods and pharmaceuticals to cosmetics and industrial applications, such as road surfaces and building panels.

28. European Union Energy Initiative Partnership Dialogue Facility (2013). *Myanmar Rural Electrification Workshop – International Best Practices and Options for Policy Makers: Workshop Report*. Available from www.euei-pdf.org/sites/default/files/files/field_pblctn_file/EUEI%20PDF_Myanmar_Workshop%20Rural%20Electrification_Jun2013_EN.pdf.

29. Figures for percentage of risk husks used to generate steam and percentage of diesel fuel costs saved from NES sector team (see Appendix 1).

Figure 5: Product map for the Myanmar rice sector



Source: Rice sector strategy team.

HEAD RICE

Head rice comes with a range of characteristics – depending on the variety – which consumers may be willing to pay more for. These characteristics include fragrance, texture (e.g. sticky), size, shape and appearance. Head rice may also have value added in terms of method of cultivation, preparation, enrichment and packaging. These include rice that is canned, pre-cooked, pre-washed, instant, organic, nutrient-enriched, embryoed and blended with other varieties.

BROKEN RICE

Broken rice fetches a lower market price than unbroken head rice and is, therefore, the primary form of rice used in the processing of other value added rice-derived

products. Myanmar enterprises have experience with the production of parboiled rice, rice vermicelli, rice cookies, rice liquor and a sweet sticky rice paste used in the production of 90% of Myanmar's manufactured desserts. Most of this is sold domestically, although modest amounts of rice vermicelli and sweet sticky paste have been exported to China, parboiled rice to the Russian Federation (for re-export to Ukraine and Georgia), and unprocessed broken rice to Japan for use in liquor production and as a soup ingredient.

In addition to these well-established products, a variety of innovative uses are emerging with growing markets and higher value added, such as rice milk. Table 4 summarizes some of these other interesting applications.

Table 4: *Emerging, value added applications for rice*

Product	Value Addition Potential*	Closeness to Commercialization	Market Potential**	Potential for returns
Gamma	Medium	Ready	Medium	Medium
Embryo rice	Medium	Ready	Medium	Medium
Organic five-grain rice blend	Medium	Ready	Low / medium	Medium
O-Rice	Medium	Ready	Low / medium	Medium
Modified starch	Medium / High	Ready	Medium / High	High
Baby foods	High	Ready	Medium / High	High
Stabilized rice bran	Low / medium	Ready	Medium / High	Low / medium
Tyres	Low / medium	Ready	Low / medium	Low / medium
Bio-organic fertilizer	Low	Ready	Low / medium	Low / medium
Carbonized rice husks (CRH)	Low	Ready	Low to medium	Low / medium
Biodegradable fast food meal box	Low	Ready	Medium	Medium
Rice bran oil	Medium	Ready	Low / medium	Medium / High
Paper production	Low	Ready	Low / medium	Low
Rice bran	Medium	Ready	Medium	Low / medium
Oryzanol	High	Ready	Medium / High	High
Probiotics	High	Ready	Medium / High	High
Phytosterols	High	Ready	Medium / High	High
Rice ingredients for Cosmetics	High	Ready	High	High
Rice ingredients for cosmeceuticals	High	Ready	High	High

Source: Export-Import Bank of India.

At the moment, however, Myanmar's sector stakeholders are expressing little interest publicly in such a high level of innovation and value addition. With substantial support from the Government, Thailand's rice sector was able to move from manual operations to mechanized operations, an intermediate indicator of sector development, in 4–10 years (depending on the region).³⁰ If Myanmar achieves similar success in a similar time frame, significant levels of value added rice product exports are even further away and well beyond the time frame of the present strategy. Higher prices through better storage, better yields, higher quality, better connectivity to world markets and more mechanization are all achievable goals in the next five years. If the Myanmar rice sector succeeds in those, one can expect a higher production and export of not only rice, but the variety of rice-derived products currently pro-

duced in significant volumes for the domestic market but not yet widely exported.

SOCIAL IMPACT

The agriculture sector employs more than half of the country's population and contributes to the livelihood of more than 70%. By harvested area, rice accounts for about half of the agricultural sector³¹ and represented 13% of Myanmar's GDP in 2011.

Farmer income is estimated at approximately US\$84 per acre (see Table 5). As 36% of cultivated acres are on farms of less than five acres, and as crop intensity for most farms is once per year, millions of farmers earn less than US\$420 per year. That is below US\$456 (US\$1.25/day), the World Bank definition of extreme poverty.

30. Gummert, M. (2007). Improved postharvest technologies for reducing postharvest losses and increasing of farmers incomes from their rice harvests. PowerPoint presentation. Available from www.thairice.org/doc_dl/AsiaRiceFoundationPresentation.pdf.

31. Myanmar, Central Statistical Organization. (2011). *Statistical Yearbook*. Yangon: Central Statistical Organization.

Table 5: Costs and revenue for Myanmar rice farmers

Particular	Unit	Monsoon paddy (ks/acre)	%	Summer Paddy (Ks/ acre)	%
1.Hired labour	Ks per acre	72,100	55	84,800	41
2.Agro-input cost	Ks per acre	53,000	41	116,400	56
Total cash cost	Ks per acre	125100	96	201,200	97
3.Farm family labour	Ks per acre	4,800	4	6,000	3
4. Cost of production	Ks per acre	129,900	100	207,200	
5. Paddy yield per acre	Basket per acre	60		85	
6. Paddy yield per acre	Tonne per acre	1.25		1.77	
7.Break-even price of paddy (4)/(5)	Kyats per basket	2,165		2,438	
8. Marketing cost of paddy to be sold at rice mill	Kyats per basket	250		250	
9.Break-even cost of production and marketing	Kyatsper basket	2415		2688	
8. Selling price at rice mill	Kyats per basket	3600		3550	
10. Net margin for farmers	Kyats per basket	1185		862	
11. Net margin per acre	Kyats per acre	71100		73270	
	USD *per acre	82.67		85.19	
12. family labour (cost of hired labour)		4,800		6,000	
13. farmer income (11) +(12)	Kyats per acre	75900		79270	
	USD per acre	88		92	

Source: Department of Agriculture, MoAI.



The low economic promise of rice farming is a leading factor in Myanmar's urban migration, which itself impedes the ability of farmers to hire adequate seasonal labour, raising wages and reducing farmer margins. For monsoon paddy, in particular, hired labour is very costly, accounting for 55% of the cost of production, according to Table 5. Investment in farm mechanization would lead to significantly higher margins, but the time to recover the initial capital investment and the poor loan terms available to farmers make it unlikely that farmers – who already face substantial risks from weather, blight and price drops – will be able to adopt mechanized farming on a wide scale without Government encouragement.

However, improving the socioeconomic contribution of the sector depends on more than simply increasing efficiency and, thereby, margins. The Food and Agriculture Organization of the United Nations rule of thumb for future growth is that 10% will come from area expansion, 20% from increased crop intensity, and 70% from R&D, innovation and policy.³²

To fulfil the promise of the 70%, the Myanmar rice sector needs more technical education in agriculture. Myanmar has only one higher learning institution for agriculture, Yezin Agricultural University, near Naypyidaw. It graduates around 300 people per year. About 100 of these

go to work for the Ministry of Agriculture and Irrigation (MoAI), and about 200 go into the private sector, usually to agrochemical companies or self-employment.³³ As discussed in the section of this strategy on the institutional perspective, Yezin Agricultural University is regarded by sector stakeholders as one of the most capable institutions supporting the sector. However, they view it as having low capacity to respond to the needs of the sector. Strengthening that capacity will be an important element of improving the sector's socioeconomic contributions to the country.

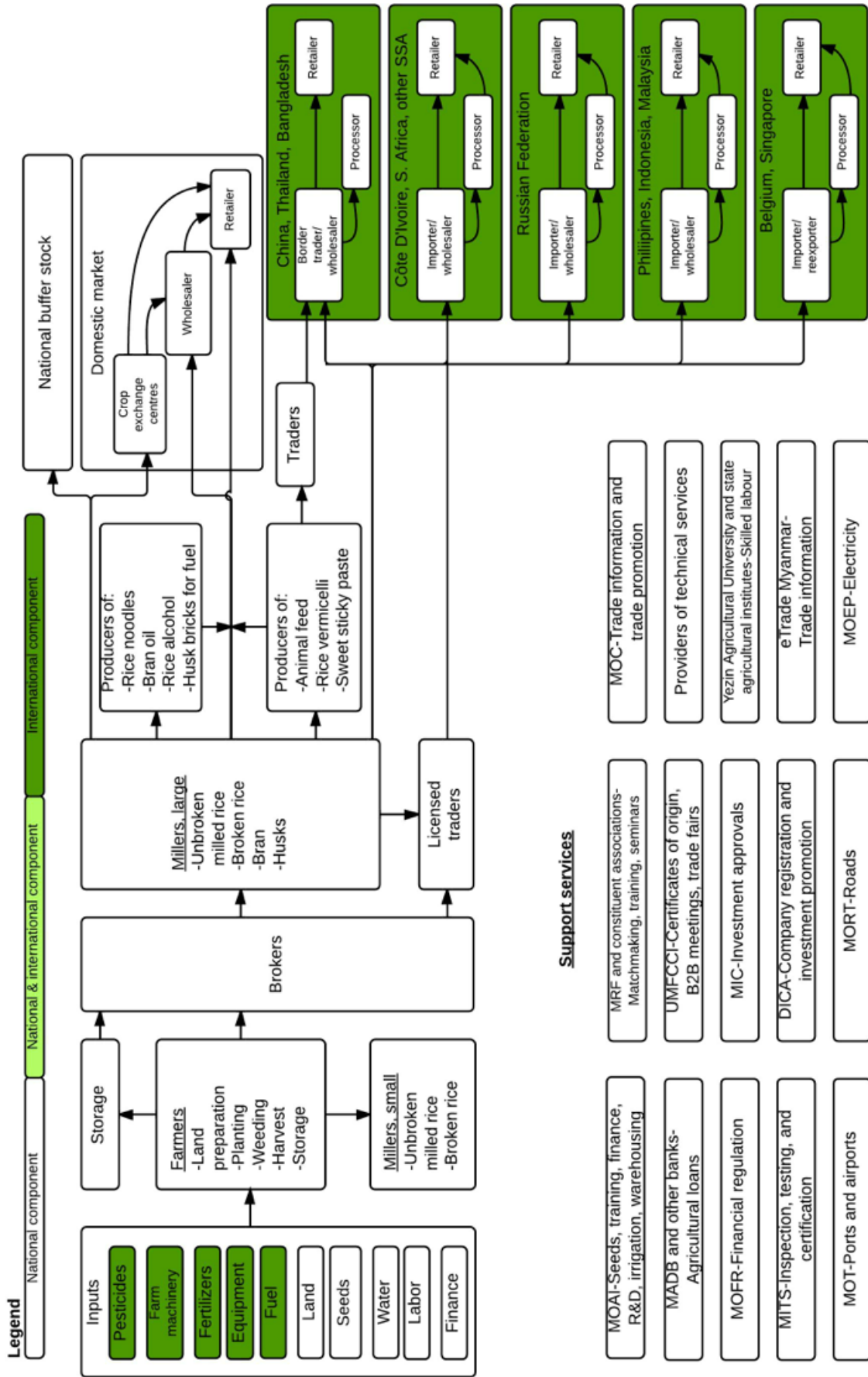
VALUE CHAIN OPERATIONS

The rice value chain involves the participation of a wide range of both national and international agents. Production, collection, processing, marketing and distribution are carried out by an array of stakeholders that range from individual entrepreneurs to large wholesalers and exporters. These stakeholders are then aided by both private and public sector support institutions. While the value chain survey seeks to illustrate the role of each of these participants in producing and bringing sector products to market, the analysis is further detailed in this document's sections analysing the sector's TSN and its export competitiveness issues.

32. Myanmar Rice Federation.

33. NES sector team (see Appendix 1).

Figure 6: Current rice sector value chain



PRODUCTION

The value chain starts with the production of rice paddy; that is, rice in its raw form. The essential inputs of land, water and seed are available domestically. An ample supply of water, in the Ayeyarwady Delta and during the monsoon season, is one of Myanmar's natural advantages in rice production. Seeds, on the other hand, are not one of the sector's strengths. Farmers mostly use their own harvested rice for the next season's seeds, but while this is the cheapest source of seeds, it perpetuates the use of the low-quality, low-yield, mixed varieties of seeds which are widespread among Myanmar's millions of small farmers. Most farmers import or do not make use of other inputs such as fertilizers, insecticides and machinery.

For a very few farmers, the value chain includes farming services, such as land preparation, irrigation, drainage and flood management. Most harvesting is done manually, creating high labour demand once or twice per year, depending on the crop intensity of the region. However, migration flows from rural areas to cities make it increasingly difficult to meet labour demand and heighten the need for more farm mechanization.

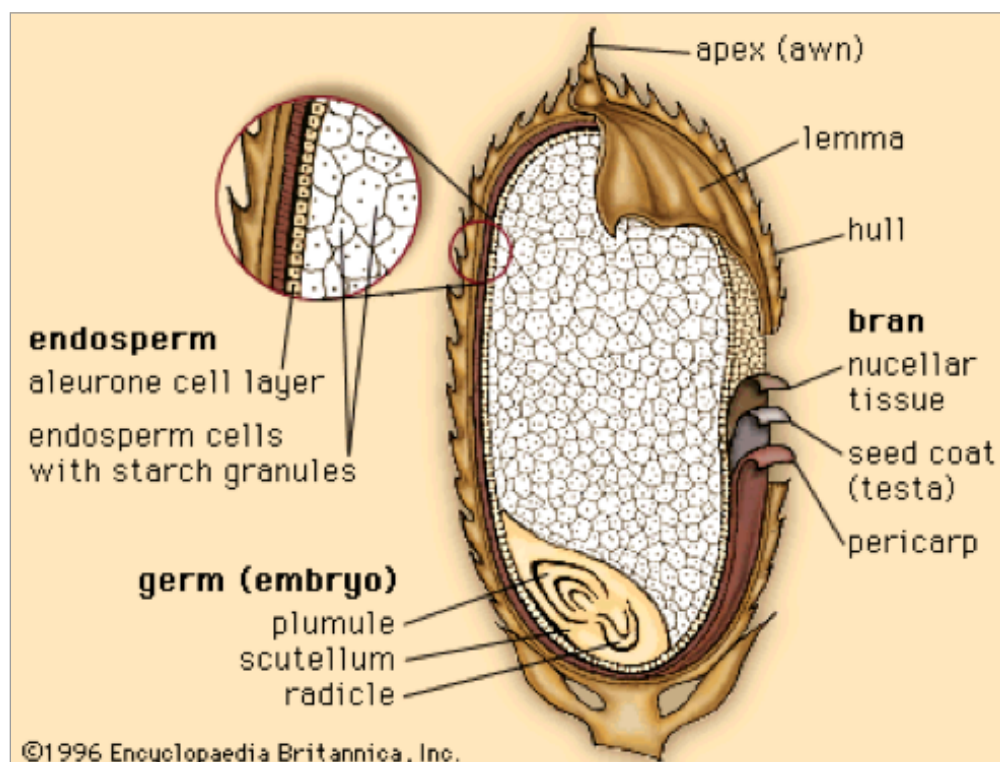
COLLECTION AND STORAGE

Once harvested, rice is dried, stored and/or transported to rice mills. Farmers, transportation providers, and sometimes village brokers are involved in these stages. The smaller or more remote the farmer, the higher the number of intermediaries is likely to be, with multiple brokers moving paddy (or indeed small volumes of rice milled by village millers) closer to large millers and traders.

MILLING AND OTHER PROCESSING

Milling is the link in Myanmar's value chain where most processing takes place. Husks, also called hulls, are removed, leaving brown rice (white rice with embryo and covered by the bran coating) and husks, which are used by many millers as a fuel source. Brown rice has the highest nutritional value and fetches higher prices, but the global market for brown rice demands relatively high quality and, by value, was only about a tenth of the global market for fully milled (i.e. white) rice in 2012.

Figure 7: Structure of a grain of paddy rice



Source: Encyclopaedia Britannica.

Further milling is done to remove the bran and embryo, leaving white rice. In Myanmar's current value chain, bran and embryos are sold as animal feed and sometimes processed to create rice bran oil, which is useful for cooking. Rice bran oil may also be processed into rice bran wax, an alternative to carnauba wax in the production of cosmetics, creams, polishes and foods. However, rice bran wax is not currently produced in Myanmar. Special milling machines are available to remove the bran without removing the embryo for those millers and traders interested in supplying the small but more lucrative markets for embryoed rice; however, this is not a significant part of Myanmar's rice sector.

After milling, some percentage of the rice grains will be broken, depending on the skill and equipment used. Rice is then sorted, so that it can be sold by percentage of broken rice, most typically 100% broken, 25%, 15%, 10%, and 5%, with less broken rice garnering higher market prices. The rapid growth in Myanmar's rice exports in recent years has come mostly on the strength of growth in broken rice. Whereas broken rice accounted for 24% of Myanmar's rice exports between 2005 and 2009, the percentage was 41% between 2010 and 2012.

Broken rice itself is also sold as animal feed, although it has less nutritional value than bran and embryos. Processing of broken rice in Myanmar is rather limited. It is used to produce rice liquor or rice powder, also known as rice flour, which is then sold as is or further processed into sweet sticky paste for confectionaries, rice vermicelli and rice noodles. Experience exporting these products is extremely low and mostly limited to small amounts of vermicelli, noodles and sweet sticky paste to markets in south-eastern China.

COMMERCIALIZATION

The next step in the value chain is the marketing of rice and its derivative products by traders connected to domestic wholesalers and retailers and to foreign importers / wholesalers. The geographic diffusion of the rice sector and the small scale of most farmers, millers and processors has made it difficult to foster any rice clusters where more processing can be competitively performed. In 2012 a coalition of public and private sector stakeholders took a step towards remedying this with the creation of the Myanmar Agribusiness Public Corporation (MAPCO).

IMPORTS

As a least developed country (LDC) with little manufacturing, Myanmar does not produce most of the manufactured inputs needed for the rice sector and must import them. Imported products include fertilizers, pesticides, combine harvesters, threshers and dryers, milling equipment and testing equipment. These are important to increase yields, reduce postharvest losses and raise quality. Two of the country's five urea fertilizer factories have been shuttered for several years and current domestic production meets only a small portion of domestic demand.

These inputs are mostly imported through border crossings with neighbouring countries China, Thailand and India. As shown in Table 6, 96% to 97% of machinery for soil preparation, harvesting, threshing and milling comes from these three countries. The percentage may be even higher, as any trade that is unreported to avoid Customs duties is more likely to happen across Myanmar's long land border than through ports.

Table 6: Myanmar's imports of inputs for the rice sector

Farming inputs imported by Myanmar	2012 imported value (US\$ millions)	Leading source countries (% share of Myanmar market)
Fertilizers (HS 31)	89	China (57), Thailand (24)
Insecticides (HS 3808)	29	China (57), India (13), Thailand (11)
Machinery for soil preparation (HS 8432)	16	Thailand (41), China (40), India (16)
Harvesting and threshing machinery (HS 8433)	14	Thailand (48), India (31), China (13)
Machinery for cereal milling (HS 8437)	6	China (67), Thailand (29)
Machinery for cleaning, sorting, and grading seeds and grain (HS 843710)	6	China (47), India (19), Thailand (13), Chinese Taipei (10)

Source: ITC calculations based on United Nations Comtrade statistics.

It is unlikely that all of the farm inputs imported from China, Thailand and India are manufactured in those countries. As will be discussed in the section on export competitiveness issues, Myanmar financial regulations prevent importers from making industry-standard deposits or advance payments on heavy machinery. This severely discourages foreign vendors from selling directly to Myanmar. It forces Myanmar buyers to buy the same goods as re-exports through neighbouring countries with which there is more trust and the possibility of making the same advance payments in cash. This comes with additional costs and risks for Myanmar buyers.

Seeds, for the most part, are not imported. Only a few thousand dollars' worth of imports were recorded by United Nations Comtrade in 2011 and 2012. Farmers tend to use their own seeds rather than purchase them, thereby

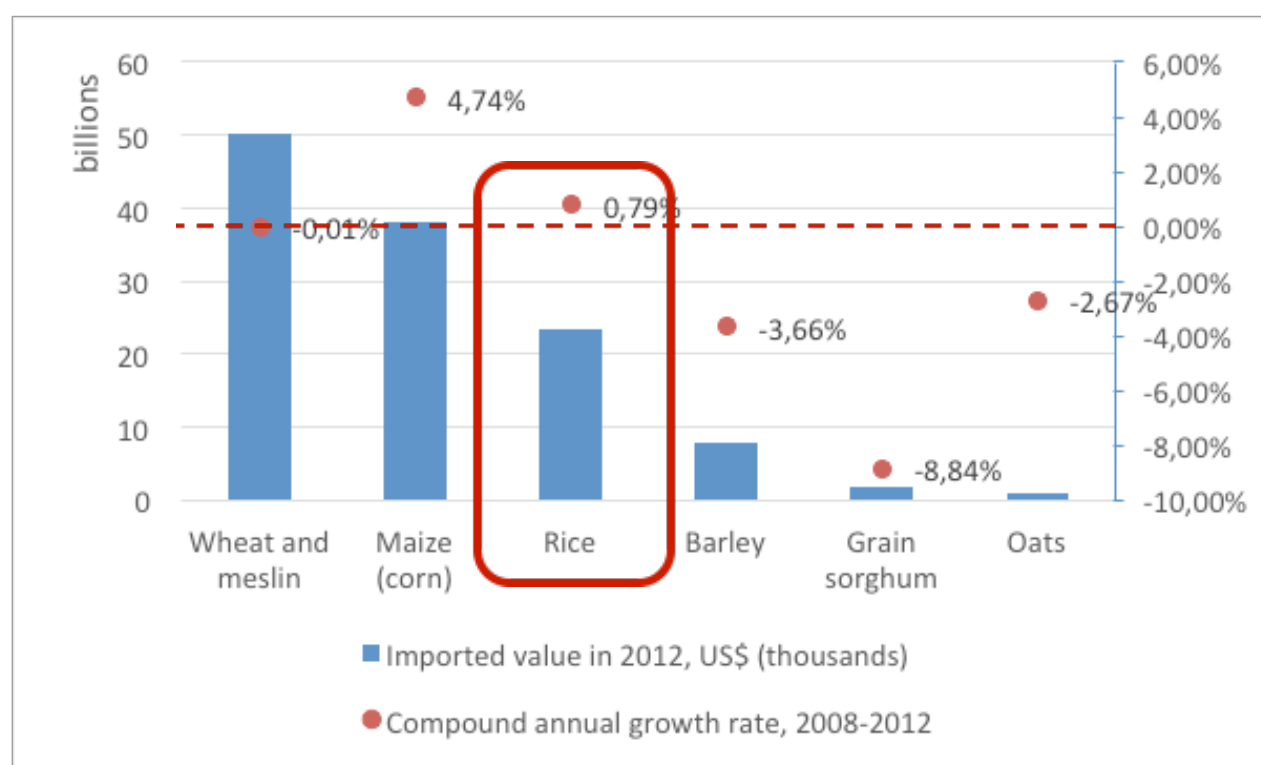
perpetuating Myanmar's overall production of low-quality, low-yielding, mixed variety rice crops.

GLOBAL PERSPECTIVE

GLOBAL IMPORTS

In 2012, the global import market for rice was worth US\$23 billion, as shown in Figure 8. Rice is a staple food for nearly half the world's population, but it is widely cultivated in many of the countries where it is most consumed, making it only the third most exported cereal, behind wheat (US\$50 billion) and corn (US\$38 billion). However, among the six most exported cereals, rice's growth rate is second only to corn.

Figure 8: Top cereal imports, by market value and growth



Source: ITC calculations based on United Nations Comtrade statistics.



Rice comes in four forms at the six-digit level of the Harmonized System (HS) of tariff codes.

Table 7: *The four forms of rice at the six-digit level of the Harmonized System*

HS code	Description of rice form	2012 world import value (US\$ billions)	2012 global average unit value (US\$ / ton)	2012 quantity imported (million tons)
100610	Raw rice paddy (All parts of the rice as harvested: husk, germ, bran and grain)	1.1	434	2.6
100620	Brown rice (Grain and bran only. Husk and germ removed)	1.8	821	2.2
100630	Milled or semi-milled rice (Grain only. Husk, germ and all or most of the bran removed)	18.1	716	25.3
100640	Broken rice (Grain only, but broken. Milled rice which has been overmilled, overdried, or otherwise damaged.)	2.3	483	4.9

Source: ITC calculations based on United Nations Comtrade statistics.

On every continent, the form most imported is milled rice, accounting for 78% of total value in 2012. Broken rice is the second most imported type, but primarily on the strength of African demand, which accounts for 70% of world demand. Whereas broken rice imported by more developed economies, such as Japan and the Republic of Korea, is used in the production of liquor, cosmetics and other high value added products, the broken rice imported by Africa is consumed as a cheaper alternative to unbroken milled rice.

Brown rice has a high unit value because of its greater health benefits but demand for it is low, and short-grain varieties are best suited to sale as brown rice. Given the Myanmar propensity for long-grain rice, brown rice is unlikely to become an important strategic element of Myanmar's rice export basket. Raw rice paddy is also in low demand and has the lowest unit price of the four forms in Table 7.

Therefore, the two forms of rice considered at the six-digit level in the present strategy are HS 100630 and HS 100640, which are the two forms most exported from Myanmar today. The world's top 25 importers of each type are given in Table 8.

Table 8: Top 25 markets in the world for milled rice and broken rice

Milled and semi-milled rice (HS 100630)			Broken rice (HS 100640)		
Importers	Imported value in 2012 (US\$ millions)	Share of market	Importers	Imported value in 2012 (US\$ millions)	Share of market
World	18 090	100.0%	World	2 349	100.0%
Nigeria	1 466	8.1%	Senegal	449	19.1%
China	1 007	5.6%	Ghana	218	9.3%
Islamic Republic of Iran	981	5.4%	Nigeria	162	6.9%
Saudi Arabia	965	5.3%	Côte d'Ivoire	160	6.8%
Iraq	840	4.6%	Guinea	126	5.4%
Indonesia	820	4.5%	China	110	4.7%
United Arab Emirates	700	3.9%	Indonesia	97	4.1%
South Africa	679	3.8%	Zimbabwe	91	3.9%
United States	630	3.5%	Belgium	82	3.5%
Malaysia	600	3.3%	Burkina Faso	65	2.8%
Japan	428	2.4%	France	63	2.7%
Philippines	406	2.2%	United Kingdom	60	2.5%
Côte d'Ivoire	369	2.0%	Mauritania	53	2.3%
Yemen	321	1.8%	Sierra Leone	44	1.9%
France	314	1.7%	Uganda	37	1.6%
Benin	303	1.7%	Gambia	34	1.4%
Cameroon	297	1.6%	Netherlands	32	1.4%
Hong Kong, China	297	1.6%	Germany	31	1.3%
Canada	248	1.4%	Mali	31	1.3%
Singapore	245	1.4%	Switzerland	28	1.2%
United Kingdom	230	1.3%	United States	23	1.0%
Brazil	222	1.2%	Democratic Republic of the Congo	18	0.8%
Germany	218	1.2%	Guinea-Bissau	18	0.8%
Kuwait	218	1.2%	Republic of Korea	16	0.7%
Papua New Guinea	208	1.2%	Liberia	15	0.6%

Source: ITC calculations based on United Nations Comtrade statistics.

GLOBAL EXPORTS

Global exports of both milled rice and broken rice are dominated by four countries – Thailand, India, Viet Nam and Pakistan. In the period 2010-2012, they accounted for 73% of milled rice exports and 64% of broken rice exports. For each product, the fifth-ranked country had a 7% market share but no other country had more than 3%. For milled rice, the fifth-ranked country was the United States of America. For broken rice it was Brazil, as shown in Table 9.

Of the other exporters, only a few countries both averaged more than 1% of market share and showed significant growth. For milled rice there was only Uruguay, with a compound annual growth rate of 10%. For broken rice, five countries met these conditions. In order of highest growth to lowest, they were Myanmar (581%), Senegal (27%), Uruguay (14%), Italy (8%) and Argentina (8%). However, as a trading hub for West Africa, Senegal's exports are primarily re-exports rather than domestic production.

Table 9: Top exporters of milled and broken rice

Milled rice (HS 100630) exporters	2010-2012 average value exported (US\$ millions)	Share of global market	Broken rice (HS 100640) exporters	2010-2012 average value exported (US\$ millions)	Share of global market
World	18 713 351		World	1 471 082	
Thailand	4 836 349	26%	Thailand	465 370	32%
India	3 992 026	21%	Pakistan	221 796	15%
Viet Nam	3 019 396	16%	Viet Nam	127 905	9%
Pakistan	1 847 688	10%	India	117 087	8%
United States	1 358 263	7%	Brazil	103 583	7%
Italy	548 647	3%	Belgium	48 341	3%
Uruguay	363 210	2%	Myanmar	44 336	3%
United Arab Emirates	299 181	2%	Senegal	38 277	3%
Brazil	273 721	1%	Uruguay	34 919	2%
China	218 181	1%	Italy	34 077	2%
Australia	209 932	1%	United States	28 621	2%
Argentina	176 593	1%	Argentina	27 957	2%
Belgium	175 638	1%	Egypt	26 746	2%
Netherlands	132 414	1%	Netherlands	21 537	1%
Egypt	127 656	1%	Uganda	15 333	1%
Myanmar	117 009	1%	Guyana	14 116	1%

Source: ITC calculations based on United Nations Comtrade statistics.

EXPORT PERFORMANCE

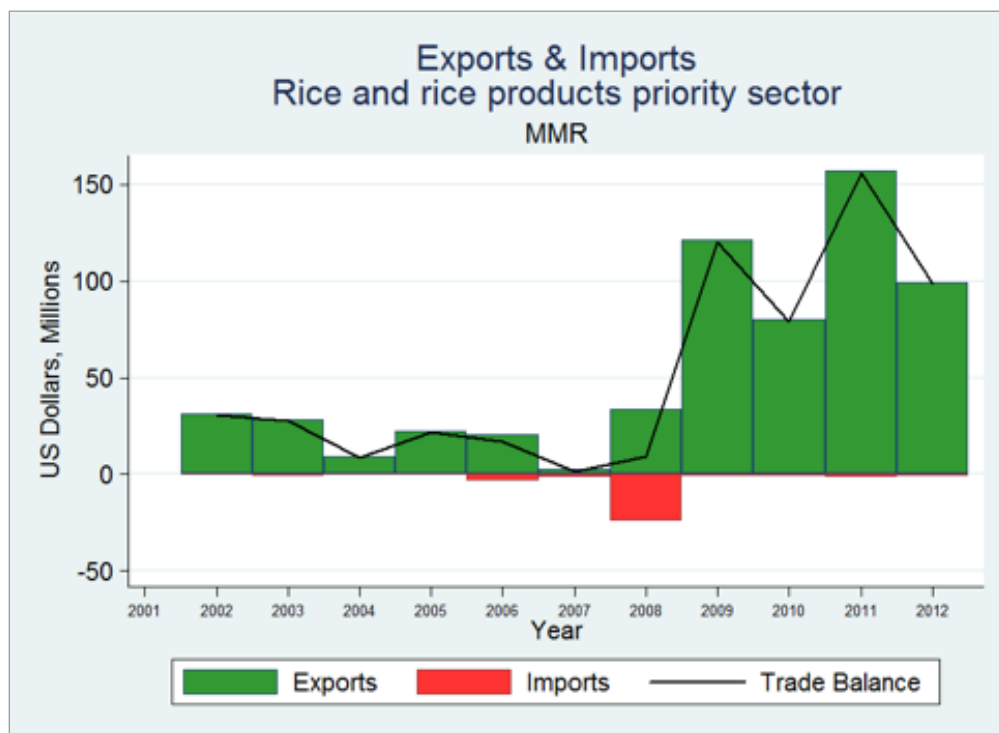
Rice and rice products were Myanmar's ninth most important export by value in 2012. Over the last decade Myanmar has enjoyed at least a small trade surplus for rice every year, even in 2008, when about US\$20 million of rice was imported to assist in the recovery from Cyclone Nargis, which devastated the major rice-producing region of Ayeyarwady, possibly killing as many as 138,000 people and affecting as many as 2.4 million.³⁴ The trade balance was at its lowest in the five years after the 2003 privatization of the rice sector, as shown in Figure 9, but exports have boomed since 2009 as the sector has adjusted and private traders have established new international marketing channels.

The boom in rice exports since 2009 has come almost entirely from penetration of new markets, as shown in Figure 10, with exports of 25% broken rice (i.e. a mixture of 25% broken with 75% whole). Chief among these markets have been China, Côte d'Ivoire, Bangladesh and South Africa. Myanmar traders have begun to sell 10% and 5% broken rice in small amounts to some smaller European markets, and sector stakeholders hope this will provide a basis for entry into the larger, higher-priced Western European and Middle Eastern markets in the short term. A few other products – namely rice vermicelli and 100% broken rice for animal feed and porridge – were newly exported to China in small amounts during this period.³⁵

34. International Federation of Red Cross and Red Crescent Societies (2011). Myanmar: Cyclone Nargis 2008 facts and figures, 3 May. Available from www.ifrc.org/en/news-and-media/news-stories/asia-pacific/myanmar/myanmar-cyclone-nargis-2008-facts-and-figures/.

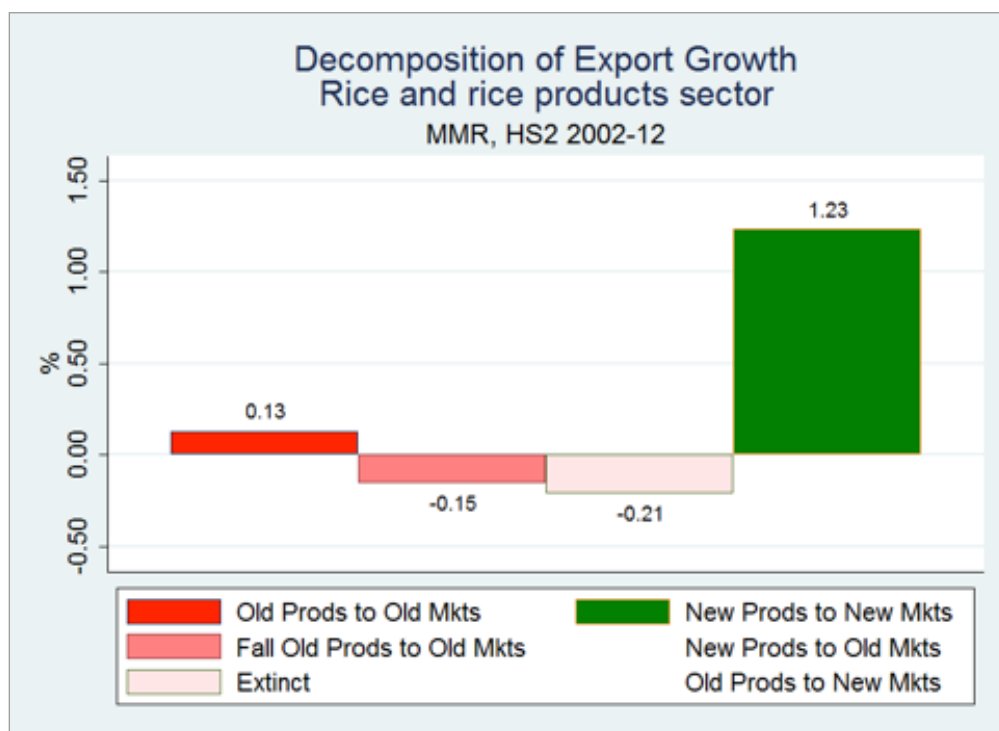
35. Characterizations of export markets and products in this paragraph from the NES rice sector team (see Appendix 1).

Figure 9: Myanmar's trade balance in rice and rice products, 2001-2012



Source: ITC calculations based on United Nations Comtrade statistics.

Figure 10: Myanmar's rice export growth



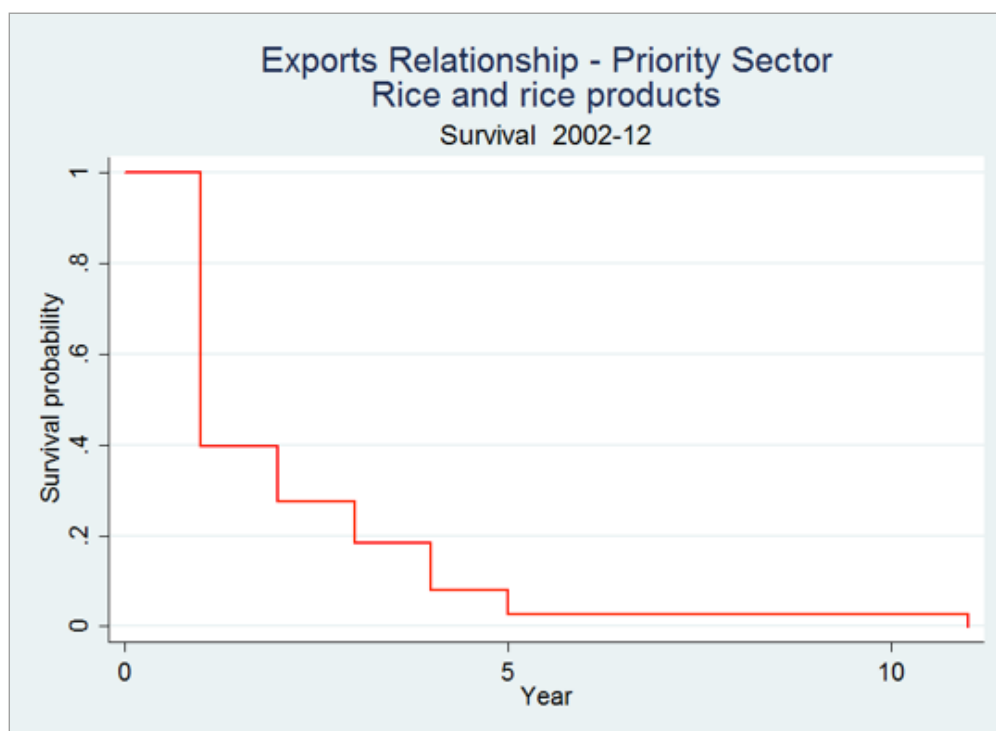
Source: ITC calculations based on United Nations Comtrade statistics.

Despite this apparent success in penetrating new markets, the relationships of Myanmar's traders with foreign buyers have a very low rate of survival. As Figure 11 shows, over the last decade, any given export sale was more probably a one-time transaction, rather than the start of a lasting business relationship. The reasons behind this are unclear and may be manifold, but future success will be supported if Myanmar's rice traders place a premium on building lasting relationships. Ways of achieving this include but are not limited to:

- Targeting stable markets rather than chasing high prices in markets with large fluctuations (see the Nigeria example in the market identification section);
- Being accessible and providing good aftersales care to buyers;
- Targeting markets based on consumer preferences for the characteristics of the specific rice varieties being exported by Myanmar (possible in the medium term, as sector awareness of rice varieties grows, mixing of varieties decreases and quality management improves);
- Entering into long-term supply contracts with buyers (less risky as the ability to guarantee consistent quality grows).



Figure 11: Survival probability of Myanmar's rice export relationships



Source: ITC calculations based on United Nations Comtrade statistics.

Box 2: The low reliability of official statistics in Myanmar and their use in the present analysis

The keeping of empirically sound official statistics is a challenge in any LDC, and a series of observers have noted that official statistics may be particularly unreliable in Myanmar. Most recently, the United Nations Economic and Social Commission for Asia and the Pacific noted that Myanmar has extremely low capacity 'to produce reliable and timely data even for the most basic statistics'. Some observers ascribe this to several factors, including 'the government having limited control over parts of the territory, limited resources for data gathering and analysis, and data being manipulated for internal and external consumption' (Ware & Clarke, 2009). However, others find most fault in a custom of data manipulation, born under the former military regime, to present superiors with favourable results (Steinberg, 2004).

Whatever the cause of the data problem in Myanmar, it persists today, with the United States Agency for International Development (Michigan State University and the Myanmar Development Resource Institute's Center for Economic and Social Development, 2013) and ITC coming to similar conclusions during their respective technical assistance projects over the past year. For the purposes of the present analysis, this issue is most problematic in that bad data threatens to invalidate analysis of sector export performance and the market recommendations which flow from it. Therefore, the market analysis in the present export strategy is based on export data from United Nations Comtrade, except as it relates to China and Côte d'Ivoire.

According to Myanmar Customs data, China became the largest destination for the country's exported rice in 2012, accounting for 56% of Myanmar's exports in FY 2013 (1 April 2012 to 31 March 2013). This occurred via border trade that the Chinese government considers illegal. The unofficial nature of this trade has apparently resulted in United Nations trade data underplaying China's significance. Côte d'Ivoire was Myanmar's second largest rice export destination in 2012, accounting for 12% of Myanmar's exports, and had been the largest destination for several preceding years. However, a reporting lag means this is reflected only up to 2010 in Comtrade statistics.

Therefore, unless otherwise noted, the following tables are based on United Nations data, except for the addition of China and Côte d'Ivoire as the largest rice importers. The analysis which accompanies the tables assumes that China is Myanmar's largest and quickest-growing destination for exported rice, as consistently reported by the NES rice sector team.

According to the Myanmar Government, a little more than 2% of its total rice production in 2011 was exported. As shown in Table 10, about two-thirds of production was consumed domestically, while one-third was surplus.

According to Myanmar's official statistics, 61 trading companies handled the country's rice exports. Three companies handled around 100,000 tons each and together accounted for 39% of the total. Among the others, 10 companies handled between 5,000 and 50,000 tons, and just over half handled less than 1,000 tons.

Table 10: Myanmar Government statistics of rice exports as a share of total production

Myanmar fiscal year (1 April – 31 March)	Quantity produced (million tons)	Quantity exported (tons)	Percentage of rice production exported
FY11	32.6	536 410	1.6
FY12	29.0	707 200	2.6
FY13	34.6	1 396 800	4.0

Sources: Myanmar Customs Department (quantity exported) and: Myanmar, Ministry of Agriculture and Irrigation, Department of Agricultural Planning (n.d.). *Myanmar Agriculture at a Glance*. Naypyidaw (quantity produced).

MILLED RICE

The low number of high-capacity traders has meant a high concentration of rice exports to a few big importing countries and many small shipments to smaller markets. As shown in Table 11, 96% of Myanmar's non-China / non-Côte d'Ivoire exports of milled rice went to eight countries, with 13 other countries making up the remaining 4% with small orders.

Table 11: Myanmar's 23 export markets for milled rice (HS 100630) in 2012

Importers	Exported value 2012 (US\$ thousands)	Exported quantity 2012	Unit value (US\$ / ton)	Ranking of partner countries in world imports	Total import growth in value of partner countries 2008-2012 (% , p.a.)	Tariff (estimated) faced by Myanmar (%)
Total	78 147	192 067	407		5	
China	330 000*	775 922*		2	52	65
Côte d'Ivoire	55 051*	164 478*				
Russian Federation	24 564	43 978	559	38	-8	0
Burkina Faso	13 883	53 219	261	58	-5	10
Philippines	11 197	29 423	381	12	-34	50
Madagascar	10 355	22 686	456	46	8	0
Thailand	5 322	15 033	354	115	-8	
Singapore	4 745	11 436	415	20	5	0
Cameroon	2 871	5 473	525	17	6	0
Indonesia	2 349	4 895	480	6	115	9.2
Malaysia	769	1625	473	10	-3	40
Hong Kong, China	573	1082	530	18	4	0
Chinese Taipei	309	740	418	65	1	230.1
Turkey	293	500	586	92	-42	45
Croatia	199	372	535	114	-3	2
Serbia	163	299	545	128	-7	3
Niger	153	310	494	29	15	10
Fiji	152	504	302	90	12	15
Macao, China	129	294	439	94	9	0
Bosnia and Herzegovina	68	121	562	135	1	0
Montenegro	27	24	1 125	166	-5	3
South Africa	14	25	560	8	10	0
Australia	12	28	429	35	-4	0

Source: ITC calculations based United Nations Comtrade statistics and Myanmar Customs Department.

* See Box 2 for a discussion of data conflicts between United Nations Comtrade statistics and official Myanmar statistics. United Nations Comtrade statistics are the primary source for this table but, according to official Myanmar data, they grossly underrepresent the importance of China and Côte d'Ivoire in Myanmar's rice exports. China and Côte d'Ivoire have, therefore, been added here based on statistics from the Myanmar Customs Department for Myanmar's FY 2013 (1 April 2012 – 31 March 2013). These numbers include data for both milled and broken rice, are given here only as a general indication of the countries' relative importance, and are not included in the totals at the top of each column.

Four of Myanmar's eight major non-China markets were among the world's top 20 importers (Philippines, Singapore, Cameroon and Indonesia), and one was neighbour Thailand. The others were the Russian Federation, Burkina Faso and Madagascar. In 2012, the Russian Federation was Myanmar's largest non-Asian, non-European Union trading partner. However, Myanmar's only trade of any kind with Burkina Faso and Madagascar was exported rice.

The same was true of Niger and Fiji, which were among Myanmar's 13 minor markets. That almost a third (31.4%) of Myanmar's value of milled rice exports (excluding China) came from countries with which it had no other trade relationship in 2012 is remarkable. Such trade relationships tend not to be long-lasting, and replacing them with orders from new buyers entails new marketing costs.

Eight of Myanmar's top 13 trading partners are Asian net importers of rice, accounting for 20% of the global import

market by volume. These include existing major markets for Myanmar rice: China, Singapore and Indonesia. However, Japan, the Republic of Korea, Malaysia, Chinese Taipei and Hong Kong (China) could be further developed, both on a commercial and political level.

BROKEN RICE

Myanmar's broken rice exports are dangerously undiversified, with 80% going to two countries that import only rice from Myanmar and export nothing in return. These countries are Guinea and Burkina Faso, ranked 34 and 47, respectively, among national markets for broken rice. With 22% of Guinea's market and 32% of Burkina Faso's, Myanmar is a big fish in a little pond. This can be a good position to be in, but Myanmar traders should seek out more ponds, so that they are protected against downturns in these markets.

Table 12: Myanmar's 19 export markets for broken rice (HS 100640) in 2012

Importers	Exported value 2012 (US\$ thousands)	Exported quantity 2012	Unit value (US\$ / ton)	Ranking of partner countries in world imports	Total import growth in value of partner countries 2008-2012 (% , p.a.)	Tariff (estimated) faced by Myanmar (%)
Total	81 304	231 928	351	5	7	
China	330 000*	775 922*		6	103	65
Côte d'Ivoire	55 051*	164 478*				
Guinea	41 257	92 617	445	10	9	10
Burkina Faso	23 462	90 863	258	9	22	10
Belgium	7 563	21 632	350	7	-1	16.6
Indonesia	2 405	6 925	347	24	46	16.2
Republic of Korea	1 725	5 000	345	37		5
Singapore	1 167	3 252	359	66	5	0
Thailand	1 052	5 093	207	12	67	
United Kingdom	919	2 324	395	17	-5	16.6
Netherlands	459	1 306	351	1	5	16.6
Senegal	329	650	506	62	-3	10
Hong Kong, China	327	781	419	18	4	0
Germany	254	629	404	43	-1	16.6
Poland	198	500	396	44	19	16.6
Philippines	122	251	486	110	27	50
Albania	51	75	680	2	-46	2
Ghana	13	29	448	20	13	20
Switzerland	1	1	1 000	6	33	0.4

Source: ITC calculations based United Nations Comtrade statistics and Myanmar Customs Department.

* See Box 2 for a discussion of data conflicts between United Nations Comtrade statistics and official Myanmar statistics. United Nations Comtrade statistics are the primary source for this table but, according to official Myanmar data, they grossly underrepresent the importance of China and Côte d'Ivoire in Myanmar's rice exports. China and Côte d'Ivoire have, therefore, been added here based on statistics from the Myanmar Customs Department for Myanmar's FY 2013 (1 April 2012 – 31 March 2013). These numbers include data for both milled and broken rice, are given here only as a general indication of the countries' relative importance, and are not included in the totals at the top of each column.

Table 13: Myanmar's price advantage among its major competitors

Average unit price (HS 100630) in US\$ per ton		Average unit price (HS 100640) in US\$ per ton	
Myanmar	407	India	327
Viet Nam	494	Myanmar	351
Pakistan	575	World	432
India	612	Pakistan	433
World	628	Viet Nam	446
Thailand	702	Thailand	593

Source: ITC calculations based on United Nations Comtrade statistics.

There is a second tier of markets for Myanmar's broken rice, which does include a more orthodox mix of good candidates for market development. These include three Asian net importers of rice (Indonesia, the Republic of Korea and Singapore), a neighbouring country (Thailand), Myanmar's largest non-Asian trading partner (United Kingdom), and a major European trading hub (Belgium). These should be considered for further development, including through public trade promotion and negotiation of trade agreements on rice.

COMPETITION IN TARGET MARKETS

This report's section on options for development proposes four groups of target markets for Myanmar to target in sequence – as the rice sector's capacities improve – over the coming five years. Although there is some variation in supplying countries and their relative market shares from target group to target group, the four major suppliers remain the same and typically control more than 90% of a market. These exporters are Thailand, Viet Nam, India and Pakistan.

Myanmar's primary advantage relative to these exporters is in its average unit price, which is lower than all others for milled rice and lower than all but India for broken rice. It is difficult to predict whether this advantage will hold. Higher quality and the investments and operating costs involved in improved farming techniques and technology will demand higher prices, but improved yields and efficient handling and processing will keep downward pressure on Myanmar's prices. The Myanmar Government can help to ensure that the net effect preserves

Myanmar's price competitiveness, even as its quality rises, by investing in cost-reducing infrastructure, such as that for transportation, and public services such as trade promotion.

The one group of target markets which has a significantly different make-up of suppliers is Western Europe, where other Western European countries frequently import rice for processing and re-export. Processing includes enrichment, pre-cooking and convenience packaging.

THE INSTITUTIONAL PERSPECTIVE

The Myanmar rice sector and its exports are supported by a network of institutions providing policy support, trade services and business services, as well as civil society institutions which are not directly involved in trade but are often opinion leaders representing interests that have a bearing on the country's export potential and socio-economic development. Many of these institutions will have important roles to play in the successful implementation of the rice sector strategy. As such, it is necessary to understand the capacity of these TSIs to implement its recommendations in coordination with other each other.

Tables 14 to 17 list the TSIs with the largest roles to play and provide an assessment of their ability to coordinate with other TSIs, the human capital and financial resources at their disposal, and their record as advocates of the sector. A score of low, medium or high is given in each of these categories, based on consultations with a wide range of private and public stakeholders.

POLICY SUPPORT NETWORK

These institutions represent ministries and competent authorities responsible for influencing or implementing policies at the national level.

Table 14: Policy support network for the Myanmar rice sector

Name	Function / role	Coordination*	Human capital**	Financial resources***	Advocacy****
MoAI	<ul style="list-style-type: none"> • Seed distribution • Training • Finance • Research • Extension • Irrigation development • Land development • Farm machinery development • Plant protection • Warehousing • Land records • Small loans • Seed development • Seed certification 	L	L	L	L
Ministry of Finance and Revenue (MoFR)	Leads the development and implementation of the policies that constitute the trade finance framework	L	L	L	L
Ministry of Transport (MoT)	Planning, investment and regulation for port and airport facilities	L	L	L	L
Ministry of Rail Transport (MoRT)	Planning, investment and regulation for roads	L	L	L	L
Ministry of Electrical Power (MoEP)	Planning, investment and regulation for rural electrification	L	L	L	L
Ministry of Energy	Fertilizer production	L	L	L	L
Myanmar Investment Commission (MIC)	Licensing of enterprises with foreign investment	M	M	M	M
Directorate of Investment and Company Administration (DICA)	Company registration and investment promotion	M	M	M	M

* Coordination with other TSIs: measures the strength of this institution's linkages with other institutions as well as the beneficiaries of their services (in particular, the private sector) in terms of collaboration and information sharing.

** Human capital assessment: assesses the general level of capability of this institution's staff in terms of their training and responsiveness to sector stakeholders.

*** Financial resources assessment: assesses the financial resources / capacity available to the institution to provide service delivery in an efficient manner.

**** Advocacy: assesses the efficacy of this institution's advocacy mechanisms, and how well / frequently this institution disseminates important information to the sector.

TRADE SERVICES NETWORK

These institutions or agencies provide a range of trade-related services to both Government and enterprises. They support and promote sectors, as well as deliver trade and export solutions.

Table 15: Trade service network for the Myanmar rice sector

Name	Function / role	Coordination	Human capital	Financial sustainability	Advocacy
Department of Trade Promotion, MoC	Market information, trade promotion, business-to-business meetings, trade fairs, export training, commodity price	M	L	L	M
Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI)	Issues certificates of origin and arranges business to business meetings and participation in trade fairs	M	L	L	L
Myanmar Agricultural Development Bank (MADB)	Provides short-term loans to farmers	M	M	M	M
Myanmar Customs Brokers Association	Advocacy, coordination and training for providers of Customs clearance and freight forwarding services	L	L	L	M
Myanmar Organic Agriculture Group (MOAG)	Information, training and certification for organic agriculture	L	L	L	L

BUSINESS SERVICES NETWORK

These are associations, or major representatives, of commercial service providers used by exporters to effect international trade transactions.

Table 16: Business services network for the Myanmar rice sector

Name	Function / role	Coordination	Human capital	Financial sustainability	Advocacy
MRF	Business matchmaking, training and seminars	M	L	L	M
Myanmar Rice Millers Association	Disseminates technology and knowledge, vocational training and study tours abroad	M	L	L	M
Myanmar Rice and Paddy Traders Association	Advocacy, coordination and training for rice traders	M	L	L	M
Myanmar Paddy Producers Association	Advocacy, coordination and training for rice farmers	M	L	L	M
Myanmar Fertilizer, Seed, and Pesticide Entrepreneurs Association	Assesses and standardizes quality	M	L	L	L
MAPCO	Mobilizes public savings and fosters broader investment in agriculture and agribusiness	M	L	L	M
Myanmar Inspection and Testing Service	Inspection, testing and certification	L	L	L	L
Truck associations (Container, Highway, and Mandalay)	Transportation to ports, airports and border crossings	L	L	L	L

Table 17: Civil society network for the Myanmar rice sector

Name	Function / role	Coordination	Human capital	Financial sustainability	Advocacy
Yezin Agricultural University	Important potential source of skilled labour, agricultural research and best practices	M	M	M	M
State agricultural institutes	Important potential source of skilled labour, agricultural research and best practices	L	L	L	L
eTrade Myanmar	Trade information	M	M	L	M

Table 18: Relative influence and support capacity of rice sector TSIs

		Capacity of institution to respond to sector's needs	
		Low	Medium
Level of influence on the sector	High	DICA MADB MoAI MoC Ministry of Energy MoEP MoFR MoRT MoT UMFCCI Yezin Agricultural University	MAPCO MIC MRF
	Low	Myanmar Customs Brokers Association Myanmar Fertilizer, Seed, and Pesticide Entrepreneurs Association Myanmar Rice Millers Association Myanmar Inspection and Testing Service MOAG Myanmar Paddy Producers Association State agricultural institutes Myanmar Rice and Paddy Traders Association Truck associations	eTrade Myanmar

CIVIL SOCIETY NETWORK

ANALYSIS OF THE TRADE SUPPORT NETWORK

These institutions are not explicitly engaged in the sector's trade-related activities. However, they are opinion-leaders representing specific interests that have a bearing on the sector's export potential and socioeconomic development.

These institutions are not explicitly engaged in the sector's trade-related activities. However, they are opinion leaders representing specific interests that have a bearing on the sector's export potential and socioeconomic development.

The weak capacity and coordination of the sector's TSIs suggests that the rice sector is not receiving all the services and support it might expect, and that the services which are being delivered are of low effectiveness. The generally low level of advocacy indicates a disconnect between private enterprises and the institutions established to help them through policymaking, sector development, public-private dialogue, provision of technical and vocational education and training, standard-setting, and the collection and dissemination of statistics. This has an aggregate adverse impact on the export competitiveness of the sector.

OVERALL PERCEPTION OF MYANMAR TSIS IN THE RICE SECTOR – INFLUENCE VERSUS CAPACITY

Table 18 represents the perception of sector stakeholders regarding each institution's level of influence and the capacity to respond of each institution.

As indicated in Table 18:

- With the modest exception of the MRF, all TSIs were judged to have low capacity to respond to the rice sector's needs. This is especially remarkable for the fact that no public institution is regarded as having high capacity to respond to the sector's needs;
- Among the private sector associations, only UMFCCI is regarded as having influence in the sector;
- Among technical and vocational education and training institutions, only Yezin Agricultural University is deemed to have high influence over the sector.

The most highly assessed institution overall is Yezin Agricultural University, which is the most important source of skilled labour for the sector. This relative strength should be capitalized on, as the availability of greater skills will be a crucial requirement for the development of each link in the sector's value chain.

DEVELOPMENT INITIATIVES

As Myanmar's most important staple crop and in light of its high export potential, rice is deservedly a major concern of the Government. However, as an LDC, Myanmar's capacity to formulate and implement sector-wide development initiatives is low. International donors, which might help to fill this gap with technical assistance and aid, have only recently begun to reengage with Myanmar after a long period of international sanctions. Reengagement has been fast and intense, as illustrated by a US\$2 billion World Bank aid package after 27 years of no new loans.³⁶ However, most initiatives have yet to be fully formulated, let alone reach the implementation phase.

In September 2013, Myanmar signed a memorandum of understanding with the International Rice Research Institute to develop a Myanmar Rice Sector Development Strategy and Programme, which is expected to emphasize the building of rice science capacity as a means of expanding production and rural income.³⁷ The FAO of the United Nations has funded a project to upgrade rice

36. Radio Free Asia (2014). World Bank pledges \$2 billion in aid to Myanmar, 27 January. Available from www.rfa.org/english/news/myanmar/world-bank-01272014180632.html.

37. International Rice Research Institute (2013). Myanmar taps science to target rice exports, 9 September. Available from <http://irri.org/news/media-releases/myanmar-taps-science-to-target-rice-exports>.

warehouses and institute warehouse receipt financing systems in three townships.³⁸

Most development initiatives are likely to target agriculture and infrastructure more generally, but the fact that rice represents roughly half of Myanmar's sown acreage and the livelihood of 70% of the population means that the rice sector should benefit from most large development initiatives. For example, US\$1 billion of the World Bank aid is expected to go towards electrification, which is important to improving the availability and quality of drying, storage and milling.³⁹

Since 2010, the Livelihoods and Food Security Trust Fund has directed approximately US\$130 million in aid from 10 countries to eradicate extreme poverty and hunger in Myanmar. Its primary output is 'Increased agricultural production and incomes supported through improved production and postharvest technologies [and] improved access to inputs and markets'.⁴⁰ Another project currently in implementation is the International Fund for Agriculture Development's US\$300,000 project to build capacity for rural development, agriculture and livestock.

The NES, through its implementation by the MTDC, should be well integrated with other sector development initiatives and offer a strategic focal point for new export-related initiatives.

EXPORT COMPETITIVENESS ISSUES

This section presents a summary analysis of the major constraints to export development faced by Myanmar rice producers, as well as issues that would likely inhibit the positive socioeconomic spillovers desired from the sector's growth. The analytical framework for the analysis is a 'four gears' framework consisting of the following elements.

- **Supply-side issues** are those that affect the ability of firms to produce goods of the types, volumes, quality, speed, reliability and profitability sought in target markets. Supply-side issues typically concern skills, technology, innovation, efficiency and value added.

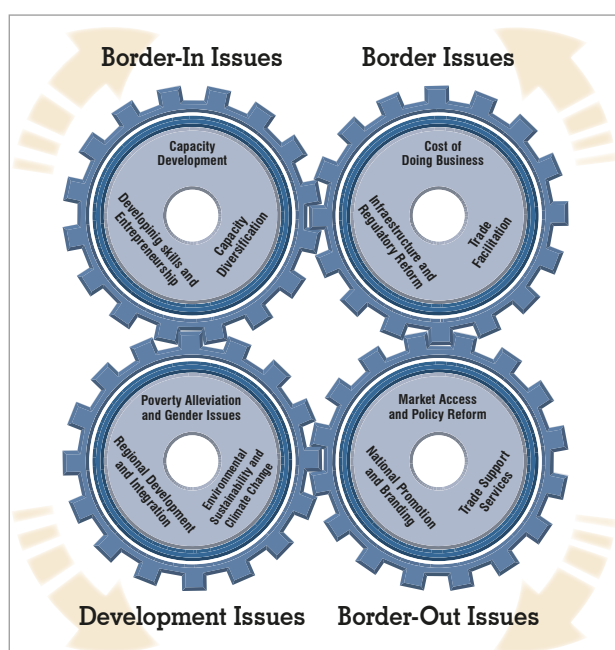
38. Myanmar Freedom Daily (2014). Rice warehouses to be upgraded, inspected, 22 January. Available from www.mmfreedom-daily.com/?p=17454.

39. Radio Free Asia (2014). World Bank pledges \$2 billion in aid to Myanmar, 27 January. Available from www.rfa.org/english/news/myanmar/world-bank-01272014180632.html.

40. Livelihoods and Food Security Trust Fund (2013). *Livelihoods and Food Security Trust Fund*. Available from www.lift-fund.org/Publications/LIFT_Flyer_web.pdf.



- **The quality of the business environment** has to do with environmental factors affecting the costs and risks of doing business, such as regulation, administrative procedures, infrastructure, and support services.
- **Market entry issues** are essentially external to the country (but may also be manifested internally), such as market access, market development, market diversification and export promotion.
- **Social and economic concerns** include poverty reduction, gender equity, youth development, environmental sustainability and regional integration.



THE BORDER-IN GEAR (SUPPLY-SIDE)

Box 3: Overview of supply-side issues in Myanmar's rice sector

- High-quality seeds are poorly understood and not widely available, leading to low yields and unpredictable quality
- Many millers use outdated machinery and practices that contribute to the low quality of rice
- Weak water management significantly reduces yields
- Inadequate finance contributes to lower productivity, output and prices, and hampers the sector's ability to grow
- Small farm size severely limits economies of scale in production
- Low domestic supply of fertilizers and weak understanding of how to use them discourage farmers from their application, thereby inhibiting production volumes
- Inadequate supply of farm labourers and service providers constrains crop intensity and raises postharvest losses
- Low interest in meeting, and lack of ability to meet, high quality standards limit the sector's ability to secure higher prices and penetrate new market segments
- Inadequate control of postharvest losses significantly reduces the sector's productivity and output

HIGH-QUALITY SEEDS ARE POORLY UNDERSTOOD AND NOT WIDELY AVAILABLE, LEADING TO LOW YIELDS AND UNPREDICTABLE QUALITY

Despite their long-term advantages for profitability, high-quality seeds are used on a mere 2% of cultivated rice acreage.⁴¹ Rice farming is a low-margin enterprise subject to a range of risks, including weather, disease and price drops, which may make farmers hesitant to take on any additional risk. The small landholders that make up the large majority of Myanmar farmers – 65% farm fewer than 10 acres – are generally reluctant to abandon traditional seed varieties for varieties which they would have to buy and do not understand. Farmers tend to use their own seeds or locally sold seeds, the varieties of which are often poorly understood and, consequently, mixed. This leads to unpredictable, but generally low, quality levels.

Relieving these constraints will require activities that build MoAI capacity to act as a developer and distributor of high-quality seeds; that stimulate the creation of private and public-private seed companies; and that help farmers to overcome the challenges and doubts associated with switching seed varieties.

MANY MILLERS USE OUTDATED MACHINERY AND PRACTICES THAT CONTRIBUTE TO THE LOW QUALITY OF RICE

Village-level and other small-scale millers use outdated machinery and lack training in best practices for milling, handling, storage and transportation. This leads to undermilling, excessive breakage and spillage, contamination, and general degradation of quality. Many village millers produce table rice for the population of that village and possibly a few others. As farm output increases, these millers may be able to take part in that growth and expand sales to local traders if they upgrade their practices and capacity. If they do not, they may be bypassed. Relieving these constraints will require activities that raise the skills of the country's many small-scale millers and that facilitate the duty-free import and/or local sale of modern machinery.

WEAK WATER MANAGEMENT SIGNIFICANTLY REDUCES YIELDS

Many farmers depend on the monsoon season for the water to grow their crops and are unable to raise crops the rest of the year for lack of irrigation. Irrigation could allow for double and triple cropping in some areas, as well as higher yields per crop. Competition with fisheries for water, a lack of capital investment and low technical

capacity prevent this irrigation from being put in place. At the same time, heavy rains can cause crop damage without necessary flood prevention measures, such as levees and embankments, and drainage systems. Flood prevention and drainage infrastructure face the same challenges in terms of investment and technical capacity, as well as the absence of electricity to power pumps, and the laying of roads and railways with inadequate regard for the disruptions they can cause to standing drainage systems.

Even MoAI seed farms, which are meant to act as multipliers for the nation's rice quality, lack adequate drainage and irrigation. Relieving these constraints will require activities that build farmer skill in water management and that lead to public and private investment in irrigation, flood prevention and drainage.

INADEQUATE FINANCE CONTRIBUTES TO LOWER PRODUCTIVITY, OUTPUT AND PRICES, AND HAMPERS THE SECTOR'S ABILITY TO GROW

Better access to finance is needed to modernize Myanmar's rice farming and to enable the risk mitigation needed by farmers and traders to compete internationally. Loans to farmers are typically short-term loans with repayment periods of 6–9 months, and cannot exceed 30% of collateral value. This means that harvests must be sold promptly, when prices are lowest, so that farmers can meet repayment terms. It also means that loan repayment is due long before investments in mechanization and irrigation can provide the returns necessary to make them worthwhile.

The lack of unsecured financing (i.e. financing with no collateral), the inability to use harvests and other movable assets as collateral, and the 30% limit on the value of an asset which can be used as collateral all inhibit the sector's access to finance and ability to grow. These characteristics are reflective of an underdeveloped financial sector which lacks the legal and regulatory framework to enable provision of basic risk management products which are available to many competing farmers and traders abroad. These include warehouse financing, crop insurance, trade financing and equipment leasing.

SMALL FARM SIZE SEVERELY LIMITS ECONOMIES OF SCALE IN PRODUCTION

Roughly one-third of Myanmar's acreage sown with rice is part of a farm that is under five acres in size. Another third is between 5 and 10 acres. This does not allow for efficient development of the farm infrastructure needed to maximize yields. Five-acre farms cannot provide the returns on investment needed to justify independent irrigation systems, heavy farm machinery, access roads

41. NES sector team.

and climate-controlled storage. They are also unable to independently protect against environmental dangers to crops, such as flooding and infestation.

LOW DOMESTIC SUPPLY OF FERTILIZERS AND WEAK UNDERSTANDING OF HOW TO USE THEM DISCOURAGE FARMERS FROM THEIR APPLICATION, THEREBY INHIBITING PRODUCTION VOLUMES

Fertilizer is currently manufactured only at low volumes in Myanmar. Two of the country's five urea factories have been shuttered for years, as a result of low natural gas availability,⁴² and the remaining three factories produce only 35,000 tons in a market that has consumed as much as 170,000 tons (in FY 2007).⁴³ Fertilizer is imported, mostly from Thailand, but not widely available. Furthermore, the written instructions for use on the fertilizer bags is in Thai. Most first-time users do not have access to other sources of instruction (e.g. Internet, agricultural extension) and run the risk of wasting their investment through improper application.

INADEQUATE SUPPLY OF FARM LABOURERS AND SERVICE PROVIDERS CONSTRAINS CROP INTENSITY AND RAISES POSTHARVEST LOSSES

Non-mechanized farmers have much higher labour demands during the rice harvest than the rest of the year. The high variation in labour demand cannot sustain enough jobs to meet demand during non-harvest times. As well, occupational hazards such as snake bites, pesticide poisoning, sunburn and rain are disincentives. This means harvesting, threshing and transporting rice takes longer than it should, leaving rice on the stalk or in the field for a quality-degrading length of time.

Similarly, there is not sufficiently consistent demand for farm service providers (e.g. machine rental, drying and storage facilities) to sustain the number of providers needed at harvest time. This shortage is a constraint on the doubling or tripling of crop intensity which is needed to realize the long-term growth objectives of sector stakeholders. Relieving these constraints will require activities that train farmers in the use of farm machinery and promote establishment of more machinery service stations.

LOW INTEREST IN MEETING, AND LACK OF ABILITY TO MEET, HIGH QUALITY STANDARDS LIMIT THE SECTOR'S ABILITY TO SECURE HIGHER PRICES AND PENETRATE NEW MARKET SEGMENTS.

Nearly all rice produced in Myanmar in recent memory has been consumed domestically, where the range of rice characteristics demanded by consumers is narrow relative to the range demanded by major international markets. Satisfying the broader range of international consumers requires an understanding of rice size, whiteness, shape, chalkiness, amylose content, gel consistency, gel temperature and fragrance, as well as the ability to measure these characteristics, adjust for them through the selection of seed varieties, and maintain them through proper cultivation, harvesting, postharvest handling, milling and storage.

Interest in meeting, and ability to meet, these quality standards are low in Myanmar, where most farms are small and most farmers carry out farming as a family tradition more than a profit-maximizing enterprise. Relieving these constraints will require activities that train and support farmers, millers and traders in understanding international market requirements, achieving good agricultural practices and affording better equipment and machinery.

INADEQUATE CONTROL OF POSTHARVEST LOSSES SIGNIFICANTLY REDUCES THE SECTOR'S PRODUCTIVITY AND OUTPUT

A shortage of labour means that crops cannot all be harvested at their peaks, leading to some quality degradation even before harvesting. Once they are harvested, a lack of adequate labour, transportation, drying facilities and storage means that crops are often left in the field too long – vulnerable to moisture and infestation – especially as farmers attempt to gain efficiency by preparing the field for a second crop while harvesting the first.

Besides poor agricultural practices, postharvest losses are also a result of underinvestment in mechanized harvesters, threshers, dryers, transportation vehicles and climate-controlled warehouses, or the ability to hire those machines and their operators. Relieving these constraints will require activities that spread implementation of good agricultural practices and make farm mechanization more widely affordable.

42. Myanmar, Ministry of Energy (2014). Myanmar Petrochemical Enterprise (MPE). Available from www.energy.gov.mm/index.php/en/about-moe/menu-mpe.

43. Lwin, H. Y., Myint, T., Than, S., Aung, N.M., San, C.C., Kyaw, D. & Htut, T. (2013). Role of fertilizer policy in transforming agriculture of Myanmar. PowerPoint presentation. Yezin Agricultural University.

THE BORDER GEAR (QUALITY OF THE BUSINESS ENVIRONMENT)

Box 4: Overview of business environment issues in Myanmar's rice sector

- The Government and its various ministries do not have a unified strategy, coordinated activities, reliable sector data, or the human resources needed to fully support the sector's competitiveness and growth
- The quality and quantity of MoAI-produced breeder and foundation seed is not commensurate with its position as sector leader, especially in light of the dearth of commercial seed companies
- Official statistics for the sector are conflicting and unreliable, making it difficult for public and private stakeholders to confidently make investment decisions and target markets
- The small number and size of warehouses, and their lack of modern features, contribute to low rice quality, volumes and prices
- Inefficient transportation of rice from farms to mills or warehouses contributes to postharvest losses
- Inadequate port facilities and road networks significantly raise costs and time to market
- Unreliable or absent electricity supply forces mills and some farm machinery to be run on costly generators
- The service providers needed to support the broad adoption of mechanized farming are largely unavailable to most farmers

THE GOVERNMENT AND ITS VARIOUS MINISTRIES DO NOT HAVE A UNIFIED STRATEGY, COORDINATED ACTIVITIES, RELIABLE SECTOR DATA, OR THE HUMAN RESOURCES NEEDED TO FULLY SUPPORT THE SECTOR'S COMPETITIVENESS AND GROWTH

The sector's short-term growth is being driven by the lifting of sanctions and a substantial production surplus. Once the short-term gains of those factors have been realized, the sector's many small-scale farmers, millers and traders will need considerable assistance to achieve international quality standards and penetrate international markets. A wide range of Government ministries provide services to actors along the rice sector's value chain or have the ability to influence the business environment in which they operate, but they lack a single unifying strategy by which to coordinate activities or allocate resources. This leads to nonstrategic application of resources, gaps in service provision, weak coordination with the private sector, and – perhaps most problematically – a lack of certainty in the business environment, which inhibits

private investments. Relieving these constraints will require activities that strengthen the Government's ability to provide nationwide leadership, extension services, quality assurance infrastructure, foreign market intelligence, a sound business environment and effective investment promotion.

THE QUALITY AND QUANTITY OF MOAI-PRODUCED BREEDER AND FOUNDATION SEED IS NOT COMMENSURATE WITH ITS POSITION AS SECTOR LEADER, ESPECIALLY IN LIGHT OF THE DEARTH OF COMMERCIAL SEED COMPANIES

There are few commercial seed companies in Myanmar, and restrictions on foreign investment impede market entry by foreign seed companies with the marketing capacity to stimulate consumer demand for high-quality seeds. MoAI supplies breeder and foundation seeds to the sector, but its seed are used in less than 2% of the country's rice cultivation, and a minority of that is high-quality seed. MoAI capacity to produce high-quality seeds is diminished by its blending of seed varieties and of nursery land with normal farmland.

Relieving these constraints will require activities that help MoAI make a strategic shift in the varieties of breeder and foundation seeds it produces, increase investment in its seed farm infrastructure, engage village-level farmers as extensions of the MoAI distribution network, and engage the private sector in best-practice public-private partnerships for greatly increased production of quality seed.

OFFICIAL STATISTICS FOR THE SECTOR ARE CONFLICTING AND UNRELIABLE, MAKING IT DIFFICULT FOR PUBLIC AND PRIVATE STAKEHOLDERS TO CONFIDENTLY MAKE INVESTMENT DECISIONS AND TARGET MARKETS

Myanmar's official statistics have very low credibility among sector stakeholders, which is attributed to inadequate staff, weak collection infrastructure and tolerance of data manipulation. Without reliable data on production and trade, and bottlenecks in each, stakeholders cannot be confident that their infrastructure investments or target markets are wisely selected. As the sector grows in strength, donors will be less inclined to fund technical assistance projects without clear baseline and impact measurements for monitoring and evaluation. Relieving these constraints will require activities that build the capacity of public institutions to produce reliable sector statistics.

THE SMALL NUMBER AND SIZE OF STORAGE FACILITIES, AND THEIR LACK OF MODERN FEATURES, CONTRIBUTE TO LOW RICE QUALITY, VOLUMES AND PRICES

A lack of adequate storage forces most farmers to sell their rice immediately after harvest, creating a glut and correspondingly low prices. Where storage is available it tends not to be controlled for moisture, temperature and pests, risking product losses and degradation of quality, and making extended storage a risk to rice prices and overall revenue. For millers and traders, climate-controlled warehouses near ports and major trading centres are too few, providing little flexibility in the timing of transactions and posing greater business risk if a sale falls through.

INEFFICIENT TRANSPORTATION OF RICE FROM FARMS TO MILLS OR WAREHOUSES CONTRIBUTES TO POSTHARVEST LOSSES

At all stages of transport, rice should be kept dry, cool and well-ventilated. The bullock carts, boats and trucks which typically carry rice to mills, warehouses and ports rarely guarantee ideal conditions, leading to some loss of product. Spillage too is increased by storage in baskets and a lack of standard operating procedures for handling. Significantly increasing the volume of exports without worsening the loss rate will depend on vehicles and ports, storage and handling systems that are modern and have a higher capacity.

INADEQUATE PORT FACILITIES AND ROAD NETWORKS SIGNIFICANTLY RAISE COSTS AND TIME TO MARKET

Myanmar's domestic transportation infrastructure consists primarily of inland waterways and roads. It is weak and designed for the movement of the country's staple crop from rice surplus regions, mostly in the south, to rice shortage regions in the north. Moving rice destined for international markets will see increased traffic over lesser routes, from rice surplus regions to the border with China, to the main international ports in Yangon and Thilawa, and possibly to a new port being considered for Dawei in the extreme south-east. Furthermore, there is no overland container transportation in Myanmar;⁴⁴ the country's primary port in Yangon is not a deep-sea port; inland waterways lack proper terminals with loading cranes; and rivers need to be dredged before they can accommodate the large volumes of rice exports envisioned.

44. Myint, A. K. (2013). Current situation of transport, logistics and supply chain in Myanmar, 25 September. Available from http://apbf.unescap.org/content/MBDW_files/files/MBDW-Day3-S8-UMFCCI_CAPTAIN_AUNG_KHIN_MYINT.pdf.

UNRELIABLE OR ABSENT ELECTRICITY SUPPLY FORCES MILLS AND SOME FARM MACHINERY TO BE RUN ON COSTLY GENERATORS

The rate of electrification in Myanmar is a very low 13% overall and almost nothing in rural areas,⁴⁵ where the large majority of warehouses and rice millers operate. Diesel generators are the primary source of power for millers, who complain of high diesel fuel prices. The burning of rice husks is a useful alternative employed by many millers but it comes with its own costs.

In the process of milling rice, husks are removed and can be burned as a source of relatively cheap fuel. However, to burn properly, husks must be compressed into bricks. Their high silica content makes them abrasive, wearing down equipment and requiring replacement more quickly. Rice husks have a high ash content of 17% to 26%, which is considerably higher than wood (0.2% to 2%) or coal (12.2%), leaving large amounts of ash to be handled and transported.⁴⁶

These issues demand technical capacities and come with costs that electricity does not. Warehouses and individual farmers typically opt to get by without electricity, meaning that rice is not well dried and not stored in climate-controlled environments, leading to costly losses and quality degradation.

THE SERVICE PROVIDERS NEEDED TO SUPPORT THE BROAD ADOPTION OF MECHANIZED FARMING ARE LARGELY UNAVAILABLE TO MOST FARMERS

The extent of farm mechanization has been too low to sustain the industries that support a mechanized agricultural sector, such as machinery sales; land preparation; equipment installation, maintenance and repair; and consulting and training on agricultural practices. Most machinery must be imported, and international vendors are accustomed to receiving advance payment or substantial deposits for expensive machinery. However, financial regulations in Myanmar do not permit international payment before receipt of goods, making it difficult not only for individual farmers to purchase machinery but for the country as a whole to establish itself as a location with which foreign vendors are comfortable doing business.

45. European Union Energy Initiative Partnership Dialogue Facility (2013). *Myanmar Rural Electrification Workshop – International Best Practices and Options for Policy Makers: Workshop Report*. Available from www.euei-pdf.org/sites/default/files/files/field_pblctn_file/EUEI%20PDF_Myanmar_Workshop%20Rural%20Electrification_Jun2013_EN.pdf.

46. International Rice Research Institute (2009). *Milling*. Available from www.knowledgebank.irri.org/rkb/rice-milling/byproducts-and-their-utilization/rice-husk.html.

THE BORDER-OUT GEAR (MARKET ENTRY)

Box 5: Overview of market entry issues in Myanmar's rice sector

- Rice exporters do not have regular access to reliable intelligence on buyer characteristics, prices, market entry requirements, distribution channels and competitors in new, high-potential markets
- Public trade promotion is not sufficiently resourced and proactive to formulate actionable intelligence on the most promising rice markets and get it into the hands of the producers and traders best able to act on it
- Public standards, testing and certification of rice quality are insufficient to support the transition to quality production to which sector stakeholders aspire

RICE EXPORTERS DO NOT HAVE REGULAR ACCESS TO RELIABLE INTELLIGENCE ON BUYER CHARACTERISTICS, PRICES, MARKET ENTRY REQUIREMENTS, DISTRIBUTION CHANNELS AND COMPETITORS IN NEW, HIGH-POTENTIAL MARKETS

Only three trading companies handled 39% of Myanmar's rice exports in FY 2012, each exporting more than 100,000 tons. Another 10 companies handled between 5,000 and 50,000 tons. The majority of exporters handled less than 1,000 tons. The low number of shipments each of these exporters deal with is insufficient to make comprehensive market analysis a worthwhile investment. Target markets are selected based on information in sector news, word of mouth from other traders and past business dealings. Having few customers means that market feedback on consumer preferences and sector trends is very limited, even in the countries where traders already do business. Without a free source of good market intelligence, unexplored markets are likely to remain unexplored for these traders. Relieving these constraints will require activities that put actionable market intelligence in the hands of smaller traders, as well as guidance on tailoring products and market entry.

PUBLIC TRADE PROMOTION IS NOT SUFFICIENTLY RESOURCED AND PROACTIVE TO FORMULATE ACTIONABLE INTELLIGENCE ON THE MOST PROMISING RICE MARKETS AND GET IT INTO THE HANDS OF THE PRODUCERS AND TRADERS BEST ABLE TO ACT ON IT

Although the Government's trade promotion officials do provide basic market information by country, they are not proactive and systematic enough in their matchmaking. On the buyer side, they do not have the resources to regularly identify and update large numbers of buyers in target markets, map their demand and contact information, put promotional materials in their hands, and offer to bring them together with rice exporters. On the exporter side, trade promotion officials do not map their capacities – rice varieties, qualities, quantities, etc. – and proactively connect them with suitable buyers. Relieving these constraints will require activities that strengthen the capacity of TSIs to proactively gather, synthesize and strategically disseminate intelligence on target foreign markets.

PUBLIC STANDARDS, TESTING AND CERTIFICATION OF RICE QUALITY ARE INSUFFICIENT TO SUPPORT A TRANSITION TO THE QUALITY PRODUCTION THAT SECTOR STAKEHOLDERS ASPIRE TO

In many respects rice quality is subjective, depending on consumer preferences for taste, size, appearance, consistency and health characteristics. There is very low awareness of these characteristics among farmers in general and, therefore, little incentive or capacity to control for them in production. MoC, MoAI and MRF are not collaborating as they could to establish quality guidelines for achieving international competitiveness based on their knowledge of foreign rice market demand (MoC), influence over public investments (MoAI), and knowledge of the production capacities of farmers and millers (MRF). Testing and certification capacity being built under the Myanmar Scientific and Technological Research Department would need to be advertised to farmers, millers and traders, with awareness-raising campaigns on how to meet and benefit from standards.

DEVELOPMENT GEAR

Box 6: Overview of development issues in Myanmar's rice sector

- Increasing wealth gaps are a challenge likely to follow development of the rice sector
- The increased use of pesticides and fertilizers expected to accompany productivity gains may be harmful to the health of farm labourers, without proper safeguards
- Water and soil quality is threatened by the increased use of fertilizers and pesticides, higher crop intensity and use of machines which are anticipated to come with sector development

INCREASING WEALTH GAPS ARE A CHALLENGE LIKELY TO FOLLOW DEVELOPMENT OF THE RICE SECTOR

The modernization of the rice sector is likely to come with increasing wealth gaps in rural areas along three lines. First, as a national priority, rice-farming regions that receive support from the Government and international donors for cultivation and export should experience faster income growth than non-rice-farming rural regions. Second, large-scale farmers will see greater returns on productivity-raising investments, such as irrigation and transportation, and be better able to meet the volume demands of the larger mills and traders participating in international markets. Third, mechanized farmers should experience much higher output growth, on average, than non-mechanized farmers, better allowing them to participate in international markets and enjoy income growth.

Global experience has shown that the wealth gaps which typically attend rapid growth can lead to serious socio-economic stresses. Avoiding these stresses and the risks they might pose to Myanmar's fragile political system will require a meaningful Government plan to promote even development by targeting disadvantaged segments of the population.

THE INCREASED USE OF PESTICIDES AND FERTILIZERS EXPECTED TO ACCOMPANY PRODUCTIVITY GAINS MAY BE HARMFUL TO THE HEALTH OF FARM LABOURERS, WITHOUT PROPER SAFEGUARDS

The lack of modern agricultural techniques includes the low use of chemical pesticides and fertilizers. While some farmers may use this characteristic to market their rice as organic, there are still considerable challenges to producing quality rice, getting organic certification, and marketing their rice as such. As a whole, the Myanmar rice sector will see increased use of chemical pesticides and fertilizers as it grows. These can threaten the health of agricultural labourers and should be adopted in line with internationally accepted health safeguards, of which there will be little awareness in Myanmar during the first years of the sector's growth.

For example, chemical fertilizer – much of which is currently imported from Thailand – comes with health warnings and handling instructions on the packaging, but these are not translated into Burmese. Mitigating these risks will require activities that raise awareness and provide training for the protection of agricultural workers' health and safety, particularly as it relates to the use of chemicals and machinery and exposure to natural hazards.

WATER AND SOIL QUALITY IS THREATENED BY THE INCREASED USE OF FERTILIZERS AND PESTICIDES, HIGHER CROP INTENSITY AND USE OF MACHINES WHICH ARE ANTICIPATED TO COME WITH SECTOR DEVELOPMENT

In addition to posing human health risks, chemical fertilizers and pesticides can degrade soil and, especially, water quality if used improperly. The higher crop intensity envisioned for Myanmar rice can also exhaust soil fertility (and increase chemical concentrations in the soil) if not carried out in line with good agricultural practices. As well, farm mechanization can have the effect of reducing soil fertility through excessive compaction. Mitigating these risks will require training farmers to minimize the negative effects of fertilizers and machinery on water and land quality.

WHERE WE WANT TO GO

VISION

The sector's current export performance is far from its full potential. That potential is articulated by the following sector vision.

“ High-quality and environmentally sustainable growth in rice production and export for rural development and income generation. ”

To achieve this vision, the strategy will reduce the binding constraints on trade competitiveness and capitalize on strategic options identified for the Myanmar rice sector. The strategic orientations for the next five years aim at developing key markets in the short and medium terms for Myanmar exporters, and facilitating structural changes in the value chain to increase its efficiency and value generation.

MARKET IDENTIFICATION

PRODUCTS

Rice is increasing in popularity as an ingredient for a wide range of innovative products around the world, including pharmaceuticals, cosmetics, light manufacturing and construction. Less exotically, many forms of prepared, enriched and functionally packaged rice products are bringing greater value to the rice sector. However, even these require a quality management framework, industrial base and R&D capacity which do not exist in Myanmar. Few of these value added products could be feasibly produced in significant quantities for export in Myanmar over the next five years, the time-horizon of the present strategy.

Rather, the strategy's focus is on increasing rice marketability, volume and quality in the following ways:

1. Getting existing rice surpluses to market;
2. Producing greater volumes of rice;
3. Ensuring that less rice is broken;
4. Producing rice with greater control of marketable characteristics (whiteness, shape, chalkiness, amylose content, gel consistency, gel temperature and fragrance);
5. Growing a wider range of rice varieties tailored to the tastes of target markets; and
6. Producing vermicelli, sweet sticky paste, and powder made from rice.

MARKETS

The first five product groups listed above are progressively difficult to market, and each is suited to being marketed in a different set of countries. As Myanmar farmers and traders succeed in marketing one group and shift their product focus, they should change their market focus accordingly. The following Table plots existing and potential markets along two axes, one axis indicating



the relative quantity of existing exports from Myanmar to each market and the other axis indicating the potential for Myanmar's export growth to each market. Potential for export growth is based on a combination of factors, including market size, Myanmar's existing market share, the depth of Myanmar's overall trade relationship with that

country, the tariffs faced by Myanmar in that country and the distance to that country. The markets with potential for export growth for broken and milled rice are divided into four colour-coded categories in Table 19.

1. Blue shading indicates significant existing markets with good potential for additional growth which can be further developed in the short term.
2. Green indicates untapped markets for broken rice which Myanmar should be able to penetrate in the short term.
3. Orange indicates untapped markets for milled rice which Myanmar should target for development in the long term.
4. The two markets shaded in purple are non-priorities in the time frame of the present strategy. Brazil is a significant world market for milled rice of many varieties and quality levels, but its relative distance, size and

average unit value make it less promising in the coming five years. However, it may be worth reconsidering in the future. Bulgaria, on the other hand, is an existing market in which Myanmar holds a significant market share. However, Bulgaria is a small market offering little potential for growth.

The six markets marked in red are those which impose high tariffs on rice imported from Myanmar. This is significant, as tariffs are the market factor which the Myanmar Government may be able to affect through bilateral negotiation, as opposed to factors such as market size or Myanmar's proximity to the market.

Table 19: Short- and long-term priorities for Myanmar's milled and broken rice

		Existing rice import value from Myanmar		
		Low (under US\$ 1 million)	Medium (US\$ 1million – US\$5 million)	High (over US\$5 million)
Potential for rice import growth from Myanmar	High	United Kingdom (broken) France (broken)	Malaysia (milled) Indonesia (both) Singapore (milled)	China (milled and broken) Côte d'Ivoire (broken) Russian Federation (milled) Republic of Korea (milled)
		Saudi Arabia (milled) United Kingdom (milled) Iraq (milled) United Arab Emirates (milled) Japan (milled) France (milled) Germany (milled)		
	Medium	United States (broken) Germany (broken) Ghana (broken) Hong Kong, China (broken)	Senegal (broken) Belgium (broken) Netherlands (broken)	Burkina Faso (both) South Africa (milled)* Philippines (milled)
		Islamic Republic of Iran (milled) United States (milled) Yemen (milled) Hong Kong, China (milled) Canada (milled) Chinese Taipei (milled)		
		Bulgaria (milled) Brazil (milled)		
	Low			

Colour legend

	Short-term market development for both broken and milled rice		Long-term market penetration for milled rice
	Short-term market penetration for broken rice		Maintain business
			Non-priority

* Based on Myanmar Customs Department data for FY12.

The sixth product focus (vermicelli, sweet sticky paste and powder made from rice) consists of products commonly produced for the domestic market and which have been exported in small quantities to China. These business relationships should be further developed in the hope of providing Myanmar manufacturers with enough demand to stimulate larger-scale production and experience with international trade.

SHORT TERM (0–3 YEARS)

Target markets for **broken and milled** rice:

- Border traders and wholesalers in China (both broken and milled);
- Importers and wholesalers in Burkina Faso, France (broken), Ghana (broken), Germany (broken), Indonesia (both), Côte d'Ivoire (broken), Malaysia (milled), Philippines (milled), the Republic of Korea (milled), the Russian Federation (milled), Senegal (broken), South Africa (milled), the United Kingdom (broken) and the United States (broken);
- Re-exporters and wholesalers in Belgium (broken), Hong Kong (broken), the Netherlands (broken) and Singapore (milled).

The most immediate goal of Myanmar's rice strategy is the marketing of its substantial surplus, approximately 12 million tons in a typical year. While the sector's public and private stakeholders implement the improvements needed to upgrade quality, improve yields, build brands and make value added rice-derived products, rice traders and trade promotion officials can immediately expand exports by collecting market intelligence and building distribution channels in a wider range of high-potential markets.

Much of the existing surplus is broken rice of relatively low quality, which is precisely the reason that 80% of Myanmar's broken rice exports in 2012 (as recorded in the United Nations Comtrade database) went to Sub-Saharan Africa (SSA). However, several of these countries have no other trade with Myanmar (e.g. Guinea, Burkina Faso and Niger) and/or their rice markets are subject to unstable prices and policies. In Nigeria, for example, the price in 2011 and 2012 skyrocketed to more than eight times the global average price of US\$483 per ton, prompting import duties and the threat of additional market interventions by some politicians.

At the outset of the short-term phase of the present strategy, Myanmar rice exporters should focus on finding additional markets for the existing rice surplus in the European Union, which offers (a) higher unit values for broken rice than their current African markets (e.g. Germany: US\$600, France: US\$574, Netherlands: US\$498); and (b) experience with the distribution channels that they will eventually use to distribute high-quality milled rice to Europe's major markets.

As improvements to quality are made through quicker fixes, such as better postharvest handling, farmers and traders can begin focusing on exporting higher-value milled rice to the markets where they had previously sold mostly broken rice but which import both. These include the United Kingdom, France and Germany.

MEDIUM TO LONG TERM (3+ YEARS)

Target markets for **milled** rice:

- Importers and wholesalers in Canada, Chinese Taipei, France, Germany, the Islamic Republic of Iran, Iraq, Japan, Saudi Arabia, Yemen, and the United Arab Emirates, United Kingdom and United States; and
- Re-exporters and wholesalers in Hong Kong (China).

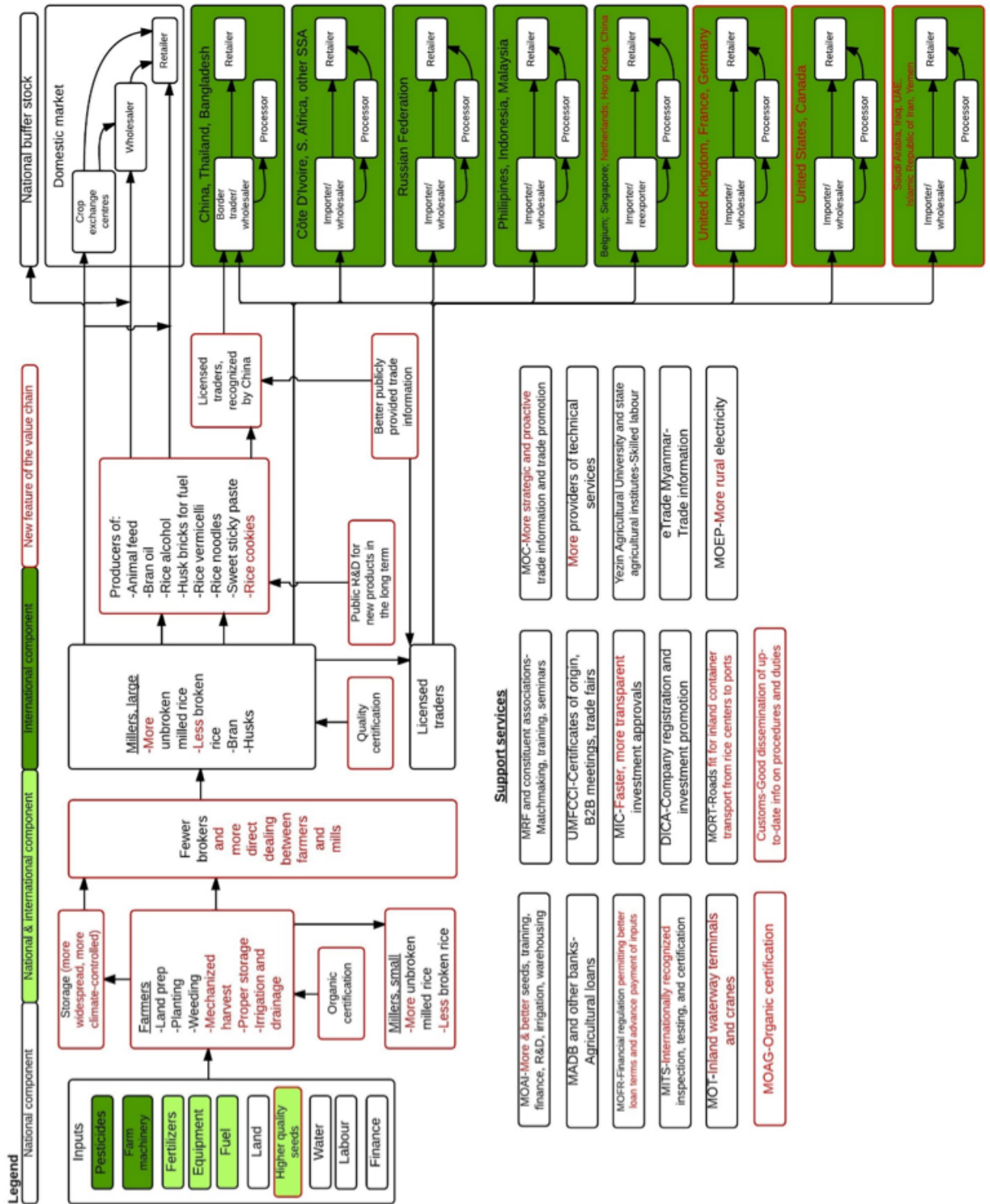
As farmers begin to consistently produce high-quality milled rice, and traders diversify their markets, traders and trade promotion officials should collaborate with the now technically more proficient farmers to alter rice output according to the characteristics most valued by consumers in target markets. These may concern size, whiteness, shape, chalkiness, amylose content, gel consistency, gel temperature and fragrance. At the same time, national quality standards and branding support will allow the rice sector to better reap the profits of its new capacity for quality and innovation by marketing on that basis. High-quality milled rice to Western Europe and the Middle East in particular will be targeted during this phase.

Success in the marketing of rice vermicelli, sweet sticky paste and powder in China during the short-term phase of this strategy should lead to the marketing of:

1. Rice vermicelli, sweet sticky paste and powder in Bangladesh, Thailand and Asia more broadly; and
2. Additional rice-derived food items in China, such as rice noodles, cookies and liquor.

In parallel to improvements in supply, the Myanmar Government could pursue bilateral trade agreements on rice with the governments of China, the Philippines, Malaysia, the Islamic Republic of Iran, the United States and Chinese Taipei. These are major existing or potential markets for Myanmar which impose high tariffs on its rice, ranging from 40% (Malaysia) to 230% (Chinese Taipei). While these tariffs have not prevented Myanmar from exporting significant quantities to several of these countries, quantities could be greatly increased by reducing this barrier to competitiveness. The formalization of the rice trade with China, in particular, could be transformative to the strength and stability of Myanmar's rice sector, due to China's large market and declining ability to satisfy domestic demand with domestic production.

Figure 12: Future Myanmar rice sector value chain



STRUCTURAL IMPROVEMENTS TO THE VALUE CHAIN

Realizing the plan for the sector's development over the next five years as depicted in Figure 12 entails the following enhancements to the value chain.

- Improved quality and yields from most farmers by using high-quality seeds, including a high percentage of hybrid seeds;
- Greater numbers of distributors for fertilizer and pesticides, as well extension services to train farmers in their use;
- Greater numbers of vendors and service providers for irrigation and drainage systems;
- Greater numbers of distributors and service centres for farm machinery;
- More climate-controlled warehouses;
- Access to higher-value markets thanks to the availability of organic certification;
- Modern milling practices and equipment capable of meeting international demand for better quality and high volumes;
- More small farmers and millers participating in international trade, thanks to better and more numerous inland ports and roads;
- Higher profit margins for farmers and small millers from having fewer intermediaries and better market information;
- Internationally recognized quality certification and the ability to consistently meet quality standards demanded by big buyers in higher-value markets;
- Consistent exports of substantial amounts of unbroken milled rice to each country in a growing set of destination countries;
- A significant and sustained presence in the major markets of Western Europe, the Middle East and North America;
- Increased exports from bilateral legalization of rice exports over the border with China;
- Increased exports of animal feed from rice by-products, rice vermicelli and sweet sticky paste (higher quantities to China and new markets);
- Exports of rice noodles, bran oil, rice alcohol, husk bricks for fuel and rice cookies; and
- Public R&D that will enable Myanmar's long-term advancement up the value chain through the production of innovative rice products (table 4) and their tailored inputs.

ROLE OF INVESTMENT TO MOVE INTO NEW VALUE CHAINS

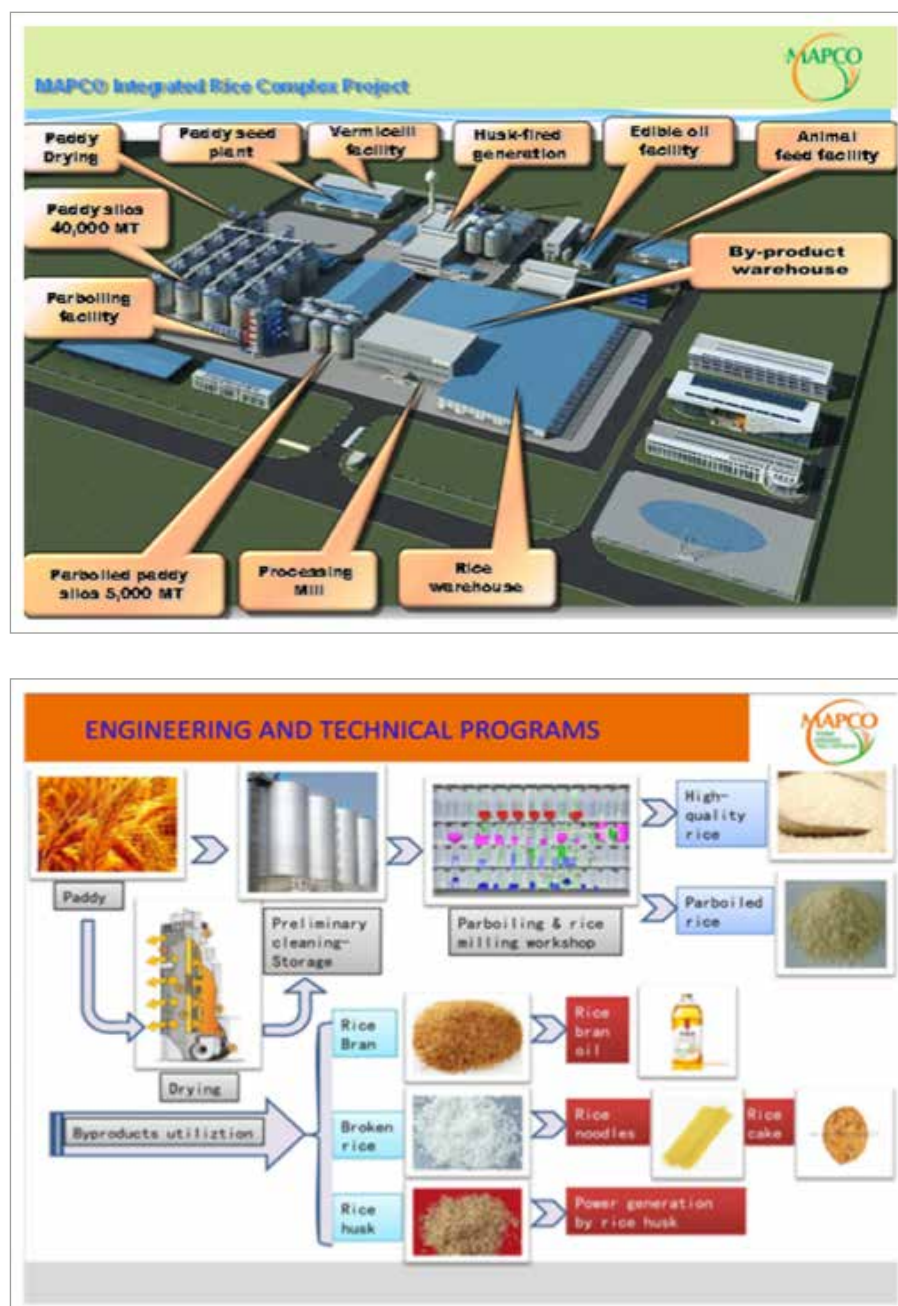
Improving the rice value chain as envisioned by the sector strategy and PoA will require considerable investment. Public funds and donor aid will be important sources of this investment, particularly for infrastructure, the business environment, Government capacity, and guidance to the private sector. However, few factors are as fundamental to the success of a sector as its capital investment, which must be profit-driven to be sustainable in the long term. Therefore, the private sector itself will be the primary source of investment, and a successful rice strategy should mobilize export-oriented private investment as an integral part of, and an early driver of, improvements to the value chain. In the medium to long term, the combination of concerted public support, motivated private investment and the general air of hope for Myanmar's future should create enough confidence and momentum to stimulate a virtuous cycle of self-sustaining growth and development.

Figure 13 provides an example of a large investment project designed to integrate the value chain in a single location, creating new economies of scale and cost efficiencies that will enable higher production volumes, better quality control and greater product development.

The project, envisioned by MAPCO, is a complex one most likely to be funded by public investment, a consortium of private investors, or a combination of the two. And while such a project could encourage cluster development, long-term sector development will be fuelled by individual private investors with less grand projects. However, Myanmar is an LDC and classified as being in a fragile or conflict-affected situation. It has a transition economy and a very weak financial sector. As such, domestic investment is unlikely to reach transformative levels for the rice sector in the foreseeable future. Although a comprehensive private sector development plan is needed for domestic enterprises, in the short to medium term the role of foreign direct investment (FDI) will be especially important.

FDI can have a transformative effect on a developing country's home-grown, domestically oriented industry, and help it to achieve significant export growth. International investors may be able to introduce a wide range of assets otherwise unavailable to local enterprises, such as large amounts of capital, better inputs (e.g. high-quality seeds), technologies, skills, management practices, operational experience, economies of scale and international distribution channels, among others.

Figure 13: Concept for a stronger value chain: MAPCO integrated rice complex



Source: Myanmar Rice Federation.

TYPES OF INVESTMENT NEEDED AND THEIR LIKELY SOURCES

Expanding the sector's production volume, quality, efficiency and value chain operations will require a proliferation of companies engaged in various aspects of manufacturing, services and primary production. Table 20 presents the types of investment needed in the rice sector, leading sources of such investment, and competing locations in the region where investors are active.

Table 20: FDI needed in Myanmar's rice sector – leading companies and destinations

Types of investment	Leading companies with foreign affiliates in Asia	Source country	Regional locations with an existing presence
Rice seeds, fertilizers, and pesticides – sales, distribution, manufacturing and R&D	Monsanto	United States	Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	DuPont (Pioneer)	United States	Cambodia, China, India, Indonesia, Pakistan, Philippines, Thailand, Viet Nam
	Syngenta	Switzerland	Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand, Viet Nam
	Bayer Crop Science	Germany	China, India, Indonesia, Pakistan, Thailand
	Dow AgroSciences	United States	China, India, Malaysia
	BASF	Germany	Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	KWS (seeds)	Germany	China, Pakistan
Farm machinery and equipment – sales, distribution, manufacturing, operation, maintenance and repair	John Deere	United States	China, India, Thailand
	CNH	Netherlands	China, India
	AGCO	United States	
	CLAAS	Germany	China, India, Thailand
	SAME Deutz-Fahr	Italy	China, India
	Kubota	Japan	China, India, Indonesia, Philippines, Thailand, Viet Nam
Animal feed (using rice bran and husks) – manufacturing and R&D	Charoen Pokphand	Thailand	Bangladesh, India, Indonesia, Malaysia, Myanmar , Viet Nam
	Cargill	United States	China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	New Hope Group	China	Bangladesh, Indonesia, Philippines, Viet Nam
	Brasil Foods	Brazil	
	Tyson Foods	United States	China
	Twelve other Chinese companies producing 1 million to 10 million tons / year, including Guangdong Wen's Food Group, COFCO, and East Hope Group		
	Seven other Japanese companies producing 1 million to 10 million tons / year, including ZEN-NOH Cooperative, Marubeni Nisshin and Mitsubishi Nosan		
	Seven other Asian companies producing 1 million to 10 million tons / year, including Betagro (Thailand), San Miguel (Philippines), Zuellig Gold Coin (Malaysia), Japfa Comfeed (Indonesia), CJ CJ CheilJedang (Republic of Korea), Easy Bio System (Republic of Korea) and Proconco (Viet Nam)		
Vertically integrated trading, including warehousing, transportation and risk management (as well as agricultural consulting and manufacturing of biofuels and animal feed in some cases)	Louis Dreyfus Commodities	Netherlands	Bangladesh, China, India, Indonesia, Malaysia, Philippines, Thailand, Viet Nam
	Cargill	United States	China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	Archer Daniels Midland	United States	China, India, Indonesia
	Bunge	United States	China, India, Indonesia, Philippines, Thailand, Viet Nam

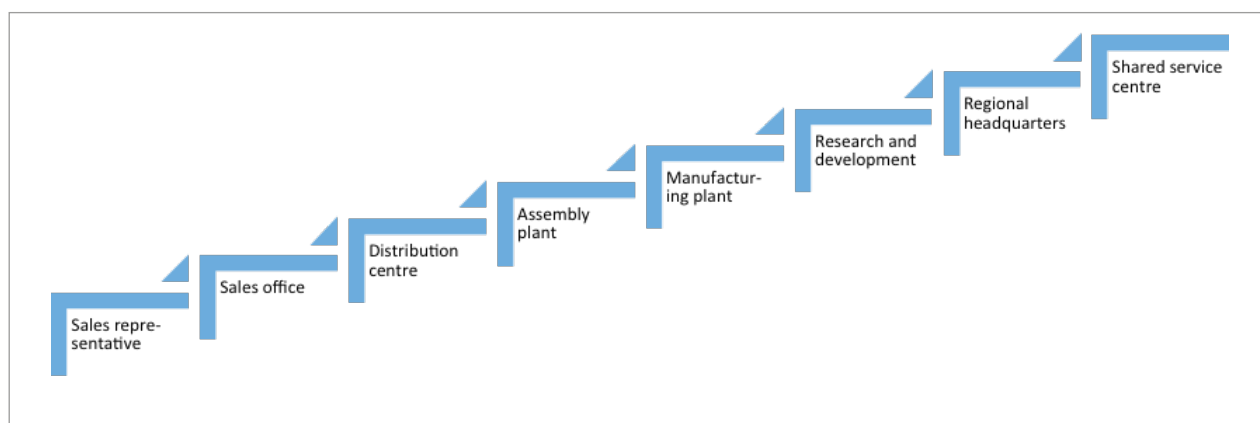
Types of investment	Leading companies with foreign affiliates in Asia	Source country	Regional locations with an existing presence
Quality testing and certification	SGS	Switzerland	Bangladesh, China, India, Indonesia, Malaysia, Myanmar , Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	Cotecna		Bangladesh, China, India, Indonesia, Malaysia, Myanmar , Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	Intertek		Bangladesh, China, India, Indonesia, Malaysia, Myanmar , Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	NSF		China, India, Malaysia, Thailand, Viet Nam
	SCS		China, India, Indonesia, Malaysia

Sources: Shand, H. (2012). The Big Six: A Profile of Corporate Power in Seeds, Agrochemicals & Biotech. *The Heritage Farm Companion*, Summer, pp. 10–15; Noealt Corporate Services (2013). *Annual Strategy Dossier – 2013 – World’s 6 Leading Agriculture Equipment Manufacturers: Key Strategies, Plans, SWOT, Trends & Outlook*; Best, P. & Jennison, K. (2013). Special report: top feed companies 2011-2012. *AFMA Matrix*, vol. 22, No. 1, April, pp. 60–62; Murphy, S., Burch, D., & Clapp, J. (2012). *Cereal Secrets: The World’s Largest Grain Traders and Global Agriculture*. Oxford: Oxfam; and company websites.

Myanmar’s rice sector stakeholders – in particular DICA, MRF, MoAI and UMFCCI – should work to present proven investors with Myanmar’s investment opportunities and, simultaneously, to advocate investment climate reforms that will enhance Myanmar’s attractiveness. Table 20 presents the group of companies which collectively control large majorities of the global markets in their given fields. These are not the only potential investors, and smaller regional companies may be better poised to move quickly into Myanmar, given their proximity and knowledge of the country. However, given the immense potential volume of Myanmar’s rice sector, the world’s leading players are likely to be involved in a scaling up which fully realizes the sector’s potential.

Furthermore, most of the companies in Table 20 already have extensive presences in the region. Future investment projects in Myanmar might originate with headquarters or with these regional affiliates. For the companies with no presence currently in Myanmar, a first venture would likely take the form of a sales office. Although, this does not create the jobs, technology spillovers or skill spillovers of a manufacturing project, for example, the possibility of a sales office should not be dismissed by investment promoters as being of low value. A first sales office is an opportunity for a foreign company to make tentative entry into a new market, learning the business landscape and achieving a level of comfort. Of more immediate importance, it can provide Myanmar’s rice sector with valuable access to high-quality inputs, such as seeds, that are essential to the strengthening of the sector.

Figure 14: Possible evolution of a foreign investor’s activities in a given location



MYANMAR'S LEADING COMPETITORS FOR RICE-RELATED FDI

Low transportation time and costs are essential to maintaining profit margins in the sale of commodities such as rice. With Asia consuming the majority of global rice

production, it makes sense for that production to take place within the region. Myanmar's major competitors for rice-related FDI, be it domestic market-oriented or export-oriented, are other low- and middle-income countries in the region with a record of high rice consumption and/or production. Table 21 presents these competitors for FDI.

Table 21: Leading Asian consumers and exporters of rice, as FDI destinations

Country	Quantity of rice consumed in 2012 (million tons)	Quantity of rice exported in 2012 (million tons)	Global rank by 2012 FDI inflows in all sectors
China	139.6	0.4	2
India	93.3	10.4	15
Indonesia	38.2	0.0	17
Viet Nam	19.7	7.7	36
Thailand	10.4	7.0	35
Philippines	12.9	0.0	62
Myanmar	10.2	1.4	69
Pakistan	2.6	3.5	105

Colour legend

Major rice exporter

Major rice importer

Sources: ITC calculations based on United Nations Comtrade statistics; United Nations Conference on Trade and Development.

CRITICAL FACTORS FOR FOREIGN INVESTORS IN MYANMAR'S COMPETITOR LOCATIONS

The World Bank Group's Enterprise Surveys collect business data from 130,000 firms in 135 countries, from which indicators can be selected to approximate the competitiveness of these countries. Table 22 ranks Myanmar's competitors, from left to right, by total rice output and overall success in attracting FDI. Below each country, the Table presents the results of an enterprise survey in which foreign investors in that country were asked to pick one of 15 issues as the biggest obstacle to doing business.

Although enterprise survey data on the biggest obstacles to doing business are available for Myanmar's major competitors (except Thailand), at the publication of this document, Myanmar's first enterprise surveys remain ongoing. When data becomes available around June 2014, they can be used to compare its relative investment climate strengths and weaknesses, giving sector stakeholders an area on which to focus their investment climate reforms. Even just having such a reform process under way will add to the sector's attractiveness.

When approaching foreign affiliates listed in Table 20, Myanmar's investment promoters will be trying to persuade them to invest in Myanmar based on absolute advantages – such as a large market and abundant resources – and relative advantages, such as better tax rates than its competitor countries. Myanmar's investment promoters must distinguish themselves from other specific locations being considered by the investor. In the absence of detailed, country-by-country cost and risk data, Table 22 provides a rough basis for demonstrating relative advantages. It lists the obstacles to FDI from most-cited (practices of the informal sector), to least-cited (courts) among Myanmar's competitors for FDI. Looking at the group average, there is a clear top tier of four problems among Myanmar's competitors. If Myanmar could perform well in these areas, that would represent a compelling asset for attracting investors. 'Tax rates' is the one area in which Myanmar clearly outperforms its competitors. It beats all but Thailand in *Doing Business's* ranking for 'paying taxes' and it improved significantly over the last year, offering investment promoters a narrative of continuous enhancement of this existing strength.

Table 22: Percentage of surveyed foreign investors citing an issue as the 'biggest obstacle' to doing business in countries competing with Myanmar for rice-related FDI

Strongest competitor -----> Weakest competitor

	Group average	China	India	Indonesia	Viet Nam	Philippines	Pakistan
Practices of the informal sector	14.7	10.1	8.3	1.2	51.8	16.2	0.5
Tax rates	14.6	19.9	27.8	1.2	2.3	16.7	19.6
Electricity	14.5	2.7	5.6	8.9	3.3	8.3	57.9
Access to finance	10.7	18.5	13.9	15.7	2.6	13.2	0.0
Customs and trade regulations	8.4	11.5	8.3	8.3	5.5	16.8	0.0
Inadequately educated workforce	7.8	14.3	5.6	1.9	15.4	9.4	0.0
Political instability	6.5	1.0	0.0	26.4	1.3	5.5	4.5
Transportation	4.9	12.7	5.6	3.9	3.9	1.3	1.9
Corruption	4	1.2	5.6	2.7	1.5	4.0	9.1
Access to land	3.7	3.8	5.6	9.3	2.8	0.5	0.0
Crime, theft and disorder	3.2	0.4	0.0	11.7	0.5	0.1	6.5
Tax administration	3	2.2	5.6	0.5	4.1	5.7	0.0
Labour regulations	2.5	1.5	8.3	4.3	0.3	0.8	0.0
Business licensing and permits	1.4	0.2	0.0	4.0	2.5	1.6	0.0
Courts	0.4	0.0	0.0	0.2	2.2	0.0	0.0

Source: World Bank (2014). Enterprise surveys, 2006-2012. Available from <http://www.enterprisesurveys.org/>. Accessed 28 April 2014.

Note: Orange shading indicates an obstacle which more than 10% of the surveyed foreign investors cited as the biggest obstacle.

On the other hand, with respect to the other top-tier obstacles, Myanmar is a notably poor performer. These obstacles are unfair competition from the informal sector, a lack of reliable electricity and weak access to finance. This reinforces the conclusions of the NES, which found that electricity and finance were particularly problematic for Myanmar. Making relevant reforms will not only strengthen the country's rice sector; it will give the sector two competitive advantages over its top competitors for rice-related FDI. Anticipated aid of US\$1 billion from the World Bank for rural electrification should aid in this effort, and considerable power to reform the country's financial markets lies in the hands of the Myanmar Government.

The preceding analysis provides a useful but rough indication of the relative attractiveness of Myanmar's rice sector and how its standing can be improved. However, the MTDC and its stakeholders should commission a sector study to benchmark the competitiveness of the rice sector specifically. This study should evaluate specific costs and constraints for each of the investment types to be promoted in Table 20, simulating the cost-benefit and risk analyses of potential investors. Armed with this information, DICA – strengthened in line with NES recommendations and in partnership with MRF, MoAI, UMFCCI and other sector stakeholders – would be equipped to effectively target investors for the most competitive activities and advocate investment climate reforms to make the others more competitive.

HOW TO GET THERE

The vision of the strategy of “High-quality and environmentally sustainable growth in rice production and export for rural development and income generation” responds to the constraints, but equally to the ambitions, identified in the sector strategy. The following section explains the framework that will guide the implementation of the strategy. A detailed action plan setting out what needs to be done, and by whom, is presented at the end of this section.

STRATEGIC OBJECTIVES

The sector strategy design process was highly inclusive of major stakeholders in the rice sector. This was critical to understanding the real situation on the ground from every angle, to building consensus on the strategic steps to be taken, and to starting the work of assembling a coalition of actors with the interest and ability to jointly implement the strategy in a decisive and effective manner. This section contains a PoA to guide the strategy’s implementation. It is broken into targeted activities or projects, each with its own concrete goals, beneficiaries and responsible parties. Each of the activities contributes in one or more ways to the accomplishment of the following strategic objectives.

1. Increase rice production and quality substantially.

This objective will be realized through initiatives implemented along the following dimensions (or operational objectives):

- Increase the use of HYV and high-quality seeds.
- Increase production and use of fertilizers and pesticides.
- Increase farm mechanization.
- Reduce postharvest losses and quality-degrading practices at all stages of production.
- Attract foreign investment as a way to stimulate new flows of capital, know-how, technology and skills to farming and milling.

2. Increase efficiency and reduce costs through expansion of sector infrastructure.

This objective will be realized through initiatives implemented along the following dimensions (or operational objectives):

- Reduce transportation costs.

- Increase availability of warehouses for affordable storage and financing.
- Expand and upgrade infrastructure for irrigation, drainage and electricity in rice-producing regions.
- Ease trade procedures.
- Expand access to finance for operation and trade.

3. Diversify export products and export markets.

This objective will be realized through initiatives implemented along the following dimensions (or operational objectives):

- Develop new markets and new, higher value added rice products.
- Establish brand recognition of Myanmar quality rice.
- Strengthen public sector capacity to diversify the rice sector’s products and markets.

4. Grow the rice sector in a way that promotes health, equitable growth and environmental sustainability.

This objective will be realized through initiatives implemented along the following dimensions (or operational objectives):

- As more farmers adopt modern agricultural practices, help them meet environmental standards, while helping organic farmers obtain better prices by branding their products as organic
- Create off-season jobs for seasonal agricultural workers.

The types of activities undertaken will include policy, training, provision of information and assistance, institutional strengthening and funding, investment promotion and stakeholder outreach. The immediate outputs of these activities should be improved performance by: rice farmers, rice millers and processors, several departments of MoAI, MRF, the Department of Trade Promotion of MoC and the Foreign Investment Department of DICA.

Together, the activities will lead to better product quality, reduced costs and a transformative level of export preparedness among Myanmar’s rice farmers, millers and traders. Over several years, their success is expected to lead to a several-fold increase in the output value of the sector, which until now has largely served the domestic market.



IMPORTANCE OF COORDINATED IMPLEMENTATION

The first step in rolling out the PoA is matching the activities to donors, many of whom were consulted during the sector strategy design process. If all activities are fully funded and implemented, it is expected that the value of Myanmar's rice exports will triple by 2020. The activities needed to realize this vision are broad in scope, and their coordinated implementation is a complex matter. An effective coordinator is needed to guide the broad range of stakeholders involved in implementation, ensure the efficient allocation of resources, advocate policies in support of the strategy, and monitor results at both the micro and macro levels. To this end, the MTDC was established in order to facilitate the public-private partnership which will elaborate, coordinate and implement the sector strategy. Moreover, the MTDC will play a key role in recommending revisions and updates to the strategy so that it continues to evolve in alignment with Myanmar's changing needs.

IMPLEMENTATION PARTNERS – LEADING AND SUPPORTING INSTITUTIONS

A number of institutions will play a key role in the implementation of this export strategy, as illustrated in the section on TSIs and the PoA. These are institutions that have the overall responsibility for successful execution of the strategy, as well as support institutions that are active partners but not leading institutions. Each institution mandated to support the export development of the rice sector is clearly identified in the PoA.

Implementing partners include MoAI, MRF and its constituent associations, MoC, MAPCO, MIC, DICA, MoFR, the Privatization Commission, rice research institutes, rice specialization companies and seed production companies, among others.

THE REPUBLIC OF THE UNION OF MYANMAR NATIONAL EXPORT STRATEGY

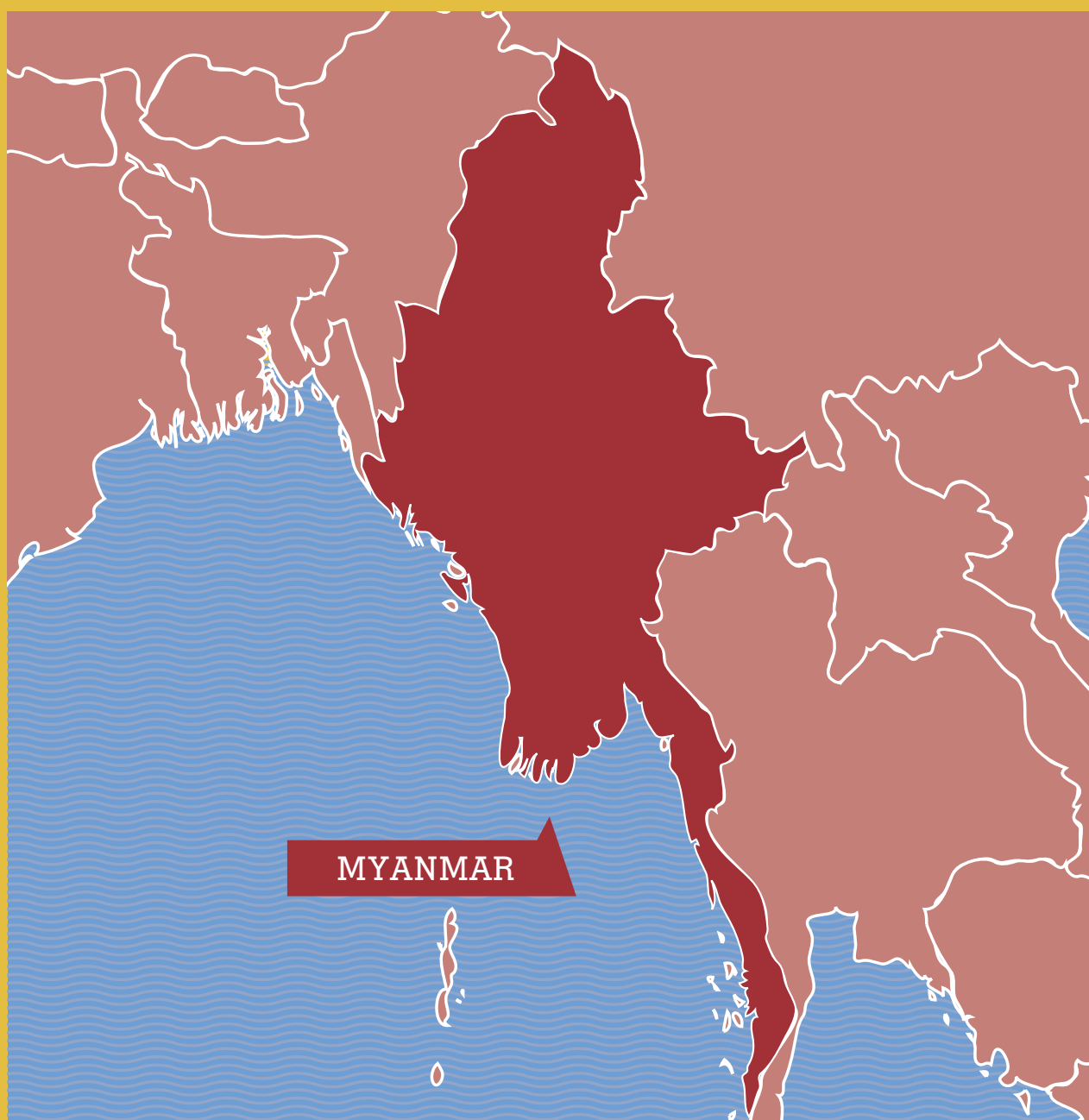
RICE

SECTOR STRATEGY 2015-2019

PLAN OF ACTION

The following action plan details all the activities to be undertaken over the next five years to achieve the vision of the strategy. The action plan is organized around strategic and operational objectives that respond to the

constraints and opportunities identified in the strategy. The action plan provides a clear and detailed framework for the effective implementation of the Rice sector strategy.



Strategic objective 1: Increase rice production and quality substantially.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
1.1 Increase the use of HYV and high-quality seeds.	1.1.1 Dedicate more of MoAI registered and certified seed production to high-quality varieties such as Paw San and Immayebaw as a critical source of quality seed supply to rice farmers.	1	Farmers, seed production companies	High-quality seeds supplied for 2 million acres every year for five consecutive years	MoAI	Rice research institutes, seed production companies	Existing MoAI seed production programme	Very low. Strategic decision.
	1.1.2 Invest in best-practice infrastructure at MoAI seed farms, including irrigation, drainage, and the segregation of nursery land from normal farmland, so that MoAI can fulfill its role as sector leader and multiplier of quality seed and practices.	1	MoAI, farmers, seed production companies	High-quality seeds supplied for 2 million acres every year for five consecutive years	MoAI	Rice research institutes, seed production companies	Rice research institutes, seed production companies	25 000 000 for five consecutive years
	1.1.3 Use public-private partnerships as another means of setting up companies to supply quality seed, matching private best practices and public development goals.	3	MoAI, farmers, seed production companies	Support for setting up a public-private partnership with seven local companies and three foreign companies	MoAI	Seed production companies, MAPCO, MRF	Seed production companies, MAPCO, MRF	10 000 000
	1.1.4 Provide officials at MoAI, MoFR, MoC, the Ministry of Industry, MoRT, MoI and MoEP with training on the design, due diligence, negotiation and administration of public-private partnerships.	3	MoAI, MoFR, MoC, Ministry of Industry, MoRT, MoI, MoEP	One well-structured, well-administered public-private partnership infrastructure project (e.g. ports, roads, electricity)	MoAI			20 000
	1.1.5 Overcome farmer hesitation to switch seed varieties through campaigns to raise their awareness of the yield-, labour-, and price-related advantages of better seed varieties.	2	Farmers	Direct training / counselling given to <ul style="list-style-type: none"> > 10 000 farmers > Educational materials delivered to 1 million farmers 	MoAI	MRF, individual farmers, Myanmar Rice Millers Association	MRF, individual farmers, Myanmar Rice Millers Association	1 100 000
	1.1.6 Expand the MoAI seed distribution network by engaging farmers in each village to produce certified seeds in all regions.	2	Farmers	Five thousand farmers and 25 000 acres enlisted as certified seed producers at township level	MoAI	MRF, seed production companies, farmers	MRF, seed production companies, farmers	5 000 000
1.2 Increase production and use of fertilizers and pesticides.	1.2.1 Conduct a feasibility study on renovation or privatization, so as to resume and/or ramp up production at the country's five urea (fertilizer) facilities, either through privatization or joint ventures with foreign companies, in order to increase the domestic supply of affordable, high-quality fertilizer significantly.	3	Farmers	Five urea plants operating	Ministry of Energy	MoFR, MIC, Privatization Commission		60 000
	1.2.2 Conduct awareness-raising campaigns among farmers for the types, benefits, procurement channels and proper application of fertilizers and pesticides.	1	Farmers, fertilizer & pesticide companies	Ten thousand farmers reached (100 each in 100 villages)	MoAI	MoC, fertilizer and chemical companies		200 000
	1.2.3 Adopt and enforce a regulation requiring imported fertilizers and pesticides to come with instructions for use written in Burmese. Without instructions, farmers risk wasting considerable investment because of improper application.	2	Farmers, domestic distributors of fertilizers and pesticides	Tripling of the annual volumes of fertilizer and pesticide sold in Myanmar	Customs	MoAI, MoEP	MoAI, MoEP	None
1.3 Increase farm mechanization.	1.3.1 Open 15 training centres for mechanized farming across the major rice-producing regions of Sagaing, Ayeyarwady, Bago, Yangon, Rakhine and Mon.	1	Farmers	Fifteen training centres opened	MoAI, MRF	MAPCO		3 000 000
	1.3.2 Set up 100 mechanized farming service stations to support mechanization across the major rice-producing regions of Sagaing, Ayeyarwady, Bago, Yangon, Rakhine and Mon.	2	Farmers	One hundred mechanized farming service stations at township level	MoAI	MRF		50 000 000 – 500 000 each

Strategic objective 1: Increase rice production and quality substantially.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
1.4 Reduce postharvest losses and quality-degrading practices at all stages of production.	1.4.1 Provide small farmers with model agreements, procurement assistance and technical training that will allow them to confidently purchase communal dryers and warehouses at the village level, thereby providing critical loss-prevention facilities to small farmers who could not afford them individually.	1	Farmers	New warehouses with dryers in 100 villages	MoAI	MRF		10 000 000 – 100 000 each
	1.4.2 Train small-scale millers in best practices, as a way of raising the country's overall rice quality (i.e. minimizing the effects of poor milling such as undermilling, breakage, contamination, etc.).	1	Rice millers	Provision of training to 10 000 rice millers	MoC	MRF, Myanmar Rice Millers Association		24 000
1.5 Attract foreign investment as a way to stimulate new flows of capital, know-how, technology and skills to farming and milling.	1.5.1 Conduct investment promotion activities, particularly investor outreach (a.k.a. investor targeting, proactive promotion) to attract foreign seed companies to establish sales offices and manufacturing plants in Myanmar, as a way of increasing supply of the quality seeds that are necessary to upgrade the volumes and value of rice produced in Myanmar.	2	Farmers	Enlist local trainers and supply them with training materials in 2 000 villages	MoAI	MRF		3 000 000 – 1 500 per village
	1.5.2 Conduct investment promotion activities, particularly investor outreach (a.k.a. investor targeting, proactive promotion) to attract foreign manufacturers to establish sales offices and manufacturing plants in Myanmar, as a way of increasing the amount of quality fertilizer, pesticides and insecticides available to farmers.	2	Farmers, seed production companies	Ten seed companies attracted	DICA Department of Foreign Investment	MoAI, MIC, MRF, seed production companies		150 000
1.5.3 Hold a consultation, including domestic and foreign stakeholders, to review the adequacy of the current draft of the Foreign Investment Law and to propose implementing regulations that will ensure international competitiveness without neglecting environmental and social concerns.	1.5.2 Conduct investment promotion activities, particularly investor outreach (a.k.a. investor targeting, proactive promotion) to attract foreign manufacturers to establish sales offices and manufacturing plants in Myanmar, as a way of increasing the amount of quality fertilizer, pesticides and insecticides available to farmers.	1	Farmers	Three fertilizer companies and two pesticide companies attracted (wholly foreign-owned or joint venture)	DICA Department of Foreign Investment	MoAI, MIC, MRF, seed production companies		150 000
	1.5.3 Hold a consultation, including domestic and foreign stakeholders, to review the adequacy of the current draft of the Foreign Investment Law and to propose implementing regulations that will ensure international competitiveness without neglecting environmental and social concerns.	2	Investors, farmers	Law and implementing regulations adopted with working group recommendations reflected	DICA	MIC		
1.5.4 Conduct investment promotion activities, particularly investor outreach (a.k.a. investor targeting, proactive promotion) to attract foreign manufacturers of farm machinery to establish sales offices and assembly plants in Myanmar.	1.5.4 Conduct investment promotion activities, particularly investor outreach (a.k.a. investor targeting, proactive promotion) to attract foreign manufacturers of farm machinery to establish sales offices and assembly plants in Myanmar.	1	Farmers	Five new companies established	DICA Department of Foreign Investment	MoAI, companies		150 000
	1.5.5 Stimulate FDI with an international investor conference for Myanmar's agricultural sector, showcasing investment climate reforms under way, public financial and policy support for the sector, and investment opportunities.	1	Domestic and foreign agribusiness investors	Two hundred domestic companies and 100 foreign companies participating	DICA Department of Foreign Investment	MoC, MoAI, UMFCCI, MRF, MIC		200 000

Strategic objective 2: Increase efficiency and reduce costs through expansion of sector infrastructure.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
2.1 Reduce transportation costs.	2.1.1 Use public transportation and agriculture finances to vastly expand the number of farm access roads, in order to give farmers the local transportation infrastructure to get rice harvests from their fields to inter-village road networks quickly. This will permit efficiency gains through: The use of motor vehicles (as opposed to bullock carts or people) to transport harvests; Fewer postharvest losses because of prolonged exposure to the elements; Greater speed to market.	1	Public and farmers	New farm access roads, amounting to 2 000 km, connecting 10 000 farms	MoFR	Regional governments, Ministry of Livestock, Fisheries and Rural Development, MoAI		Need to consult with concerned ministries for plan and budget requirements
	2.1.2 Encourage greater use of pick-up trucks (as opposed to bullock carts or people) in rural areas by providing grants, credits, and/or policy support for: The purchase of light transport vehicles; The establishment and expansion of local transport-for-hire providers; The establishment and expansion of local vehicle repair providers.	1	Farmers	Doubling of percentage of paddy transported from fields to mills by motor vehicle	MoFR	State / private banks		2 000 000
	2.1.3 Invest in loading cranes at critical river ports to allow transportation of rice by river instead of land, for significant cost and time savings for farmers far from Yangon port.	1	Rice exporters	Doubling of amount of rice shipped through river ports	MoT	Private terminal investors, MoFR		Need to consult with concerned agencies for plan and budget requirements
2.2 Increase availability of warehouses for affordable storage and financing.	2.2.1 Use public-private partnerships to provide land and financing for the construction of warehouses at the township level, so that small farmers without their own storage can take advantage of warehouse space (free or for rent) to reduce postharvest losses and free up farm space to make way for new crops.	1	Rice millers, rice exporters	Construction of 100 warehouses at township level	MoAI	MRF, MoFR		20 000 000 – 200 000 each
	2.2.2 Develop a legal framework for warehouse receipt financing.	1	Rice millers rice exporters	Adoption of law and regulations Acceptance of 70% of receipt value as collateral	Attorney General's Office	MoAI, MoFR, private banks		None
2.3 Expand and upgrade infrastructure for irrigation, drainage and electricity in rice-producing regions.	2.2.3 Find one or more parties willing to fund and/or administer the warehouse receipt financing initiative (e.g. banks, donors, commodity exchange).	2	Rice millers, rice exporters	Start of operations at one warehouse	MoFR	MoAI, state and private banks		None
	2.3.1 Conduct a feasibility study to determine irrigation needs and options for major rice-producing areas, including irrigation types, technologies and costs.	1	Farmers	Feasibility study completed	MoAI	MRF		1 000 000
	2.3.2 Mitigate harmful flooding by: Repairing drainage pipes severed by new roads; Implementing a policy of preserving drainage systems when laying new roads.	3	Public and farmers	Double percentage of paddy acreage with adequate drainage	MoAI	MoFR		Need to consult with concerned ministries
	2.3.3 Engage with MoEP and the World Bank-led project to devise a national electrification strategy. Prioritize electrification of the rice-producing areas of Ayeiwarady, Yangon and Bago Divisions, which account for 83% of rice production, as a way of facilitating farm mechanization, drying and milling without relying on costly generators.	2	Rice millers	In rice-producing regions, 2 000 km of new transmission / distribution lines	MoEP	Private investment companies, state and private banks, World Bank	Existing electrification funds and plans	Need to consult with concerned ministries

Strategic objective 2: Increase efficiency and reduce costs through expansion of sector infrastructure.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
2.4 Ease trade procedures.	2.4.1 Promote greater exports of Myanmar rice by facilitating trade procedures through a one-stop service.	1	Rice exporters	Establishment of a one-stop information and assistance centre for agricultural export procedures	MoC	UMFCCI		100 000
	2.4.2 Develop an international rice commodity exchange to facilitate global access to Myanmar supply, encourage price standardization, provide farmers and traders with risk management tools, and reduce transaction costs.	1	Rice exporters	Opening of commodity exchange	MRF	MoC		200 000
2.5 Expand access to finance for operation and trade.	2.5.1 Reform financial regulations and the policies of State-owned banks for agriculture and rural development, in order to extend financing for rice production in more places, on longer repayment terms, with a higher principal-to-collateral ratio, using movable assets as collateral, and at internationally comparable interest rates. Create more access to finance, especially for trade.	1	Farmers	Ten thousand, three hundred new agricultural loans granted with tenure of one year or more (50 loans x 206 MADB branches)	MoFR	MADB, Ministry of Cooperatives, MRF		None
	2.5.2 Have MoFR permit: <ul style="list-style-type: none"> » Export of rice without proof of advance payment; » Advance payment for imported farm machinery, so that the sector's competitiveness is not lessened by the inability to conduct business according to international norms. 	1	Rice farmers and millers	<ul style="list-style-type: none"> » One hundred first-time exporters » Doubling of imported farm machinery 	MoFR	Customs, commercial banks		None
	2.5.3 Reform financial regulations to permit and promote the full suite of trade finance products and practices.	1	Rice exporters	Broad availability of trade finance	MoFR	Central Bank of Myanmar, Attorney General		None

Strategic objective 3: Diversify export products and export markets.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
3.1 Develop new markets and new, higher value added rice products.	3.1.1 Help rice processors see more opportunities for the export of a variety of value added, rice-derived products by providing the sector with market research (price, quality standards, etc.) on regional markets for high-quality rice, parboiled rice vermicelli, rice noodles, rice powder, bran oil, sweet sticky paste, rice liquor, animal feed, baby food, rice paper, etc.	2	Exporters	Reports of market trends and opportunities for each of the 11 stated products	MoC	MoAI, MRF, international and local research Institutions		300 000
	3.1.2 Facilitate market entry for inexperienced rice processors and exporters by sharing the costs of innovation through a public-private centre for the design, research and development of rice products.	3	MAPCO, companies specializing in rice	Establishment of a research, design and development centre	MAPCO, companies specializing in rice	International and local research Institutions		500 000
	3.1.3 Petition the United States for the lifting of sanctions and for LDC status in application of tariffs.	1	Exporters	Law lifting sanctions Designation of Myanmar as an LDC by United States Customs	Rice exporters	MRF		
3.2 Establish brand recognition of Myanmar quality rice.	3.1.4 Negotiate a bilateral trade agreement with China on rice, including border trade.	1	Exporters	Signed agreement	MoC	MRF		
	3.2.1 Provide overseas marketing support, including development of a brand for high-quality Myanmar rice, as a way to help rice farmers and exporters obtain better market prices. To do this, the branded rice must be recognized as being of high quality with special, differentiable characteristics, rather than as a simple commodity. Brand development and overseas marketing may be performed directly by stakeholders or through a public relations agency.	3	Exporters	Creation of a quality brand for Myanmar rice Publicly funded advertising and trade event participation in target markets	MRF	MoC		300 000
	3.2.2 Establish national quality standards for use of the Myanmar brand to give producers clear quality goals and preserve the integrity of the brand.	2	Exporters	Creation of standards for authorized use of the Myanmar brand for quality rice	MRF	MoC		50 000
3.3 Strengthen public sector capacity to diversify the rice sector's products and markets.	3.3.1 Train TSI officials to proactively gather, synthesize and strategically disseminate intelligence on target foreign markets.	1	Exporters	Fifty exporters receiving actionable market intelligence from public TSIs	MoC	MRF, MoAI, UMFCCI		50 000
	3.3.2 Train Government officials on the negotiation of international trade agreements on rice and other agricultural products, so that they can confidently enter into negotiations with China to open border trade of rice and secure Generalized System of Preferences or LDC privileges in American and other target markets.	3	Entire rice value chain	Fifty trained officials among all relevant ministries	MoC	MoAI		50 000
	3.3.3 Train Government officials on the methodologically sound production of rice sector statistics so that public and private stakeholders can make well-calculated investment and marketing decisions.	1	Central Statistical Organization, analysts at all ministries	Fifty trained officials at Central Statistical Organization and 10 trained officials at each of the data collecting / reporting ministries	Central Statistical Organization	MRF, MoAI		100 000

Strategic objective 3: Diversify export products and export markets.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
3.3 Strengthen public sector capacity to diversify the rice sector's products and markets.	3.3.4 In the absence of private insurers, create a Government-run crop insurance programme to reduce the major risk faced by farmers, and thereby allow farmers to more confidently undertake other necessary risks, such as the switching of seed varieties and investment in farm machinery. 3.3.5 Invest in training and equipment for greater R&D capacity at MoA and state agricultural institutes to support rice processors in the production of higher value added and more innovative rice-derived products.	1	Farmers	One thousand new crop insurance policies issued	Myanmar Insurance	Myanmar Farmers Association		None (this should be a profitable enterprise)
	3.3.6 Invest in training and resources for greater capacity at MOAG to provide the sector with internationally recognized organic certification.	2	MOAG, farmers	One thousand farmers certified as organic	MOAG	MoA, MRF, MoC		2 000 000
	3.3.7 Reduce trade uncertainty by establishing or improving the Customs Department's information window, call centre, website and automatic publication and transmission of new rules, so that the sector may have up-to-date information on export and import procedures and regulations.	2	Traders, value chain actors depending on imports	Customer survey demonstrating a high level of satisfaction with all four systems	Customs	MRF, MoC		1 000 000
Strategic objective 4: Grow the rice sector in a way that promotes health, equitable growth and environmental sustainability.								
Operational objectives	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US\$)
4.1 As more farmers adopt modern agricultural practices, help them meet environmental standards, while helping organic farmers obtain better prices by branding their products as organic.	4.1.1 Help those already engaged in organic farming (for lack of fertilizer, pesticides, etc.) get organic certification through counselling and facilitation. 4.1.2 Raise awareness and provide training for the protection of agricultural workers' health and safety, particularly as it relates to exposure to chemicals, machinery and natural hazards. 4.1.3 For those farmers willing and able to adopt modern technology, train them to incorporate environmental considerations so as to minimize the negative effects of fertilizers and machinery on water and land quality.	3	Farmers	Triple the amount of Myanmar rice marketed as organic	MoA	MRF, MOAG		300 000
		1	Farmers, farm labourers	Direct training / counselling given to 10 000 farmers	Ministry of Health	Ministry of Labour, Employment and Social Security, MoA		1 100 000
		1	Public, farmers	Direct training / counselling given to 10 000 farmers	Ministry of Environmental Conservation and Forestry	MoA, Ministry of Health		1 100 000
4.2 Create off-season jobs for seasonal agricultural workers.	4.2.1 Provide training to seasonal farm labourers in land preparation, construction, and the operation and maintenance of farm machinery, so as to provide them with employment opportunities outside of the harvesting seasons.	2	Farm labourers, farmers	Construction of 100 training centres at the township level	Ministry of Labour, Employment and Social Security	MoA, MRF		20 000 000 – 200 000 each



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APPENDIX 2: CALCULATION OF EXPORT POTENTIAL FOR TARGET MARKETS

Potential for export growth was calculated as a combination of five factors:

- Rice import market size
- Myanmar's existing share of that market
- The strength of Myanmar's overall exports to that country
- The tariffs faced by Myanmar rice in that country
- The distance to that country.

Countries were scored in each category on a scale of 0-2, and these scores were weighted for the relative importance of the five factors. Scores were given according to the following standards.

Import market size	Myanmar's existing market share	Strength of overall exports	Favourability of tariffs faced by Myanmar rice	Proximity of Myanmar to market
2 = global rank of 15 and above	2 = market rank of 8 and above	2 = 2013 exports of \$25 million and above	2 = total ad valorem equivalent tariff of 0%–10% at the HS four-digit level	2 = 4 200 nautical miles or less between Yangon port and a major port in the importing country
1 = global rank of 16–20	1 = market rank of 9–20	1 = 2013 exports of \$5 million to \$25 million	1 = total ad valorem equivalent tariff of 10%–30% at the HS four-digit level	1 = 4 200–7 800 nautical miles between Yangon port and a major port in the importing country
0 = global rank of 21 and below	0 = market rank of 21 and below	0 = 2013 exports of under \$5 million	0 = total ad valorem equivalent tariff of 30% or more at the HS four-digit level	0 = More than 7 800 nautical miles between Yangon port and a major port in the importing country



The 35 countries included in the analysis were countries identified by United Nations Comtrade as being among the world's top rice importers, by Myanmar Customs as being top importers of Myanmar rice, and by the NES rice sector team as being target markets. With Myanmar holding significant market share in relatively few foreign rice markets today and the present strategy focusing on a relatively short five-year time frame, it is unrealistic to focus on all 35 countries simultaneously. Therefore, they have been ranked according to their weighted average score and divided into high-, medium-, and low-potential markets. The top 40% (14 countries) have high potential; the next 40% (14 countries) have medium potential; and the last 20% (seven countries) have low potential.

The United States and Thailand were each downgraded one category. The United States was downgraded because of the effects of its sanctions, and Thailand has very little real potential for growth as it is a major net exporter of rice. Its exports account for a fifth of the global export market and its imports equal less than a third of 1% of its exports. Most of Myanmar's border with Thailand is along Thailand's non-rice-producing regions, and Myanmar rice exports to Thailand have been through border trade, apparently to serve those small, remote markets, which are unlikely to grow significantly.

Table 23: Analysis of export potential for target markets for Myanmar rice

		Import market size*	Myanmar's existing market share*	Strength of overall exports	Favourability of tariffs faced by Myanmar rice	Proximity of Myanmar to market	Weighted average score
Weights		1.5	0.5	1	1	0.5	
HIGH potential for growth	Indonesia	2	2	2	2	2	1.80
	Japan	2	2	2	2	2	1.80
	France	2	1	2	2	1	1.60
	Singapore	1	2	2	2	2	1.50
	China	2	2	2	0	2	1.40
	United Kingdom	2	0	2	2	0	1.40
	Malaysia	2	2	2	0	2	1.40
	United States	2	0	2	2	0	1.40
	Iraq	2	0	0	2	2	1.20
	Republic of Korea	0	2	2	2	2	1.20
	Côte d'Ivoire	2	2	0	2	0	1.20
	Saudi Arabia	2	0	0	2	2	1.20
	United Arab Emirates	2	0	0	2	2	1.20
	Russian Federation	0	2	2	2	2	1.20
MEDIUM potential for growth	Yemen	2	0	0	2	2	1.20
	Belgium	2	0	1	2	0	1.20
	Thailand	0	2	2	2	2	1.20
	Germany	1	0	2	2	0	1.10
	South Africa	2	0	0	2	1	1.10
	Netherlands	1	1	1	2	0	1.00
	Philippines	2	0	1	0	2	1.00
	Senegal	2	0	0	2	0	1.00
	Burkina Faso	2	0	0	2	0	1.00
	Hong Kong, China	1	0	0	2	2	0.90
	Canada	1	0	1	2	0	0.90
	Chinese Taipei	0	2	2	0	2	0.80
	Islamic Republic of Iran	2	0	0	0	2	0.80
	Ghana	2	0	0	1	0	0.80
	LOW potential for growth	Bangladesh	0	2	0	2	2
Madagascar		0	2	0	2	2	0.80
Benin		1	0	0	2	0	0.70
Brazil		1	0	0	2	0	0.70
Cameroon		1	0	0	2	0	0.70
Bulgaria		0	1	0	2	1	0.60
Guinea		0	0	0	1	0	0.20





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