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GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR

**Formulation and Operationalization of National Action
Plan for Poverty Alleviation and Rural Development through
Agriculture (NAPA)**

Working Paper - 14

FOOD SAFETY AND QUALITY STANDARD

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ACRONYMS

ACCP	ASEAN Committee on Consumer Protection
ACCSQ	ASEAN Consultative Committee on Standards and Quality
AEGFS	ASEAN Expert Group on Food Safety
ASEAN	Association of Southeast Asian Nations
DOF	Department of Fisheries
DOH	Department of Health
DRD	Department of Rural Development
EU	European Union
FDA	Food and Drug Administration
FAO	Food and Agriculture Organization of the United Nations
FIFSTA	Federation of Institutes of Food Science and Technology in ASEAN
FoSTA	Food Science and Technology Association
FSMS	Food Safety Management Systems
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GHP	Good Hygienic Practice
GMP	Good Manufacturing Practice
GSP	Generalized System of Preferences
HACCP	Hazard Analysis Critical Control Points
IPM	Integrated Pest Management
LBVD	Livestock Breeding Veterinary Department
LIFT	Livelihood and Food Security Trust Fund
MAS	Myanma Agricultural Services
MCDC	Mandalay City Development Committee
MCU	Myanmar Consumer Union
MFPEA	Myanmar Food Processors and Exporters Association
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MoAI	Ministry of Agriculture and Irrigation
MOCOOP	Ministry of Cooperatives
MOC	Ministry of Commerce
MOH	Ministry of Health
MOI	Ministry of Industry
MOScT	Ministry of Science and Technology
MRL	Maximum Residue Level
MSTRD	Myanmar Scientific and Technological Research Department
NAPA	National Action Plan for Agriculture
NCDC	Naypyidaw City Development Committee

MYANMAR: National Action Plan for Agriculture (NAPA)

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NGO	Non-governmental Organization
NHC	National Health Committee
NHL	National Health Laboratory
NSPARD	National Strategy on Poverty Alleviation and Rural Development
SPS	Sanitary and Phytosanitary Measures
TBT	Technical Barriers to Trade
UNDP	United Nations Development Programme
WHO	World Health Organization
YCDC	Yangon City Development Committee

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EXECUTIVE SUMMARY

Myanmar has a diverse and favourable range of agro-ecological zones with varying climatic conditions, land quality and suitability for agricultural activities. The country is largely self-sufficient in basic food commodities, with surplus production of rice, pulses and fish in most years. While Myanmar is generally food secure at the national level, recent household food security assessments conducted by various agencies confirm that many poor households both in rural and urban areas still face the issues of food insecurity and malnutrition. The steady increase in population size over time has policy implications for all sectors of the economy particularly those relating to education, health, employment and housing.

Myanmar lags behind various developing countries in many respects as it missed opportunities to participate in numerous global and regional programmes and projects on strengthening food safety, especially in the mid-1990s. Agriculture and the agribusiness sectors make an important contribution to the national economy in Myanmar. The specific nature of these sectors varies from country to country in terms of food products, types of technology employed, size of businesses, access to domestic and export markets, and development of GHP, GAP, GMP and HACCP programmes. Among the industries in Myanmar, food industries, mainly rice and edible oil industries, constitute about two-thirds of the country's total industry composition. The government assumes responsibility for public health and economic development including improvements in food safety. In this regard, the implementation of GHP/GAP/GMP and HACCP in food businesses is critical to ensure better food safety and quality standards in both export and domestic market areas.

As in other countries, the food industry comprises mainly small businesses, which handle a large share of the food consumed. Small food businesses also contribute significantly to the total employment in the food sector and make a vital contribution to the economic well-being of the community at the local level. The government wants indigenous small food businesses to thrive, but with proper public health coverage. Because of the size of the small food business sector, lack of technical expertise, limited economic resources or the nature of their work, difficulties are encountered in implementing food safety measures. There is a lack of awareness, ability and/or unwillingness to comply with basic hygiene procedures.

With the rising urban populations in Myanmar, street food vending has multiplied and often clusters around places of work, schools, hospitals, railway stations and bus terminals, and so forth. Street food has significant nutritional implications for consumers, particularly for middle- and low-income groups who depend heavily on it. It plays significant nutritional implications at the work place as well as other important locations. For many street food and small food businesses, GHP/GMP/HACCP mean additional cost required for upgrading facilities. Furthermore, hygiene management is also hindered by inadequate local infrastructure. Good hygienic practices are lacking in small food businesses compared to the corporate-level food industry.

The adaptation of manufactured foods to international standards of safety, quality and labeling would require more complete food analysis and an extended system of supervision. A major constraint in the implementation of effective controls on food safety in food processing is the lack of laboratory facilities and capacity. However, government organizations, and some private sectors, have established a few quality control laboratories, although their facilities are not of the required standard to provide tests that could be generally regarded as valid and reliable. To a large extent this reflects a more general lack of food safety capacity in both the

public and private sectors. Though there are some basic facilities, these are generally outdated and far below international standards. Strengthening of laboratory systems deserves priority

support by providing the required level of precision and/or the laboratory to be implemented with a coherent system of Good Laboratory Practice (GLP), and to be accredited by an outside agency.

To harness the potential of the food-processing subsector to enhance livelihoods in Myanmar, there is a need to develop food industry clusters in rural areas. As the potential of labour absorption is high in agriculture-based industries and small and medium industries, there is a policy need to provide appropriate openings and avenues by developing industrial clusters and increasing investment in infrastructure to absorb the growing labour force. For employment opportunities in rural areas, non-agricultural enterprises play a sustainable role. Evidence shows that some countries have made substantial progress in poverty reduction by creating additional off-farm opportunities. If provided adequate support, rural enterprises may become both an engine of growth and also a major contributor to the reduction of rural poverty and enhancing public health. In this regard, self-employment through small enterprise training to rural communities to become entrepreneurs is another stimulus.

Research systems in Myanmar have a range of problems and ambiguities related to mandates, leadership, institutional arrangements as well as scarcity of human, physical and financial resources. Operational linkages between the various research institutions and among research, extension and training organizations within the public sectors are weak. The exchange of scientific information and research results among research organizations, and with research, extension and training institutions, is also limited. Human resources are inadequate in terms of knowledge, skills and motivation. Hence, there is an urgent need to strengthen the human and material resources of the present research and development organizations to undertake both pure and applied research in postharvest and agroprocessing technology. The absence of an Institute of Food Science and Technology is a major shortcoming and needs to be urgently addressed.

To set up educational, extension and research capabilities, there is also an urgent need to provide technical training to the staff of management agencies with the various ministries on specific areas such as food safety, sanitation, disease and health management, GHP, GMP, postharvest and processing techniques, new technologies in food production and other practices. For street vendors, the focus can be on training on proper handling practices and maintaining good hygienic environments to meet food safety requirements so that they can reduce incidences of food poisoning and food-borne diseases, and improve the nutritional value of the food consumed, thus ultimately increasing the health of consumers. Also in the context of small food processors' lack of awareness, ability and/or unwillingness to comply with basic hygiene procedures, attention should be given to their training on GHP, GMP and HACCP principles.

At this stage support by the government, UN organizations, donor agencies, INGOs, NGOs, and CSOs is critically needed for awareness-raising programmes on food safety. In most cases most consumers are not aware of, and hence not concerned about the safety and nutritional aspects of food preparation/consumption. Participation of consumer associations, farm organizations, cooperatives and the private sector in such programmes is also vital.

1. INTRODUCTION

In May 2011, the Government of Myanmar organized the first national-level workshop on rural development and poverty alleviation, and articulated a National Strategy on Poverty Alleviation and Rural Development (NSPARD). This strategy called for focusing efforts on eight strategic priority areas: i) agricultural production; ii) livestock and fisheries; iii) rural productivity and cottage industries; iv) microsavings and credit enterprises; v) rural cooperatives; vi) rural socio-economy; vii) rural renewable energy; and viii) environmental conservation.

One important development in this regard was the launch of the ASEAN Economic Community in 2015. The government also requested the Food and Agriculture Organization of the United Nations (FAO) to formulate a National Action Plan for Agriculture (NAPA). Agriculture in NAPA is defined broadly to include crops, livestock, fisheries and forestry as well as several subsectors of the rural economy closely linked to agriculture such as agro-industries, product value chains, markets, finance, etc. The ultimate objective of NAPA, through the NSPARD, is poverty alleviation and rural development in Myanmar. The NAPA project aims to provide strategic guidance for the effective implementation of the agricultural component of the NSPARD through a comprehensive agricultural and rural development plan consisting of reform proposals for policy and institutions, which are to be backed up by investment plans.

Under the assigned Terms of Reference, the consultant reviewed all relevant aspects of activities related to food safety, standard and quality in Myanmar, with emphasis on the importance of the supply chain of value-added products from the smallholders and poorer rural households, although other small and medium food production activities from the government and private sectors were also covered. The report reviews the policies, prevailing laws, regulations and market opportunities facilitating or impeding the growth/effectiveness of food safety and quality standard services; analyses the feasibility of agriculture/livestock/aquaculture insurance; assesses the capacity of the service providers (government, private sector institutions and NGOs); describes constraints and opportunities and expected risks for rural people and also reviews the ongoing and completed technical assistance and development projects for the promotion of food safety and quality standards and lessons drawn from such projects.

2. BACKGROUND

2.1 Food safety and quality in the context of Myanmar

The Asia and the Pacific Region covers about 23 percent of the world's land area and accounts for around 32 percent of the world's arable and permanently cropped land. The region contains 53 percent of the world's total population and 73 percent of the agricultural population. Thus nearly three-quarters of the world's agricultural population exists on one-third of the world's arable and presently cropped land. Although the percentage of agricultural population to total population in the region has declined, the actual agricultural population in the region has increased in absolute numbers. The ratio of arable and presently cropped land to agricultural population has declined because of severe land scarcity. It is evident that the highest engagement of the labour force is in the agriculture sector in countries like Nepal (81 percent), Lao PDR (80 percent) and Afghanistan (80 percent). Myanmar follows suit with 70 percent employment in the agriculture sector. Dependency on agriculture still continues but it has sharply declined due to vulnerability to various risks.

Myanmar has a diverse and favourable range of agro-ecological zones with varying climatic conditions, land quality and suitability for agricultural activities. The country is largely self-sufficient in basic food commodities, with surplus production of rice, pulses and fish in most years. Generally food security at the national level has a potentially important role to play in regional food security. Rice accounts for the largest area of crops grown in Myanmar – about 7.6 million hectares (mha) or 34 percent of the total (multiple) cropped area of 22.7 mha in 2011/2012. Paddy production has increased considerably in Myanmar since the introduction of high-yielding varieties (HYVs) in the late 1970s and the growth of summer (dry season) paddy since 1992. Between 1994/1995 and 2009/2010, the area harvested increased from 5.75 mha to 8.06 mha, paddy production from 18.2 million tonnes (mmt) to 32.7 mmt and paddy yield from 3.17 tonnes/ha to 4.06 tonnes/ha, or by 40, 80 and 28 percent respectively. Analysis of the change in production shows area growth contributing 58 percent and yield growth 42 percent. For 2011/2012, self-sufficiency based on total utilization (i.e. adjusting for seeds, losses etc.) is estimated to be 147 percent. According to a Myanmar Rice Federation (MRF) estimation, total production of milled rice is about 14-15 mmt, domestic consumption 11-13 mmt, leaving 2-3 mmt as exportable surplus. The area and production of maize, the second most important cereal after rice, has increased rapidly over the years, from about 133 000 ha in 1999 to over 327 000 ha in 2007 and production from 194 000 tonnes to 1 million tonnes in these periods.

Myanmar is one of the largest global exporters of beans and pulses. The 2010 Myanmar Census of Agriculture showed that between 2003 and 2010, the area cultivated with pulses increased from 6 to 15 million acres, or by 147 percent, compared to 70 percent growth for cereals and declines for tubers and industrial crops. In 2011/2012, the pulse area was estimated to be 10.9 million acres. Several types of pulses are grown, the major ones being chickpea, butter bean, green gram, pigeon pea, black gram, kidney bean, cowpea, lab bean, sultani and sultipya, while major exportable varieties are black gram, green gram, pigeon pea, soybean, cow bean, butter bean and kidney bean. Pulses are sown mainly in the Central Dry Zone (CDZ), followed by Delta, hilly and coastal regions in that order.

According to the comprehensive FAO study on the oilseed sector of Myanmar (Favre and Myint 2009), about 16 percent of the cultivated area, or nearly 7.5 million acres of land, is sown with oil crops, which is the third most important crop group in Myanmar agriculture after cereals and pulses. The area under pulses overtook the oilseed area since liberalization of the pulse trade in the early 1990s. Sesame occupies some 47 percent of the oil crop area in Myanmar while sesame oil contributes to about 37 percent of the total edible oil produced. Myanmar is ranked third as a world sesame producer (7 percent of global production), after India and the People's Republic of China. But for sesame oil, Myanmar ranks second (at 22 percent of global output) after China (24 percent) and before India (17 percent). Groundnut is an important cash crop from poverty reduction; also as it is grown on a wide range of soils and climatic conditions in the semiarid tropics. It has also the largest share (33 percent) of Myanmar edible oil production. Productivity is low due to low seeding rates, which in turn is attributed to relatively expensive seed. For 2011/2012, the total oilseed area was estimated to be 9 million acres.

Myanmar is considered to have a moderately high degree of competitiveness in sugar-cane farming, and substantive prospects are seen for foreign direct investment (FDI) in sugar production. Historically, the sugar industry has been dominated by the state sector. Currently, the private sector has a share of about 50 percent of total production. One of the issues discussed prominently in the literature is the restructuring of the sugar industry.

There is consensus that Myanmar's dairy sector is seriously underdeveloped relative to potentials and to the state of the industry in other Association of Southeast Asian Nations (ASEAN) countries. Dairy imports were valued at about US\$75 million in 2012. Low per capita consumption of dairy products in Myanmar (about 26 kilograms of milk/dairy products a year versus 50 kilograms in Thailand) is also an indication of the potential for further growth. While fresh milk consumption is low, use of condensed milk is growing rapidly. Myanmar has a large cattle population (13.5 million) but only about 400 000 head of dairy cattle. There are only six farms with more than 300 cattle in Yangon Region; most dairy farms have 20 or fewer cattle. There are no commercial dairy cow breeding operations. It is estimated that there are over 400 milk-processing plants producing solid condensed milk, providing about 200 tonnes per day or 73 000 tonnes per year.

Annual fish production in 2011/2012 was estimated to be about 4.5 mmt, of which 52 percent was marine, 20 percent aquaculture and 28 percent freshwater. This is a substantive growth from 680 000 tonnes in 1985/1986 and 1.5 mmt in 2001/2002. Total export is estimated to be around 317 000 tonnes, valued at US\$654 million. Marine fisheries have developed continuously in Myanmar since 1950 and gone through a phase of rapid growth since the late 1990s, increasing production from 0.6 mmt in 1998 to about 1.6 mmt. Marine capture fisheries in Myanmar can be divided into small-scale inshore and offshore marine fisheries. In 2011 there were 28 350 small-scale fishery boats registered by the Department of Fisheries of which 15 100 (53 percent) were non-motorized. In addition, there were 2 450 offshore vessels of which 400 (16 percent) were owned by foreigners.

Most of the state rice-milling sector falls under the Ministry of Commerce, and the Myanmar Agricultural Product Trading Enterprise (MAPT) under the Ministry of Commerce purchases paddy for milling on behalf of the government for targeted groups and exports. Total purchases for 2003 up until October 2003 were around 10 percent of production, which were milled by MAPT in its own mills or private contracted mills. MAPT owns 70 mills and employs a further 513 private mills on a seasonal basis. About 80 percent of the rice mills are small-scale with old technology that struggles to produce good quality rice. As a result, mill losses, measured mostly by broken grains, are 20 percent higher than in Thailand and Viet Nam. Rice mills – small to large – represent about 13 percent of the total industrial enterprises including both agriculture-based and non-agriculture industrial establishments. In 2011-2012, there were a total of 1 220 large- to medium-sized rice mills. Average milling recovery ranges from 45-65 percent, depending on the type of mill and quality of paddy. There are 17 such mills in the industrial zones of the Yangon Region and three mills in the Ayeyarwaddy Region. It is estimated that only 23 large rice mills are said to be producing 5 percent of broken rice at a high standard, with the other 80 large mills achieving 15 percent of broken rice.

Local food industries, based on fruits, vegetables and fish comprise 63.51 percent of Myanmar industries.

2.2 Current status and trends

The population of Myanmar has steadily grown since a census taken in 1872, rising from 2.7 million to 10.5 million in 1901, to 13.2 million in 1921, then to 28.9 in 1973, 35.3 million in 1983 and 51.4 million in 2014. Data from the 2009-2010 IHLCA survey indicated that at 34 percent, the poverty rate for the Yangon Region seems surprisingly high. The 33 percent poverty rate for the Mandalay Region also seems high, particularly in light of the important

commercial role that both Yangon and Mandalay cities play in Myanmar's economy. These high rates of poverty are partly reflected by the high and rising cost of living in urban areas; although urban areas have much better local infrastructure and basic services, residents pay a lot to access these services. Most poor people in Myanmar live in rural areas with limited access to critical services such as extension and they have no crop insurance. Yangon has become a magnet for rural migrants seeking new employment opportunities and a chance at a better life. But these new opportunities have been slow to develop. According to the 2009/2010 IHLCA survey, the urban poor are typically employed in the informal sector, or as casual, unskilled workers in construction or other service sectors, and many have limited education and job skills. Limited access to stable, well-paid jobs is another contributing factor to urban poverty.

Like in other countries, the food industry in Myanmar comprises mainly small businesses which are responsible for a large share of the food consumed. Many small food businesses are owned by one person or by a small group of people, mostly owner-managed and independent of ownership by larger groups of companies. They serve local customers and have a limited share of the available market. They are customer-focused, whether they are conscious of this or not. Indeed, many small food businesses have direct contact with consumers in a way that larger businesses cannot achieve. The government aims for indigenous small food businesses to thrive, but it must at the same time protect public health. Because of their size, lack of technical expertise, economic resources, or the nature of their work, owners encounter difficulties in implementing food safety in their food businesses.

Increasing urban populations have been accompanied by proliferation in street food vending in clusters around places of work, schools, hospitals, railway stations and bus terminals. Street foods have significant nutritional implications for consumers, particularly for middle- and low-income sectors of the population who depend heavily on street food. It has significant nutritional implications at the work place as well as other important locations; and its variety and form depend upon local eating habits, the socio-economic environment and trends in style of living. It is recognized that the issue of street foods is quite complex in terms of its political, economic and health implications. They are inexpensive when compared to food from the formal sector (such as restaurants, hotel, etc) and in fact are often less expensive when compared to home-cooked food. They also fill the need of providing food at places where people work or otherwise congregate.

There are positive socio-economic and cultural factors in favour of street foods but significant negative factors also prevail including generation of traffic congestion, encroachment on and blocking of pavements, accumulation of filth and garbage and the illicit use of water and electricity. Important aspects of street foods that deserve particular attention are related to their potential for creating serious food poisoning outbreaks due to microbiological contamination, improper use of additives (in particular the use of unapproved colourings) and the presence of other adulterants and environmental contaminants. Improper food handling practices could be a serious cause of contamination. There are also problems with potable water supply, the quality of raw materials used (for example rotten vegetables or spoiled meat) and unsuitable environments for street food operations (such as proximity to sewers and garbage dumps). Inadequate facilities for garbage disposal pose further hazards. Street food vending becomes a problem in terms of degradation of the environment, deterioration of law and order, and jeopardy to the health of the consumer from food sold under unregulated conditions.

Besides the traditional technologies used in food preparation there are other technologies which have a bearing on food safety and sale value. These include storage of potable water, utensils for cooking, storage and sale, the means of heating or cooling and the source of energy for the same, the design of stalls and push-carts, the wrapping and packing applied to food, the means of serving the food, the means of cleaning and the facilities for waste disposal, and the provision of toilet facilities. The lack of an adequate supply of potable water for cooking, cleaning utensils and washing hands may cause street food to be unsafe. Often unclean water is used in beverages and more so as drinking water.

2.3. Types of food safety and quality standard systems in Myanmar

Several ASEAN bodies have been formed to lead programmes on food safety, standards and capacity building. The ASEAN Expert Group on Food Safety (AEGFS) provides the overall oversight, facilitation and coordination of food safety activities in the ASEAN region. The ASEAN Food Safety Improvement Plan consists of the ASEAN Food Safety Policy and Plan of Action. Ten programme areas have been identified for improvement, namely, legislation, laboratory services, monitoring and surveillance, implementation of food safety systems, food inspection and certification, education and training, information-sharing, research and development, international participation, and consumer participation and empowerment. Of these, five programme areas have been identified as priority areas, i.e. legislation, laboratory services, food inspection and certification, information-sharing, and consumer participation and empowerment. FAO (2011) suggested a framework for organizing issues and priorities in the subsector in terms of six priorities for public sector roles and investment. These are: i) animal health (disease control); ii) the extension system; iii) policy development focused on supply chains; iv) livestock trading and marketing; v) competitiveness of the dairy industry; and vi) as a cross-cutting priority, evidence-based and inclusive policy development processes.

It is obvious that the state of food safety, quality and standards in Myanmar is relatively underdeveloped. Myanmar lags behind in many respects from many other developing countries in the region as it missed opportunities to participate in numerous global and regional programmes and projects focusing on strengthening of technical, physical and professional capacity related to food safety, especially since around 1995 when food safety issues came to prominence in the food security and trade domains following the World Food Summit and the coming into force of the World Trade Organization's Uruguay Round Agreement. Trade sanctions and the loss of Generalized System of Preferences (GSP) status in some major export markets also interrupted efforts underway to improve standards. Myanmar was also a late participant in ASEAN's efforts to upgrade standards and food safety in the region. So, all in all, there are considerable challenges ahead in all elements of food safety. Akin to food security, there is no single solution to food safety but a well-coordinated effort is needed across all of its components.

The issues on food safety and food control system typically face challenges in strengthening around the five key components and priorities of i) food legislation; ii) food control management; iii) inspection services; iv) laboratory services; and v) information, education, communication and training, and these also feature prominently in the limited literature on food safety in Myanmar. Many of the elements and issues around this subject are 'non-divisive' in the sense that there is a consensus that Myanmar needs to do more in all these areas. Some areas or issues do have policy trade-offs, e.g. in supporting one element of the food safety framework more than others and in incentivizing the private sector to take the lead in some components while public resources are focused on others. These would appear to be

some areas, or challenges, for NAPA work to focus on – not only to identify gaps in each element but also to suggest where public or private sectors have a relative comparative advantage in providing the services given the interlinkages among them. The limited literature on food safety issues in Myanmar is largely descriptive in nature with very limited analysis on aspects such as the quantification of the gaps in standards and required policy, incentives and investment needs to close the gaps.

3. FOOD SUPPLY CHAIN AND CONTROL ACTIVITIES IN MYANMAR

One issue that has been debated for years and continues to be discussed is the comparative advantage of rice production *vis-à-vis* other crops. The issue is one of providing public support to one product or other. Paddy is obviously the favoured crop, supported through farming requirements and provision of inputs and facilities. The stated official position in Myanmar is to boost rice exports as well as to promote farmers' income and welfare rather than output. To what extent these two goals conflict is not clear as there are no studies on the relative profitability of different crops under various conditions, with or without explicit targeted support. But a recent development of the rice industry could be perceived as the formation of rice-specializing companies. They attempt to overcome constraints such as poor rice quality, low selling price, lack of proper seed industry function, improper supply chain management, insufficient financing to farmers, etc.

The use of pesticides in agriculture has played an important role in the enhancement of agricultural production. Currently there is a reliance on both organic and inorganic fertilizers, but crop production is constrained by the shortage of organic manures sufficient to sustain cropping systems on even the smallest of farms, and the present high price of inorganic fertilizers. Although imports of fertilizers are liberalized for the private sector, most farmers are unable to acquire sufficient amounts due mainly to financial constraints. The government has also allowed the private sector to import and produce fertilizer for distribution. Pesticide use in Myanmar has increased because of the need for improved production and lower postharvest losses. At the same time, there is concern about food safety, so pesticide use is restricted to the lowest possible level.

The livestock sector supplies high-quality nutrients (mainly protein but also energy sources such as fat and carbohydrates, and micronutrients) through meat, eggs, milk and honey. The sector largely supplies the domestic demand for meat and eggs, but only part of the domestic demand for milk/milk products and honey. Meat competes with fish as a high-quality protein source. Livestock sometimes poses a threat to humans. Diseases can be transmitted from sick or dead animals such as avian influenza from chickens, anthrax from cattle, buffalo and pigs, and rabies from dogs. Livestock products meant for consumption can pose a threat to humans if they contain pathogens that have become established in edible parts during the animal's life, or during processing or storage. According to FAO (2011), animal health and livestock disease control should receive top priority in Myanmar for public sector attention and investment as this has the most direct outcome for livelihood improvement. FAO adds that the technology for effective disease control is available but requires resources to be applied successfully. Lack of detailed knowledge of the epidemiology of most of the diseases affecting livestock belonging to smallholders is a constraint to formulate policies and control programmes.

Briefly, the export of live cattle is prohibited by law, presumably to ensure that there is enough draught power for farming. However, this policy is not universally accepted and policy discussions are constrained by lack of reliable statistics and analyses. Exceptions have been made to export bans, e.g. some exports of cattle to Malaysia have been allowed from

time to time. In the case of sheep and goats, live goats are exported, including over land borders. For beef and other meats, exports are not banned with most beef exports being made to China via the land border. This trade is considered to be substantive. A number of official documents are required for meat product export eligibility. These include permission for cattle movement by source area, export licences, certificates of quality from authorized slaughterhouses and certificates for product, volume and price from the Livestock Breeding Veterinary Department (LBVD). Feed cost is another important issue to address. There have been increasing reports of Myanmar facing the same problems raised in other countries of high and increasing feed costs. This is a cross-sectoral issue, also linked to production and trade policy of various feeds like maize and oilseeds. Statistics on costs and cost-price ratios need to be assembled for evidence-based discussion of these issues. Given the large livestock population in the country, there is good potential to develop value-added processed industries such as hides, skins and footwear.

Global demand for fish and fishery products has increased rapidly over the last 50 years and human consumption of fish has increased. Fish is a good source of low-fat protein, minerals and omega-3 fatty acid. Fish is consumed in many forms such as fish paste, fish sauce, dried fish, salted fish, pickled fish and fish crackers. It also largely contributes to the protein requirement of the people of Myanmar. Therefore, the fishery sector is one of the most important economic sectors after agriculture, as an important contributor to the improvement of socio-economic conditions of Myanmar. The Roadmap for Integration of the Fisheries Sector has focused on four areas: i) food safety issues (Sanitary and Phytosanitary Measures [SPS], Technical Barriers to Trade [TBT], compliance with international good practices and standards, testing facilities, recognition of testing results and certification); ii) research and development (R&D); iii) human resource development; and iv) information sharing. LEI Wageningen (2012) provides an excellent listing of key constraints to the export competitiveness of Myanmar fishery products to the EU market (which also apply to exports to other markets). These include: i) unreliable and high cost of electricity (essential for fishery processing and cold storage); ii) lack of raw material supply for various reasons including declining supply from capture fisheries, necessitating import of fish from as far as South America, which may not be sustainable; iii) food safety; iv) competition from regional buyers, including the issue of trade deflection as some of the neighbouring countries receive export subsidies from their governments; v) tax burden, which has been reduced in recent years (from 10 to 7 and to 2 percent in late 2011) but could be raised again; vi) financial sanctions, which have hurt trade but could be abolished soon; vii) 100 percent food safety checks for the EU market, which add considerably to the cost, but a problem that can be solved through investment and better management; and viii) visibility in the international market which has been undermined considerably due to years of absence in trading with developed countries.

There are many issues and requirements for food safety and quality standards under primary food production. Many in Myanmar related to agricultural production concern lack of production knowledge, inadequate postharvest processing as well as poor facilities and infrastructure in production areas. There is a need to supply quality seed for good quality and high yields; to provide postharvest technology and facilities; to apply GAPs (to be issued by the MoAI); and to organize organic farming and contract farming. For the livestock sector, the issues are variability in the quality of raw materials and produce (unsafe produce), lack of reliability in the quality and quantity of raw material delivered and lack of detailed knowledge of the epidemiology of most of the diseases affecting livestock. The *Good breeding practice* guidelines issued by the MLFRD need to be followed. Local fishing communities have considerable problems marketing their catches. Particular issues include significant price fluctuations (even on a day-to-day basis), transportation problems, insufficient buyers and

lack of cold storage/ice facilities. Handling and postharvest treatment of fish are relatively primitive. Most remote landing facilities do not have access to ice and preservation of catch quality is problematical.

3.1 Issues and requirements of secondary sectors related to food safety and quality standards

The food industry in most countries is a major sector, sometimes accounting for a significantly higher proportion of the gross domestic product (GDP). In 2002, India's food industry was valued at US\$75 billion and accounted for 30 percent of the GDP. In many countries, the food industry comprises mainly small businesses which are responsible for a large share of the food consumed. In 2002, Thailand reported a total of 57 217 food factories: 1 percent (444 factories) was classed as large plants, 3 percent (1 763) as medium plants and up to 96 percent (55 010) as small plants. As in other countries, the food industry in Myanmar comprises mainly small businesses which are responsible for a large share of the food consumed. From 2010-2012, the Ministry of Industry reported the following agglomeration of registered food industries (RFIs):

- 2010: 29 103 RFIs: 6.64 percent (1 931 factories) large; 13.61 percent (3 961) medium; and up to 79.75 percent (23 211) small;
- 2011: 27 391 RFIs: 7.79 percent (2 134 factories) large; 14.50 percent (3 792) medium; and up to 78.48 percent (21 465) small; and
- 2012: 27 500 RFIs: 8.58 percent (2 360 factories) large; 14.89 percent (4 096) medium; and up to 76.53 percent (21 044) small.

Among industries in Myanmar, food industries comprise two-thirds of all industries, mainly rice and edible oil industries.

Small food businesses also provide a large share of the total employment in the food sector and make a vital contribution to the economic well-being of the community at the local level. There are 16 050 small-scale industries out of a total of 21 744 industries. As in other countries, the food industry comprises mainly small businesses which are responsible for a large share of the food consumed. The government aims for indigenous small food businesses to thrive, but it must at the same time protect public health. Because of their size, lack of technical expertise, economic resources or the nature of their work, small businesses encounter difficulties in implementing food safety. Many small food businesses only supply the domestic market and there is no significant presence of larger multinational retail in Myanmar; as a result, small food businesses in catering and other sectors have been reluctant to implement food safety measures. Actually there are many unregistered small food businesses in Myanmar. They face a variety of problems: inadequate location, layout or size of the facility, non-cleanable structures, old non-cleanable equipment, poor staff training and basic sanitation problems, such as easy access to potable water and safe disposal of waste. There are many constraints for large enterprises. Among them are difficulty in accessing raw materials, unreliable supplies of electricity, poor staff skills and technological capacity and insufficient capital inputs. Good hygienic practices are missing in small food businesses in Myanmar. For example, textile dyes are used instead of food colour additives to increase sales/profit.

3.2 Government institutions related to food safety and quality standards

Ministry of Health (MOH)

Myanmar is an active participant in ASEAN/Codex committees but food and drug control activities started in 1927. Food control is multisectoral involving exchange of information, monitoring and supervision at various stage of food production, distribution and marketing. Food and drug safety is concerned generally with the agriculture, livestock, fishery, industry, trade and environment sectors. In recognition of the need for integration, the Food and Drug Board of Authority (MFDBA) was formed and chaired by Minister of Health in accordance with the provision of the National Drug Law, 1992. To ensure efficient and uniform control throughout Myanmar, the Food and Drug Supervisory Committee (FDSC) was formed and chaired by Director General of Ministry of Health, in 1992.

The Food and Drug Administration (FDA) is the regulatory/implementing agency for food and drug safety, guided by the above-mentioned steering bodies. Myanmar food control activities follow the Food Law (1997), Public Health Law and departmental directives and refer to Codex guidelines and standards. FDA strategies address establishing the national guidelines for food standards and specifications with reference to the FAO/WHO Codex Alimentarius Commission and international code of conduct; establishing working relationships with food industries and facilitate effective cost recovery systems for services delivered to the private sector; participating in educational information activities in coordination with health departments; and strengthening coordination activities (analysis, standardization, control and education) with other ministries and the private sector (MoAI, MoLF, MI, MoC, UMFCCI). The FDA implements: (i) health recommendations for local food manufacturing plants; (ii) health recommendations for imported and exported food; (iii) postmarket surveillance and (iv) education, training and workshops concerning food safety and quality. A branch of the FDA has been functioning in Mandalay since 2000. The Food Advisory Committee, Food Orders and Directives Sub-committee and Food Technical Affairs Sub-committee were formed in 2002. In general, the basic elements of a food safety control system started in 1927, although in many cases these were inadequate for the task of complying with food safety requirements in industrialized country markets. Although there was an established inspection system to provide health recommendations for local food manufacturing plants, these recommendations were poorly enforced. Controls on imports and the control and certification of exports were in place, but they proved to be inadequate.

To generate more effective supervision a Food and Drug Control section has been created at the National Health Laboratory (NHL). The NHL is entitled to give certificates for human consumption of imported food commodities. The certificate of food safety is compulsory for food manufacturers.

Ministry of Agriculture and Irrigation (MoAI)

The MoAI is striving for agricultural development by addressing: efficient utilization of land and water resources; farm mechanization; introduction of new technologies; and supply of farm inputs. The MoAI is responsible for all aspects of agriculture and irrigation as well as water resources and its mandate is to develop agriculture and irrigation nationally. The MoAI comprises the Department of Agriculture (DOA), which was formerly the Myanma Agriculture Services (MAS) department, the Department of Agricultural Research (DAR), the Department of Agriculture Planning, the Irrigation Department, the Agriculture Mechanization Department, the Water Resources Utilization Department, the Myanmar

Agriculture Development Bank (MADB), Yezin Agriculture University (YAU), and the Department of Industrial Crops Development. Under control of the Plant Protection Division, MAS, the Pesticide Analytical Laboratory was established with technical and financial assistance from FAO to carry out product quality and residue analysis. The laboratory is being upgraded to augment capacity in the contexts of establishing appropriate maximum residue levels (MRLs) and preharvest intervals, monitoring of residue levels in marketed crops, certification of residue contents in export commodities and analysis of residues in food crops for compliance with ASEAN MRLs and the Free Trade Agreement. Certified Pesticide Applicator training is given to farmers and pesticide dealers are instructed on safe and effective use of pesticide. Biological control methods are components of Integrated Pest Management (IPM) support activities for combating targeted pests.

Ministry of Livestock, Fisheries and Rural Development (MLFRD)

The MLFRD is the key ministry with responsibility for the livestock and fishery sectors. Under the MLFRD, the Livestock Breeding and Veterinary Department (LBVD) is the line technical agency responsible for animal health and production. The major focus of the LBVD is on animal health and disease control. LBVD facilities include vaccine production centres, a veterinary assay laboratory, the central diagnostic laboratory, three regional veterinary diagnostic laboratories, four border area animal quarantine laboratories, an artificial insemination centre and offices at state/region, district and township levels. At the township level there is a township veterinary officer (TVO) and, depending on the township, deputy TVOs and animal health assistants who have undergone diploma-level training. The LBVD has in recent years established capacity in epidemiology.

The primary management institution for fisheries in Myanmar is the Department of Fisheries (DoF), under the MLFRD. The DoF undertakes many functions which include: acting as a regulatory body for the correct and proper conduct of fisheries and aquaculture (including inspection of fishing gear and sites); issuing of licences for fishing gear, vessels, aquaculture sites and ventures; evaluation of sites for aquaculture or fisheries; production of fingerlings for sale to the aquaculture industry and leasable fisheries; acting as an inspection body for trade purposes; administering the system for the auctioning of Leasable Freshwater Fisheries, and collecting fees; stocking of open water fisheries; administering waterbodies for aquaculture, including virgin land, degraded agricultural lands, perennially flooded areas, small dams, and so forth; and training, extension and information provision. While these functions are obvious, there is little information and analysis available in the literature on the issues as well as effectiveness of these regulatory systems.

Ministry of Industry (MOI)

The MOI is the Focal Point of the ASEAN Small and Medium Enterprise Working Group and the Director-General of the Ministry of Industry is the secretary of the SME Agency, which has formulated the SME Law, SME Policy, SME by-laws, Industrial Law and Industrial Zone Law. It is the focal department for Myanmar SME promotion. The Central Committee and Working Committee for SME Development was established in January 2013. The SME Law was enacted on 9 April, 2015. Drafts of the SME policy and SME by-laws have been submitted for government approval. The SMIDB Bank under the MOI is the main bank for SME loans. The SME Development Policy Framework addresses institutional framework; start-up, and better legislation and regulation for SMEs; access to finance, technology and information; promotion of entrepreneurial education and human resource development; supporting favourable taxation and incentives; and enhancing international market expansion and more communication. Many industrial food processors have not implemented complete quality management systems, including HACCP, and general hygiene procedures and

standards are inadequate. The Development Centre for Food Technology under the MOI develops new products of high nutrient value for its own industries. It also has its own specifications both for raw materials and finished products. Under the MOI, food industries have their own quality control and process control programmes.

Ministry of Commerce (MOC)

The MOC is the official focal point of the ASEAN Committee on Consumer Protection (ACCP) and since 2007 has been undertaking activities such as enforcing the main Consumer Protection Law, preparing to carry out the consumer redress scheme and promotion of consumer awareness. In the new political climate, consumer associations will be an important force to effect changes in food safety and standards. The Consumer Protection Law was enacted on 14 March 2014 and the Central Committee was established on 4 June 2014. The Consumer Affairs Division was set up under the Department of Commerce and Consumer Affairs on 1 May 2013. State and divisional head offices have been set up in Yangon, Mandalay, Ayeyarwaddy, Bago, Magwe and Sagaing divisions as well as Kachin, Mon, Rakhine and Shan states. Consumer education and public awareness activities including workshops, training events, meetings and distribution of consumer-related knowledge and information via the media are being carried out.

The MOC has been working in cooperation with relevant ministries and associations to implement consumer protection activities effectively. Being a member of the ACCP, Myanmar has been implementing ACCP work plans including notification and exchange of information about unsafe products, cross-border consumer redress, consumer education and awareness activities on best practices for self-protection through information sharing and education activities and disseminating information on market competition.

Ministry of Science and Technology (MoScT)

Under the MoScT, the Myanmar Scientific and Technological Research and Development (MSTRD) group has nine research departments and five technical support departments. The Department of Standards, one of the five technical support departments, was established in 1956. It formulated the Myanmar Standards and Adoption as national standards. The Agricultural and Food Products Standard was adopted in the 1970s. It cooperates with the MLFRD, MoAI and MOH as well as the ASEAN Consultative Committee on Standards and Quality (ACCSQ) working group focal points. Standardization technical committees have been formed to formulate standards based on international standards. Members of technical committees are inclusive of all stakeholders. The Myanmar Food Standards Law is currently being drafted. After approval of the draft law, a National Standard Council and National Accreditation Body will be organized.

Ministry of Cooperatives (MOCOOP)

Under the MOCOOP, the Small-scale Industries Department provides technical assistance to cooperative societies and small industries related to food processing. The department conducts vocational training effectively and extensively for the development of livelihood programmes; carries out registration and promotion of micro and small-scale industries, according to the promotion of the Small-Scale Industries Law; provides technical assistance to industrial cooperative societies and small-scale industries; and conducts food technology transfer programmes. The R&D section of the department performs research on innovations for starting new enterprises and also conducts food quality control (chemical and microbial analysis).

Local government organizations/city development committees

The health departments of the Yangon City Development Committee, Nay Pyi Taw City Development Committee and Mandalay City Development Committee are responsible for food hygiene and food safety in their respective development areas such as approval of health certificates for food stalls, issuing licenses for food stalls, medical inspection of food handlers and conducting water and food analysis as well as training on food safety. Other functions are (i) surveillance, prevention and control of communicable diseases; (ii) pest control (control of mosquitoes, flies and rats); (iii) regular inspection of food and food stalls and laboratory examination of food to ensure food safety; (iv) regular inspection of water, including sampling and analysis to ensure that water supplied to the city is safe; (v) monitoring environmental health, including proper disposal of refuse and garbage to remove any sources of infection; (vi) regular inspection of dangerous and offensive trades; (vii) cleanliness in public places and prohibition of public nuisance; (viii) health education; and (ix) training on food safety. Authority is limited to implementing an effective regime of inspection of processing facilities and certification of export consignments. There is a need for better training of food handlers in basic hygiene procedures and the employment of effective supervisory and quality management.

At present, the international food market is very cautious about health and standards to ensure safe and hygienic food. Exporting countries are increasingly and constantly demanding quality assurance. Stimulated by the recent liberalization of economic policy, food production and processing is increasing. Adaptation of manufactured foods to international standards of safety, quality and labeling will require more complete food analysis and an extended system of supervision. In this context, quality control laboratories are now in place (Annex 3). However, generally, laboratory facilities are not of the required standard to provide tests that could be regarded as valid and reliable.

4. CURRENT POLICIES RELATED TO FOOD SAFETY IN MYANMAR

An Agriculture Sector Review was undertaken by FAO in 2004 which set out the broad objectives for sector development. Subsequently a range of policies and strategies have been formulated, namely (a) the national policy/development plan in Myanmar which comprises the National Comprehensive Development Plan (2011-2012 to 2030-2031) and the Fifth Five-Year Plan (2011-2012 to 2015-2016), (b) Rural Development and Poverty Alleviation Action Plan, (c) Agriculture Sector Development Policy, (d) 20-Year Development Plan in the Agriculture Sector (2011-2012 to 2030-2031) and (e) the Fifth Five-Year Development Plan (2011-2012 to 2015-2016). The agriculture sector has set the three objectives of achieving surplus in rice production, self-sufficiency in edible oils and stepping up the production of exportable pulses and industrial crops to realize the three national agricultural policy objectives of food security, export promotion, and raising income and welfare of the farmers.

The present approaches employed for implementation of the policy and plan objectives can be regarded as the 'State-led Approach' and 'Rice-production-orientation Approach'. Under these approaches, the high priority assigned to rice production rather than agricultural production is obvious, and state intervention has also not been significantly reduced. Although tangible progress has been achieved in the sown acreage, production and exports of certain crops, especially paddy and pulses, the performance of agriculture as a whole could be perceived as being far short of its true potential. There are some policy issues in the edible oils subsector, mainly in the trade/pricing area. Around 2009, Myanmar was considered to have a deficit of 0.2 mmt of edible oils (with 0.4 mmt of consumption and 0.2 mmt of production). The official

policy for many years has been self-sufficiency in edible oils in addition to the interest on sustainable environments; food safety and protection of environmental hazards have also been addressed by promulgating the Pesticide Law, the Plant Pest Quarantine Law, the Fertilizer Law and the Seed Law. The Pesticide Law was enacted in 1990. Since then pesticide registration, licence issuance, training on self-handling and efficient use of pesticides, pesticide residual control etc. has been carried out. The Plant Pest Quarantine Law was enacted in 1993 in order to prevent the outbreak of disease and pests from importation of alien invasive plant species. Quarantine inspection stations have already been established at five check points at border areas and there is one at Yangon International Airport. The IPM system is also being practised for important crops like paddy, cotton, oilseed crops and pulses in order to raise awareness about the importance of natural balance in the environment and preventive measures for disease and pest infestation on crops. The Fertilizer Law, enacted in 2002, covers not only organic and inorganic

Fertilizers but also bio fertilizers produced with beneficial organisms such as bacteria and fungus. The Seed Law is still being processed. The National Seed Committee is chaired by the Deputy Minister for Agriculture and Irrigation and the Managing Director of MAS is the secretary. The MAS has established more than 10 inspection camps at all points of entry along borders and at international airports and post offices handling foreign mail.

Although no specific legislation is in place related to hygiene in the processing and marketing of fish and fishery products, there are various relevant acts and regulations, including the Public Health Act; Food, Drugs and Chemical Substances Act; Food Hygiene Regulations; Fisheries Act; and Standards Act.

5. FOOD SAFETY SERVICE PROVIDERS

Agriculture and the agribusiness sectors make an important contribution to the national economy in Myanmar. The specific nature of the sectors varies from country to country in terms of food products, types of technology employed, size of businesses, access to domestic and export markets, and development of GHP, GAP, GMP and HACCP programmes. The government takes responsibility for public health and economic development; improvements in food safety – including the implementation of GHP/GAP/GMP and HACCP in food businesses – can have a positive effect in both areas. A wide range of stakeholders are working towards the common goal of food quality and safety: government departments (health, agriculture, fisheries, education, science and technology, commerce in addition to external influences (buyers, accreditation organizations and standard-setting agencies). National governments and associated agencies and bodies are interested in HACCP systems in food industries. External and internal commitment is important for the development and implementation of a successful HACCP initiative in the food industry. For many street foods and small food businesses in Myanmar, HACCP means additional costs in upgrading facilities. Furthermore, hygiene management can be hindered by the local infrastructure. Good hygienic practices tend to be lacking in small food business compared to the food industry. For successful HACCP implementation, the concept must be understood by food business owners and managers. Their understanding and commitment is crucial if staff are to effectively operate a food safety management system. Assessment of human resource capacity to support technical transfer and extension services along the supply chain of value-added products from the farm to consumer is very limited in Myanmar at the moment.

5.1. Food Security Working Group (FSWG)

Based on the collective experience of organizations active in food security in Myanmar, the FSWG has developed the following general framework for food security interventions in the country. The FSWG considers this framework as the joint responsibility of all actors in the sector. Any specific interventions and local applications will depend on a range of additional factors that go beyond the scope of this document. The goal of the FSWG and its Member Organizations is to achieve food security for rural and peri-urban communities in Myanmar. This goal can be addressed under a variety of objectives. The objectives can either be seen as directly increasing food security and improving livelihoods (through increasing availability, access and utilization of food) or as enhancing the enabling environment. For each of these objectives a wide variety of activities can be employed to achieve them.

5.2 Food Science and Technology Association (FoSTA)

The objectives of the FoSTA are to promote knowledge development, communication exchanges and the application of science and technology to any aspect of food science and technology; to advance the interests of the food profession and to promote high ethical standards within the profession; to develop collaboration with other national and international bodies concerned with food science and technology; to promote the education and training of food scientists and technicians; to participate as a full member of the Federation of Institutes of Food Science and Technology in ASEAN (FIFSTA); and to organize conferences and exhibitions as a professional association of food science and technology. Currently, there are three working groups addressing research and development, training/workshops and seminars, and academic programmes.

5.3. Myanmar Food Processors and Exporters Association (MFPEA)

The MFPEA has attempted to promote the production of high-quality and safe food in Myanmar for local consumption and export. It has laboratory testing services and provides food quality management system training services. It organized the national workshop on food safety and food standards in Myanmar in July 2012. At the workshop, the stakeholders discussed food categories, food quality standards, hygiene standards, labeling, food additives and packaging as well as physical, chemical and microbial hazards.

5.4. Myanmar Consumer Union (MCU)

The MCU is organizing awareness-raising events, advocacy for different stakeholders and seminars for education on the rights and responsibilities of consumers due to poor quality products, unsafe food issues and inferior services that have negative effects on consumers and the natural environment. Indeed, there is an urgent need for better consumer education amongst general consumers, entrepreneurs and the authorities. The MCU, therefore, was formed on 18 November 2012 with 15 executive committee members from medical, legal, educational, agricultural, engineering, scientific and economic backgrounds, among others. The MCU plans to develop 15 states/divisions and 325 township-level branches to strengthen relations and partnerships in both national and international organizations working for consumer rights and responsibilities, and food hygiene.

5.5. Tun Win Aung Rural Development Services

Since 1999, a training consultancy team has been assigned to conduct food-processing training in the CDZ, Southern Shan State and Delta area under the UNDP/FAO projects MYA/96/006, MYA//99/007, MYA/99/008. Feasibility studies were conducted at 44 villages in Kyaukpadaung, Chaung Oo and Magway townships. Under the guidance and instruction of the Chief Technical Advisors of the projects, the training has been successfully organized and

solar dryers were successfully introduced to the CDZ to produce value-added food products (e.g. dried onion in Magway Township area). Since the devastation wrought by Cyclone Nargis, the organization has been providing village-level food-processing training to generate community income as well as enterprise development training to build community business capacity.

5.6. Shan Maw Myae Co., Ltd.

The objectives of the Shan Maw Myae Organic Group are to address poisonous chemical residues in agricultural products; to promote food products that are free of harmful chemical residues; and to enhance low-cost production and better returns and profits for the vegetable farmers of Myanmar. Production and distribution of (1) organic agricultural inputs, (2) organic livestock breeding inputs and (3) health care products as well as the formation and promotion of organic group and studying the value chain of food processing in the agribusiness-sector.

6. THE AGRICULTURE SECTOR AND FOOD SAFETY/QUALITY

The principles of Good Agricultural Practice (GAP), including IPM, are requisite for delivery of agricultural produce that is safe to consume. This requires good bio-efficacy and monitoring of MRLs in commodities intended for both local consumption and export. Thus there is a need for products of consistently high quality. Myanmar has enacted a pesticide law, following various FAO guidelines regarding management, registration, importation, distribution and use of pesticides.

Myanmar has a framework for national GAP for farmers which defines essential elements for the development of best practices for safe and quality produce production via IPM and integrated crop management. Myanmar implements GAP according to ASEAN GAP standards for production, harvesting and postharvest handling, packing, processing and preparation of commodities to prevent or minimize hazards. ASEAN GAP addresses food safety, environmental impacts, workers' health, safety and welfare and quality produce. It is essential that all organizations involved in the food production chain accept their share of the tasks and responsibilities to ensure that GAP is fully implemented. To maintain consumers' confidence in fresh produce, GAP standards must be adopted. All growers should be able to demonstrate their commitment to do this.

7. CONSTRAINTS, OPPORTUNITIES AND EXPECTED RISKS FOR RURAL PEOPLE

The loss of the EU market due to food safety reasons was a major factor behind interruptions to various improvement measures. Things have changed and the outlook is much better now with the lifting of sanctions and restoration of the GSP status. There are many opportunities for mobilizing private investment and technical assistance from developed countries as well as ASEAN members. Indeed, fisheries were among the 11 priority sectors identified by ASEAN leaders in 2004. One of the four areas of the *Roadmap for Integration of the Fisheries Sector* is on food safety issues (SPS, TBT, compliance with international good practices and standards, testing facilities, recognition of testing results and certification). The overall outlook among traders and processors for improvements in this area is very positive but challenges are immense as Myanmar has lagged behind ASEAN standards for several years.

At present, the international food market is very cautious about health and standards to ensure safe and hygiene food. Countries are increasingly and constantly demanding quality assurance. Stimulated by the liberal economic policy, food production and processing is increasing. However, sampling and testing facilities in Myanmar are insufficient. The adaptation of manufactured foods to international standards of safety, quality and labeling will require more complete food analysis and an extended system of supervision. Myanmar's statistical system is generally characterized by poor quality data. This is the result of limited capacity and funding over the years, while the use of some data has become highly politicized.

Most people food manufacturers and street food vendors are not technically skilled enough to conduct a meaningful hazard analysis as this is in the early stages of implementation. Barriers envisaged by all food industries, large and small, depend on customer demands; moreover, they suffer time/cost pressure. They lack motivation and believe that GAP/GHP/GMP/HACCP would not necessarily make a difference in their business. The consumer can be a very strong driver for change, but when customers (and consumers) do not perceive food safety as an issue of fundamental importance, it is unlikely that small food businesses will be driven to implement GHP/GMP/HACCP. Consumer awareness (and the pressure that can be placed on food businesses) is in the early stages of development. The mass media is in an excellent position to educate consumers and to promote the demand for safe food and appropriate control systems. However, this may also have a negative effect if not handled properly and if journalists are not appropriately informed.

It is not by chance that most street food vendors in Myanmar are women. Women are involved in food preparation for the family at home and therefore establishing a small street food vending business comes naturally to them; this has many significant positive social implications. Therefore, targeting women for awareness-raising on food safety/hygiene is an obvious strategy.

Food processing is vital to rural communities to ensure their food security and to increase their income and employment. Successful village-level food processing can enhance the quality of their lives. Food processing is more accessible than other types of business. Everyone is familiar with the food that they grow and eat. However, the risk of contamination and variable product quality may reduce the value of the processed food and potential income and sometimes lead to unsafe food for consumers. To deliver consistently high-quality products, processing skills should be augmented by technical skills related to GMP in food processing, food hygiene and safety, and packaging and labeling as well as marketing and financial skills.

To conclude, there is a critical need for an organizational structure (informal or formal) from which the development effort can be directed.

8. TECHNICAL ASSISTANCE AND DEVELOPMENT FOR THE PROMOTION OF FOOD SAFETY AND QUALITY STANDARDS

8.1 United Nations Industrial Development Organization (UNIDO)

National governments and their associated UN agencies and bodies are interested in applying HACCP systems in food industries. External and internal commitment is important for the development and implementation of a successful HACCP initiative in the food industry. With the aim of developing the use of food safety standards in Myanmar, UNIDO is organizing

activities related to Food Safety Management Systems (FSMS). Key requirements for implementing FSMS are solid infrastructure and utilities; adequate qualified human resources; financial resources; management commitment; and awareness of food safety. The primary goal is to build up national capacities at the institutional level. The meaning of 'institutional capacities' covers: 1) a team of food specialists with knowledge and consulting skills, 2) a host structure capable of providing facilitation to specialists (registration, promotion) and matching the supply (specialist expertise) and the demand SMEs need for food safety/technology (FST), and 3) developing the range of services offered on a sustainable (paid) base. UNIDO is implementing FSMS in Myanmar for commodities such as processed food, fish, prawns, dried vegetables and beans, and edible oil at 11 factories. The UNIDO project wishes to adopt a market-oriented development approach. Rather than providing only technical support, the objective is to assist partners in developing their services as a local, sustainable activity. In this approach, the technical inputs (training) are complemented by resources for developing the business side: management, qualifications, cost tracking and recovery, marketing and human resource management. The UNIDO project proposes to develop a food safety/technology unit (FST), which will start proposing and selling consulting services on advice, market research, training and other assistance. The project will ensure training and qualifications of consultants (at the technical level) by availing external expertise and some funding, as well as supporting the host structure for the activity (business management, linkages).

8.2 The Adventist Development and Relief Agency (ADRA)

The ADRA is a Christian NGO with the specific purpose of community development at the grassroots level. ADRA Myanmar projects have been active in some areas of Myanmar such as the CDZ, Delta zone, Chin State and Northern Southern Shan State. In the CDZ, it runs a project on Strengthening Livelihoods in the Dry Zone of Myanmar (SLIM) at Myit Chay, Pakokku Township. The general objective is to contribute to the achievement of MDG 1 in Myanmar by reducing the proportion of population living on less than US\$1 per day and the specific objective is to enhance food-processing capacity and marketing leading to a reduction in poverty for 1 500 households (12 600 beneficiaries) in 15 villages of Pakokku Township. The provision of food-processing training as well as self-help group training and entrepreneur skills training is to strengthen business development for concerned groups.

9. RECOMMENDATIONS

This section recommends priority areas of intervention and investment to enhance the contribution of food safety and quality standards towards poverty reduction and rural development under the NAPA. It is important to note that interventions can have either direct benefits for the primary target groups or by improving the enabling environment provide longer term benefit through support to the government, civil society organizations and/or the private sector.

Myanmar risks losing out on benefits from exports in the regional market due to weakness in non-tariff barriers, notably trade facilitation and product standards, as well as food safety-related issues. Myanmar should be promoting border trade through appropriate trade policy responses covering both the import and export sectors together and also trade facilitation. Further, the upgrading of food safety capacity must be seen as an essential element of efforts to expand export trade performance. There is a need to address food safety challenges and they must aim at prevention rather than correction in the context of food safety.

Myanmar is going through a major transition, which translates into an ongoing review and revision of a series of policies and laws. There is a need for a review and revision of food law

and food policy that puts emphasis on food safety, quality standards; concomitantly development of an appropriate trade and investment policies as well as by-laws and regulations to reinforce the consumer protection law is needed.

There is lack of food safety implementation capacity in both the public and private sectors; the basic components are in place but they are generally outdated and far below international standards. Collaboration is needed at national, regional and international levels to promote stakeholders' involvement in addressing the situation.

Exported products are largely in raw form and not as processed foods that attract higher tariffs. Myanmar has to shift towards local food industries based on primary produce from the agriculture, livestock and fishery sectors. The development of the food industry in Myanmar is vital to substitute imported food products with local produce for local consumption as well as to export commodities for national revenue. Many industrial food processors have not implemented satisfactory quality management systems, including HACCP, and general hygiene procedures and standards are inadequate. To maintain consumer confidence in food products, GMP standards must be adopted. All processors should be able to demonstrate their commitment to do this. On the one hand, the supply chain must continue to maintain and enhance standards of hygiene and food safety to comply with international standards. For village-level food processing, it is crucial to choose the appropriate technology because of limited knowledge of food hygiene and lack of production facilities.

Research systems are plagued with problems including overlapping mandates, leadership and institutional arrangements, as well as suboptimal human, physical and financial resources. Operational linkages between the various research institutions and among research, extension, and training organizations within the public sector are weak. The exchange of scientific information and research results among research organizations, and with research, extension and training institutions is also limited. Human resources are inadequate in terms of knowledge, skills and motivation. Hence, there is an urgent need to strengthen the human and material resources of the present research and development organizations to undertake both pure and applied research in postharvest and agro-processing technology.

There is an urgent need to establish a tertiary-level institution for food science and technology in the country. Such an institution would be able to provide professional human resources for both the private sector and the government and undertake basic research in all facets of food safety, nutrition and new product development. The institution could take the form of a degree programme faculty within an existing institution. Its mandate would be to plan, undertake, aid, promote and coordinate education, research and extension in food science and technology, and offer B.Sc., M.Sc. and Ph. D. degrees in these subjects. The absence of such an Institute of Food Science and Technology in the Myanmar is a major shortcoming and needs to be urgently addressed.

There is also an urgent need to provide technical training to the staff of management agencies within the various ministries on specific areas such as food safety, sanitation, disease and health management, GHP, GMP, postharvest and processing techniques, new technologies in food production and others. It would provide certificate-level training for existing and new food industries. Extension training would be directed at existing operatives within the sector. It would be necessarily short-term residential courses (a week at most). Focus would be on strengthening the skills of target operatives so that they can undertake their particular activity more efficiently. Towards this end, courses have to be much focused and cleared directed towards achieving specific outcomes. For instance, in the case of street vendors, focus can be on training them in good handling and good hygiene practices to the requirements of food safety stewards to reduce food poisoning, food-borne diseases and improve the nutritional

value of their food, thus ensuring the health of the consumer. For small-scale food processors who lack awareness, ability and/or have unwillingness to comply with basic hygiene procedures, attention should be paid to training on GHP, GMP and HACCP principles. Vocational training on product development would address those who wish to acquire hands-on skills in various aspects of food products. Vocational training would be largely directed towards those who are new to the food industry, though there may be those who are sponsored by existing food companies. The training here would be longer (a month or more) depending on the type of training and the level of skills desired. New training approaches need to be developed to meet the specific needs of small food business. It is preferable to provide training courses which integrate basic hygiene and primary GMP.

A major constraint in the implementation of effective controls on food safety in food processing is lack of laboratory capacity. Laboratory facilities are not of the required standard to provide tests that could be generally regarded as valid and reliable. Standards of hygiene in parts of the food-processing sector both in terms of specific structural and/or procedural requirements or the implementation of 'own checks' are below par. There is a need to strengthen laboratory systems by inculcating the required level of precision and/or in the laboratory to be implemented introduce a coherent system of Good Laboratory Practice (GLP). However, the laboratory operated by the FDA is considered to be generally satisfactory in terms of GLP, equipment, methods of analysis etc., although there is some need for improvements to operating procedures as well as including international and regional graduate training for laboratory staff capacity building.

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ANNEX 2: Small-scale enterprises in states and divisions in Myanmar

Sr. no	Type of Work	Unit	Kachin	Kaya	Kayin	Sagaing	Tanintharyi	Bago	Magwe	Mandalay	Mon	Rakhine	Yangon	Shan	Ayawady	Total
1	Rice mill	No	852	28	-	1980	19	84	730	677	693	1464	1550	1420	2236	11733
2	Rice based	No	145	-	289	42	6	14	39	-	6	25	-	34	20	620
3	Maize/bean based	No	29	1	9	94	-	14	63	-	3	37	1	150	-	401
4	Snack/Drink	No	23	-	30	39	33	4	6	182	29	8	102	135	193	784
5	Jiggery/Molasses	No	-	-	-	28	15	-	10	3882	-	-	-	385	272	4592
6	Farm implement	No	38	1	-	22	-	4	4	370	4	20	16	-	-	479
7	Rubber based	No	-	-	-	-	-	-	-	-	14	-	-	-	-	14
8	Bamboo/Cane/Nipper	No	266	3	-	528	3	-	4	629	224	8	953	262	1128	4008
9	Broom	No	17	1	-	30	3	-	-	60	32	-	-	66	60	269
10	Pot/Pitcher	No	5	-	-	257	1	-	7	2711	156	4	20	8	188	3357
11	Hand Weave	No	152	2	-	120	-	- 22	17	3197	150	7	75	50	-	3760

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12	Blackboard/ Rockbeat	No	-	-	-	380	-	-	-	-	7	-	-	-	-	387
13	Fish paste/Dry fish/ sauce	No	-	-	-	-	22	-	-	-	94	-	-	-	304	420
14	Mat	No	-	-	-	200	1	-	18	1853	4	-	-	-	1633	3709
15	Black smith	No	-	-	-	4	-	-	3	1	51	-	-	91	12	162
16	Table salt	No	-	-	-	-	-	-	-	-	6	10	-	-	-	16
17	Shoe /slipper	No	-	1	-	-	-	-	1	-	-	-	9	1	-	12
18	Iron melting/ir on box	No	-	-	-	4	1	29	-	2	-	-	-	-	-	36
19	Grinding	No	-	1	-	16	-	-	3	-	29	-	39	75	57	220
20	Tea leaves pickle	No	-	-	-	4	-	-	-	-	-	-	-	201	-	205
21	Lacquer	No	-	-	-	5	-	-	-	-	-	-	-	3	-	8
22	Shan paper	No	-	-	-	-	-	-	-	-	-	-	-	57	-	57
23	Resin product	No	-	-	-	-	-	-	-	-	-	-	-	19	-	19

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24	Tofu	No	46	-	-	-	-	-	-	-	-	-	-	-	-	46
25	Guitar/tobacco pipe	No	-	-	-	21	-	2	-	-	3	-	-	-	-	26
26	Candle/aromatic stick	No	-	-	-	6	-	-	-	-	-	-	-	-	-	6
27	Fish net	No	-	-	-	-	-	-	-	-	-	-	-	-	22	22
28	Boat construction	No	-	-	-	-	-	-	-	-	-	-	-	-	20	20
29	Plastic rope/plastic bucket	No	-	-	-	-	-	-	-	-	-	-	-	-	91	91
30	Coconut based handicraft	No	-	-	-	-	-	6	-	-	-	-	-	-	45	51
	Total		1573	38	328	3780	104	157	895	13564	1505	1583	2765	2957	6281	35530

Source: Ministry of Commerce, Myanmar

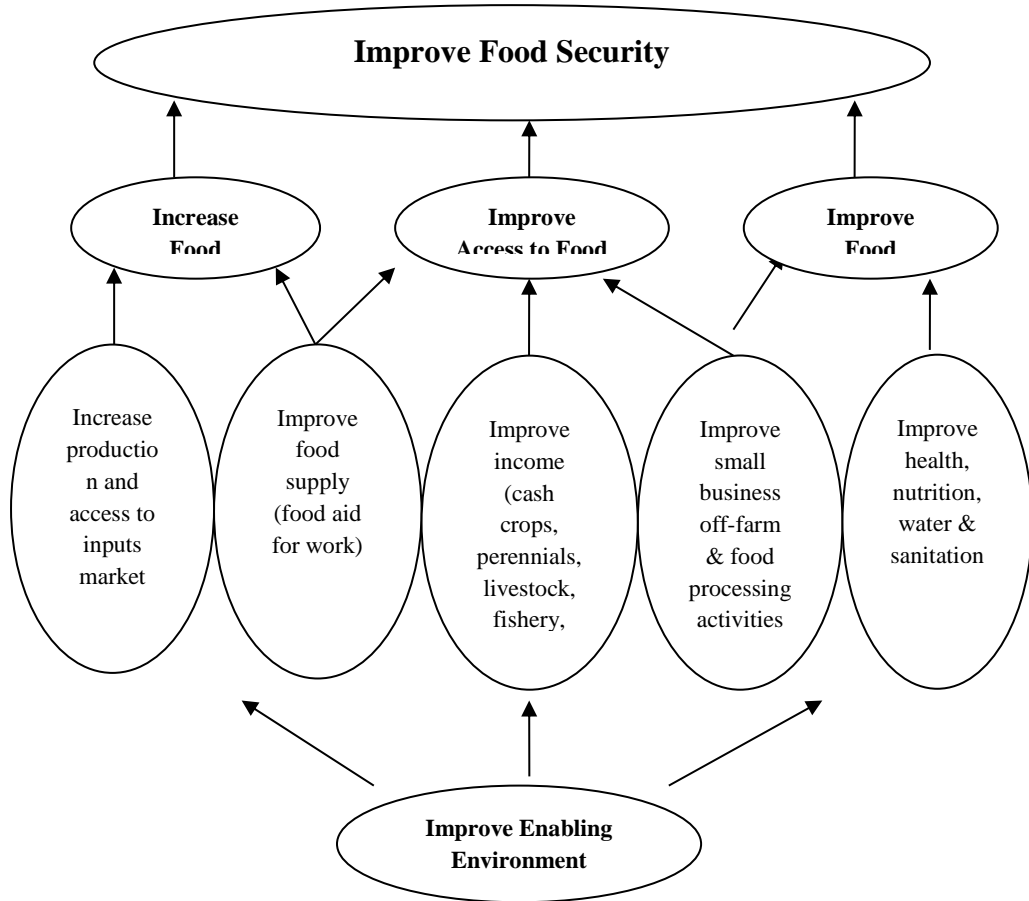
ANNEX 3: Relevant organizations for food testing

Relevant Organizations for Food Testing			
	Laboratory	Organization	Function
1	Food Quality Control Laboratory (FQCL) Public Health Law	National Health Lab, the Department of Health, MOH	Food Quality Control
2	Food and Drug Administration National Food Law	Department of Health, MOH	Registering the inspecting food factories, GMP, GHP, Market surveillance on banned unsafe products
3	Directorate of Industrial coordination and Inspection Industrial Law	Ministry of Industry	Licensing all food manufacturing establishments
4	The Development Centre of the Food Technology	Ministry of Industry	Analysis of food products
5	Pesticide Analytical Laboratory Pesticide Law and Seed Law	Plant Protection Division, Myanmar Agriculture Service, MOAI	Adopting national plant protection policies and strategies of agricultural crops
6	Edible Oil Quality Control Lab	MOAI	Ensure the Quality of Edible oil to meet international standard
7	Post-Harvest Technology Application Center	Myanmar Agricultural Produce Trading, Ministry of Commerce	R&D
8	Metrology Lab Chemical analysis Lab Microbiological Lab	MSTRD Science and Technology Development	Responsible national Quality infrastructure
9	National Analytical Lab	Ministry of Science and Technology	Being established for food, chemical, water, material Analysis
10	Dept of Livestock	Ministry of Livestock Fishery and Rural Development	Quality control of Meat and Milk Products
11	Department of Fisheries	Ministry of Livestock	Inspection and Quality control

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		Fishery and Rural Development	procedures along the production process of fisheries products
12	Myanmar Inspection and Testing Service	Ministry of Commerce	An Authorized organization in the field of inspection and verification for the commodities of exports and imports
13	Food Quality Control Analysis	Small-scale Industries Department, Ministry of Corporate	Improvement of food quality in small food business
14	Laboratory Testing Services Food Quality Management System Training Services	Myanmar Agro-based Food Processors and exporters Association	To promote the production of Myanmar high quality safe food for local and export

ANNEX 4: Objectives for FSWG interventions in Myanmar



ANNEX 5: Type of village food processing

	Category of process	Examples of types of processes
1	Heating to destroy enzymes and microorganisms	Boiling, blanching, roasting, grilling, pasteurization, baking, smoking
2	Removing water from food	Drying, concentrating by boiling, filtering, pressing
3	Removing heat from food	Cooling, chilling, freezing
4	Increasing acidity of food	Fermentation, adding citric acid or vinegar
5	Using chemicals to prevent enzyme and microbial activity	Salting, syruping, smoking, adding chemical preservatives such as sodium benzoate, Sodium metabisulphite
6	Excluding air, light, moisture, microorganism and pests	Packing