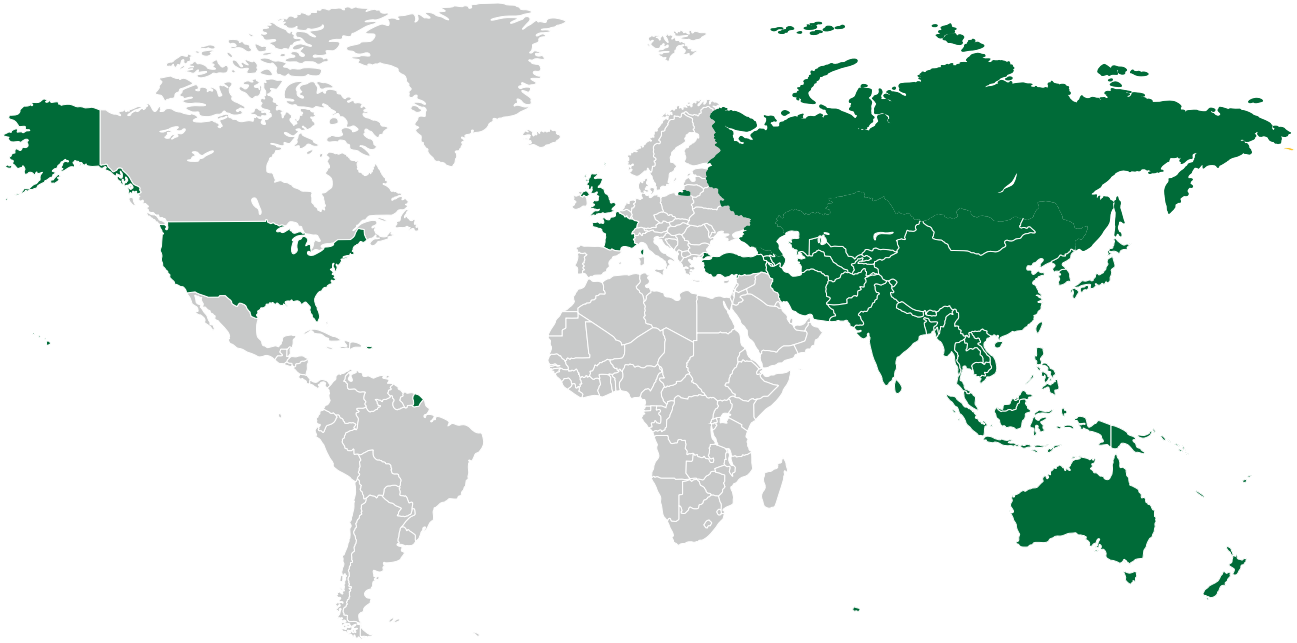
Trade and Investment Policies on Mechanisation of Agriculture

Case Studies of Selected Member Countries of
the Regional Council of Agricultural Machinery Associations
in Asia and the Pacific (ReCAMA)

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific
CSAM

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is the regional development arm of the United Nations for the Asia-Pacific region. Made up of 53 Member States and 9 Associate Members, with a geographical scope that stretches from Turkey in the west to the Pacific island nations of Kiribati in the east, and from the Russian Federation in the north to New Zealand in the south, the region is home to 4.3 billion people, or two thirds of the world's population.



The darker area of the map represents the members and associate members of ESCAP

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The idea for this study originated during the annual Member Meeting of the Regional Council for Agriculture Machinery Associations in Asia and the Pacific (ReCAMA), when the members expressed their desire to understand how trade and investment policies of member countries were facilitating the growth in mechanisation of agriculture. Accordingly, a proposal was drawn up and agreed among the Centre for Sustainable Agricultural Mechanization (CSAM), the Centre of International Cooperation Service of the Ministry of Agriculture of China (CICOS), and the co-authors of the study, which provided an overall framework to carry out this study.

The overall guidelines for carrying out this study at the beginning came from Ms. Katinka Weinberger, Session Chief of the Environment Development Division of the Environment and Development Policy Section of the United Nations Economic and Social Commission for Asia and the Pacific and Office-in-Charge of CSAM and subsequently from Dr. Li Yutong, Head of CSAM.

This study was carried out in China, India, Nepal, Sri Lanka, and Thailand. In these countries, nominees of the respective associations carried out the study under the guidance of the lead consultant. Each of these nominees, together with their local experts, collected the relevant data and compiled them in the given format, which was then edited and included in the final study.

The efforts of Mr. Lasantha Wickremesooriya, the lead consultant of the research team and the Vice Chairman of Sri Lanka Agriculture Machinery Manufacturers and Suppliers Association, are duly acknowledged for providing overall guidance for this study and leading the study team composing of Dr. Cao Guangqiao of China, Dr. Surendra Singh, Er. V N Kale, Mr. D S Balachandra Babu and Ravi Kumar Beri of India, Er. Madhusudan Singh Basnyat and Mr. Swoyambhu Krishna Shrestha of Nepal, and Ms. Dares Kittiyopas and Dr. Prachak Submanee of Thailand for contributing their overall wealth of knowledge and information to make this study a comprehensive one. Several other experts are too numerous to name individually contributed directly as well as indirectly, and their inputs are also gratefully acknowledged.

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List of Abbreviations

AEC	ASEAN Economic Community
AFET	Agricultural Futures Exchange of Thailand
ADS	Agriculture Development Strategy
AIFTA	ASEAN–India Free Trade Area
AMMA	Agricultural Machinery Manufacturers Association, India
APTA	Asia Pacific Trade Agreement
ASEAN	Association of South-East Asian Nations
BAAC	Bank for Agriculture and Agricultural Co-operatives
BOI	Board of Investment, Sri Lanka
CBSL	Central Bank of Sri Lanka
CIAE	Central Institute of Agricultural Engineering
CSAM	Centre for Sustainable Agricultural Mechanization
DAC	Department of Agriculture & Cooperation
DoA	Department of Agriculture
FAO	United Nations Food and Agriculture Organisation
FIBP	Foreign Investment Promotion Board
FCI	Food Corporation of India
HDI	Human Development Index
ICAR	Indian Council of Agricultural Research
ICSID	International Centre for the Settlement of Investment Disputes
ISAFTA	India – Sri Lanka Free Trade Agreement
NFSM	National Food Security Mission
NHM	National Horticulture Mission
PSFTA	Pakistan Sri Lanka Free Trade Agreement
PHTM	Post Harvest Technology and Management
PIP	Public Investment Programme
PPP	Public-Private Partnership
RGGVY	Rajiv Gandhi Grameen Vidhyutikaran Yojana
ReCAMA	Regional Council of Agricultural Machinery Associations in Asia and Pacific
RBI	Reserve Bank of India
SAUs	State Agricultural Universities
SDGs	Sustainable Development Goals
SMAM	Sub-Mission on Agricultural Mechanization
SAFTA	South Asia Free Trade Area
SAPTA	South Asian Preferential Trade Agreement
TIEP	Temporary Importation for Export Processing
OECD	Organisation for Economic Cooperation and Development
WTO	World Trade Organisation

Executive Summary

Agriculture continues to be the single largest employer in the world, despite us witnessing the transition of many economies from manufacturing to services, a phenomenon even more evident in the Asian context. 'Zero Hunger', one of the 17 Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in 2015, aims to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture". Sustainable mechanisation of agriculture is an important means towards this Goal. Our efforts and abilities to provide farmers access to powered machinery, tools and implements can transform the traditional subsistence model of farming to a more sustainable, market-driven and entrepreneurial form of agriculture, which can be attractive to the present-day generation. Sustainable mechanisation in agriculture provides several economic benefits, inter-alia, productivity and production enhancement and soil enrichment.

A key focus of this study is to highlight the importance of mechanisation as an input for sustainable agricultural development and assessing how trade and investment policies act as an enabler in promoting sustainable agricultural mechanisation. The countries selected for the comparative study include China, India, Nepal, Sri Lanka and Thailand. China and India, ranked amongst the top 10 economies in the world in terms of GDP size, enjoy strong manufacturing and research and development (R&D) capacity in relation to agricultural machinery and Thailand is also witnessing notable growth in these areas. Nepal and Sri Lanka are net importers of agricultural machinery. Both China and India are in a dominant position to compete on a global scale and their proximity to other countries in the region is beneficial as these countries consequently can have better access to machinery at relatively cost effective prices.

The study reveals that all five countries have a focus on achieving food security as a national priority and thus recognize the importance of promoting sustainable agriculture. The importance of sustainable agricultural mechanisation in this endeavour has been underscored on many occasions. China's globally competitive manufacturing facilities are supported by R&D and are driven by national policies that are reinforced through a structured regulatory framework. This has ensured successful implementation. India, Thailand and Nepal have 20-year national level strategic plans to which agricultural development strategies are aligned. Although Sri Lanka does not presently have such a long-term strategic plan, the development of agriculture is linked to the country's National Plan for food security.

Existing trade and investment policies were not found to be hindering sustainable agriculture mechanisation in any of the five countries in this comparative study. However, except in the case of China and India, the study did not find any specific instances of direct policy interventions that can fuel the growth of sustainable mechanisation in agriculture. Both China and India have made available development funds to manufacturers to upgrade technologies as well as provided direct financial support to enhance the utilisation of machinery in agriculture. In other countries, while efforts have been made towards removal of barriers to trade and investment, these may not necessarily lead to acceleration in the adoption of sustainable agricultural mechanisation.

Numerous multilateral and bilateral agreements between countries in this region have facilitated cross border trading with reduced restrictions. The ASEAN Economic Community and the Asia Pacific Trade Agreement (APTA) are two such noteworthy instances.

The main impediment to sustainable agricultural mechanisation found in this study is the high tariffs, ranging from 15-40%, levied on spare parts for tractors and other agricultural machinery. Such high cost of spare parts may prevent timely maintenance and repair of farm equipment and reduce the useful life of machinery and also act as a disincentive for those who plan to adopt mechanization in place of traditional farming methods.

All the five countries covered in this comparative study encourage foreign investment with a particular emphasis on transfer of technology to upgrade basic manufacturing capacity that can meet sustainability requirements. This is evident with large scale joint venture partnerships in China, India and Thailand between local and foreign firms. At the same time, land ownership by foreign investors is not permitted in the countries covered in this study. Further broad based dialogue can be encouraged on balancing national and smallholder interests with policies that can attract commercial scale farming companies who can bring improved and sustainable technology and production know-how, create the necessary outgrower network, and promote overall agricultural modernization.

The facilitation of Public-Private Partnerships for promoting investments in agricultural development, and mechanization in particular, is being pursued by all five countries in their effort to transition from traditional farming to modern agriculture. This supplements other initiatives undertaken to promote investment in enhancing mechanization in the agricultural sector.

Access to low-cost finance vis-à-vis commercial lending sources is found to be a relatively bigger constraint in Nepal and Sri Lanka, when compared with China, India and Thailand, which have dedicated agriculture development banks. Networks of agriculture development banks and national level development agencies have also facilitated investment in setting up manufacturing and R&D centres in China, India and Thailand.

In conclusion, while there are a number of specific constraints, it is encouraging that very few major impediments are observed in relation to trade and investment policy for sustainable agricultural mechanization in the five countries studied. A more focused, cohesive and inclusive approach based on broad-based discussion with key stakeholders is the need of the hour to accelerate the adoption of mechanization by the farming community for sustainable agricultural development. Some of the specific recommendations of this study include:

- Design platforms to facilitate and enhance access to learning, training and exchange of information for a broad group of stakeholders (including smallholder farmers and other vulnerable communities) on trade and investment of agricultural machinery, both at national and regional levels;

- Undertake advocacy for i) national policies conducive to sound trade and investment of agricultural machinery in the region including lowering import and export duties and taxes and minimizing other trade barriers; ii) adopting a participatory approach for formulation of trade and investment policies in relation to agricultural machinery involving all related stakeholders including farmers, manufacturers, traders, channel partners, and other facilitators;

- Promote the harmonization and mutual recognition of regional standards for testing of agricultural machinery, for example, through the 'Asian and Pacific Network for Testing of Agricultural Machinery' (ANTAM) initiative of CSAM;

- Identify measures for, and facilitate, trade and investment in appropriate agricultural machinery suitable for the agro-ecological and socio-economic conditions in the target countries; and

- Support efforts for developing a database on sustainable agricultural mechanization and strengthening related capacities at the national and regional levels that can harmonize the collection, compilation and publication of relevant statistics comparable across countries. This can support the expansion of trade and investment decisions by government and private sector stakeholders.

Photo by Qiu Weichuan

Chapter 1: Introduction

1.1 Background

Centre for Sustainable Agricultural Mechanization (CSAM), a regional institution of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), is mandated to achieve production gains, improved rural livelihoods and poverty alleviation through sustainable agricultural mechanization for a more resilient, inclusive and sustainable Asia and the Pacific.

As one of the lead activities of CSAM, the Regional Council of Agricultural Machinery Associations in Asia and the Pacific (ReCAMA) was established in October 2014. The mission of ReCAMA is to promote sustainable agricultural mechanization in Asia and the Pacific through strengthening the capacity of national agricultural machinery associations, facilitating the exchange of knowledge and information, and enhancing collaboration and closer business connection among national associations and their members. ReCAMA is expected to play an instrumental role in facilitating trade and investment of agricultural machinery, and enhancing the linkages and networking among the associations representing the manufacturers, distributors and users of farm machinery and implements in the region.

This study, conducted amongst a selection of member countries in Asia and the Pacific, facilitates in bringing together the experiences in the transformational process, the trade and investment policies framed, regulatory frameworks introduced, incentive mechanisms in operation and other related development experiences. We could observe and identify, both, policies, regulatory and other mechanisms that have facilitated as well as constrained the process of transformation. Through the findings of this study, we aim to facilitate the ongoing dialog between key stakeholders in the public sector, private sector, researchers and development agencies to assist improving/introducing policies within country-specific context as well as to identify a general set of policies that the developing agencies in particular could act upon.

1.2 Objectives of this Study

A study on the trade and investment Policies of agricultural machinery can add to the pool of knowledge available to the membership of ReCAMA as well as other relevant stakeholders in relation to the following areas:

- Identifying best practices in terms of:
  - Initiatives taken by the respective national governments to create an enabling environment for farmers and private sector to invest in agriculture mechanization. These could include technology development, productivity improvement through Research and Development, etc.;
  - Government supported financing mechanisms in the early stages of promoting mechanization of agriculture;
  - Extension services, rural credit and risk insurance;
  - Private-Public partnerships that encourage planned production, post-harvest handling and marketing of produce; and
  - Investment policies, where technology transfers from producing countries are encouraged;

- Identifying trade policies and practices that encourage mechanization of agriculture, including:
  - Duty structures, fiscal levies, non-tariff barriers (if any), incentives, if any, offered to encourage mechanization; and
  - Export subsidies (in the case of manufacturing and exporting countries), protective legislation.

If the respective Agricultural Mechanization Associations of member states are to make a meaningful contribution to promoting sustainable agriculture mechanisation in their respective countries, then they should be equipped with knowledge and information. Armed with such knowledge and information on best practices of successful initiatives of member states, will help them promote sustainable agricultural mechanization in their own countries

through lobbying and other means. As a result of the network created already, members could also avail themselves with first hand observation visits to such countries, or could be facilitated by CSAM by incorporating same into their annual programmes. An understanding of the relevant policies can also benefit members, where large producers could look at opportunities of making investments in sourcing countries, where part of the production can be completed, which can result in costs savings. This can also lead to further growth in trade as well as the development of the mechanization of agriculture across the region.

A study of this nature therefore, will provide rich insights as to how trade and investment policies have contributed successfully or even stifled the development of mechanisation of agriculture, which can be used as a launching pad by the respective member states.

The research objectives of this study therefore, are:

- To study the present status of farm mechanization in selected member countries of ReCAMA;
- To study the trade and investment policy for farm mechanization in selected member countries of ReCAMA;
- To compare the trade and investment policy for farm mechanization in selected member countries of ReCAMA and bring out the pros and cons of various policies; and
- To recommend the role of CSAM in overcoming the gaps in farm mechanization policy/mission and make import and export trouble free and tax-free among the member countries of ReCAMA

This study, conducted amongst a selection of member countries of CSAM/ESCAP, brings together the experiences in the transformational process, the trade and investment policies framed, regulatory frameworks introduced, incentive mechanisms in operation and other related development experiences. We can observe and identify, both, policies, regulatory and other mechanisms that have facilitated as well as constrained the process of transformation. Through the findings of this study, we aim to facilitate the on-going dialog between key stakeholders in the public sector, private sector, researchers and development agencies to assist improving/introducing policies within country specific context as well as to identify a general set of policies that the developing agencies in particular could act upon.

1.3 Countries Selected

In its initial brief, the Centre for Sustainable Agricultural Mechanisation (CSAM), has pre-selected China, India, and Sri Lanka for its study on Investment and Trade Policies on Mechanisation of Agriculture. Both, China and India are large producers of agricultural machineries and have produced several giants who now deal globally. During the proceedings of the 2nd annual meeting of ReCAMA, held on 18th July 2016 in Coimbatore, India, the members decided to include Thailand & Nepal too, to cover the proposed study. Thailand too has a large industrial base and promote the local manufacture of agriculture machinery through joint ventures as well as indigenous local manufacturers. Nepal and Sri Lanka on the other hand are major net importers of agriculture machinery.

1.4 Study Approach

Information was collected through focal points established via the respective agricultural machinery manufacturers associations in the selected countries. Despite the scheduling and mobility constraints, information was gathered through interviews and desk research with the aid of a structured questionnaire. The questionnaire covered a full spectrum of categories that aid directly and indirectly, the mechanisation of agriculture. Having a structured questionnaire also ensured consistency and comparability across the different countries that have been a target for this study.

1.5 Report Structure

Chapter 1 begins with an introduction to the study and followed by the research objectives and the justification for the research.

Chapter 2 elaborate on the role of trade and investment policies and its significance on enhancing sustainable agricultural mechanization in the context of driving in global food production in the 21st century. Next, it discusses the role of mechanization in agriculture and its growing importance in the current and future context. The role of the government sector and the private sector in facilitating the increases usage of mechanization in agriculture production and its sustainability, is addressed last.

Chapter 3 is dedicated for the country studies. Under each country section, policies in trade and investment in facilitating agricultural mechanization, both current and proposed, are discussed.

Chapter 4 discusses the key findings, round up the conclusions, with recommendations of a future agenda for members of ReCAMA to adopt.

Chapter 2:
Sustainable Agricultural Mechanization -Enablers

2.1 Role of Sustainable Agricultural Mechanisation

Agricultural mechanization involves the use of powered machinery, implements and tools that substitute human labour and improves the efficiency of production. Mechanisation today, has largely replaced the animal power that was the primary means of semi-mechanisation in the past. The primary aims of agricultural mechanization can be seen as to increase productivity, reduce the cost of production, optimize product quality, providing timely inputs, protect the environment and improve the livelihood of the farming community.

In an era that we are beginning to experience labour shortages in agriculture, unpredictable weather conditions and increase in cost of agricultural inputs, the need for mechanisation of agriculture has become a priority in most countries in the world. Mechanisation of agriculture plays an important role in improving agricultural production, particularly in the emerging economies, where some of the agricultural practices are yet considered traditional or at a very early stage of technology. We use the term 'mechanisation' generally to represent a variety of mechanical inputs, such as powered machinery, implements and tools (Clarke, 2000). Adamade and Jackson (2014) describe agriculture mechanisation as the application of agriculture engineering principles and technologies to agriculture, using mechanical systems, in food, fibre, fuel and fur processing and also in the production, processing, handling and storage of agriculture product.

> *"The level, appropriate choice and subsequent proper use of mechanized inputs into agriculture has a direct and significant effect on achievable levels of land productivity, labour productivity, the profitability of farming, the environment and, last but not least, on the quality of life of people engaged in agriculture" (Clarke, 2000, p4).*

However, we should be conscious of the fact that mechanisation is only one such input that enhances productivity and thus profitability of farms. Inputs such as quality seeds, fertilizer, maintenance inputs and irrigation management also are known to contribute to productivity enhancement. Yet, mechanisation plays an important role, in supplementing the aforesaid inputs.

Taking into consideration the global trends together with the foregoing, the need for mechanization of agriculture has become more acute in the present context than before and will be so in the future too. As the global demand for food grows, and as national economies in developing economies diversify and transit towards economic activities in non-agricultural sectors, there will be a continuing need for mechanization to supplement the decreasing labour availability and increasing costs. Apart from this, mechanization will also help farmers move from subsistence farming to commercial scale farming, making the venture more profitable and sustainable in the long run.

The projected world population of 9.6 billion people by 2050 will increase the demand for food production significantly. One of the primary challenges faced in increasing food production will be the availability of land for commercial scale cultivation. Accelerated urbanisation in most of the developing economies in particular, means, that such farmlands are on the decline. Hence the ability to increase potential yields of crops with existing and new technology will always be in demand. The availability of fresh water sources is the other main challenge. Growing water usage and rising temperatures will only contribute to the increase in water stress around the globe. Some countries/regions are said to be reaching alarming levels of water scarcity.

Hereto, the use of technology to use less water in food production vis-a-vis traditional methods will play a key role in the future. The

other phenomenon we observe around the globe is the decline of people engaging in farming as a profession. More and more individuals, particularly of the new generation appear to be shying away from engaging agriculture driving a severe labour shortage, particularly in the developing economies. Whilst effective use of fertilizer, herbicides, plant and animal breeding, and optimization of management practices can lead to improvement in land productivity, labor productivity has gained importance over land productivity. This is particularly so as labor continues to move out of the sector.

In the circumstances of demographic pressure, accelerated urbanization, climate change, constraints of land and water resources, sustainable agricultural mechanization should be pursued, which moves from pure technology to a broader context meeting technological, economic, social, environmental and cultural requirements, and offers innovative and economically viable opportunities for growers, consumers, policymakers and many others in the entire food system contributing to the achievement of sustainable agriculture.

A system perspective is essential for sustainable agricultural mechanization, which involves to envisioning agricultural mechanization in its broadest sense, from the individual machinery or equipment to the entire farming system; from the perspective of engineering to the whole agricultural value chain; from the contribution to agriculture solely to the rural communities and the environment as well. A system approach also implies interdisciplinary efforts in policy making, research and education, and responsibility from all pertinent stakeholders.

Sustainable Agricultural Mechanization covers all levels of farming and processing technologies, from simple and basic hand tools to more sophisticated and motorized equipment. It eases and reduces hard labour, relieves labour shortages, improves productivity and timeliness of agricultural operations, improves the efficient use of resources, enhances market access and contributes to mitigating climate related hazards[1].

Sustainable agricultural mechanization is not an end by itself, but a piece of hardware that is part of a complex array of farming system that involves a series of activities and multiple stakeholders. Thus the demand for sustainable agricultural mechanization will continue to rise. It will therefore be important to ensure that farmers have access to appropriate technology at the right price in the developing economies in particular, to increase productivity and contribute to local and international level food security programmes.

The benefits rising from sustainable agricultural mechanisation can be stated as:

- Supplementing of labour usage by removing bottle necks and making best use of available time;
- Timeliness of farming operations; targeting agronomic windows, reducing harvest losses, etc.;
- Efficient and sustainable use of inputs, such as seeding/planting, nutrients, pesticides, water, etc.;
- Enhanced quality and reduced losses in crop handling;
- Effective, sustainable and efficient usage of land; and
- Productivity improvement and thus increased earnings.

In 2015, the UN General assembly adopted the Sustainable Development Goals creating a new framework for global development; a unanimous commitment to end poverty, fight inequalities and injustice and to tackle climate change[2]. 17 Sustainable Development Goals (SDGs) were established to stimulate action over the next 15 years, in areas considered to be critical to humanity and our planet. The countries of Asia Pacific face significant challenges to achieving the 2030 Agenda for Sustainable Development and in particular Sustainable Development Goal (SDG)[2] to end hunger, achieve food security and improved nutrition and promote sustainable agriculture. These challenges include persistent poverty, reduced availability of agricultural labour, demographic changes that result in larger proportion of women in agriculture as well as ageing agricultural workers, inefficient agricultural value chains, degradation of natural resources and the environment, and impacts of climate change.

Sustainable agricultural mechanization, will contribute to increasing productivity & production, supplement labour shortages in agriculture, and with the appropriate machinery, implements and practices mechanization can also improve land and soil quality in the long run. The SDGs will be the guiding light for aligning individual country's plans with their global commitments, since the successful implementation will depend on the respective country's own sustainable development initiatives. Such initiatives can become a reality through enabling trade and investment policies,

1 FAO Website, available at <http://www.fao.org/sustainable-agricultural-mechanization/overview/what-is-sustainable-mechanization/en/>.

2 On September 25th 2015, countries adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years. Available at: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

whereby sustainable agricultural mechanization can be promoted and adopted.

Sustainable agricultural mechanization can ease hard labour, relieve labour shortages, improve productivity and timeliness of agricultural operations, improve the efficiency of use of resources, enhance market access and contribute to mitigating climate related hazards. Sustainable agricultural mechanization will assist member States in the Asia-Pacific region for achievement of SDG 2 (zero hunger), in particular the targets of doubling the agricultural productivity and incomes of smallholders (target 2.3) and ensuring sustainable food production systems (target 2.4). It will also contribute towards the target of eradicating extreme poverty (target 1.1) under SDG 1 (no poverty). Apart from these, it will support achievement of a number of other SDGs in areas such as combating climate change, ensuring sustainable and efficient use of natural resources, reducing food losses along production and supply chains, addressing land degradation and environmental pollution, promoting gender equality, and enabling effective partnerships.

2.2 Role of the Government and Private Sector

The role of the government in today's free market economies can be considered in terms of setting appropriate policy, such as industrial policy, land policy, water distribution and management, infrastructure, exchange rate policy, fair trade etc. In the past, the classical economists theorized that economic development as a growth process required the systematic allocation of factors of production from a low productivity, traditional technology, predominantly primary sector to a high productivity, modern technology, industrial sector (Adelman, 1999). Based on this notion, the Government has considered the prime mover in development. However, high rates of unemployment, coupled with disproportionate distribution of wealth, signified the industrialization and high economic growth. The neo classical economists, thus came with the proposition that, the main thing governments need to do to position an economy on an autonomous, sustained-growth path to remove barriers to international trade in commodities. The argument put forward was that the best thing a Government could do is to minimize their economic roles in promoting trade development and to allow the private entrepreneurial firms to do so.

Today, in a highly-globalized world, the role of the Government in promoting trade and investment in both, industry and agriculture is critical. Such trade and investment policies must provide incentives for improvements in productivity, and technology improvements that would result in generating higher profits to farmers. The government should focus its efforts in terms of allocating resources for research and development, testing of farm machinery for appropriateness, maintaining standards, enabling consumer protection laws, education, training and extension work. Yet another important aspect of government mediation would be drafting investment policies that can increase and improve the manufacturing bases for farm machinery and also fiscal policies, to provide a more conducive environment, removing tariffs and import restrictions and agriculture financing. In essence, the government should have a clear agricultural policy and provide a favourable environment in which the different stakeholders can operate without a hindrance.

Clarke (2000) argues that "Mechanization should not be an end in itself and therefore, in a true free choice situation, governments should refrain from making policies which will stipulate by which means or by how much, agriculture will be mechanized".

As regards to the private sector, Clarke (2000) identifies four categories of primary players from the private sector, viz., farmers, retailers and wholesalers, manufacturers, and importers. He states that the most fundamental requirement to be that the business of each category must be profitable. If any party in this link does not make profits, then the business will not be sustainable. Thus every player in the value network must make profits, if mechanisation to be sustainable, from the point of manufacture, down to application/usage. Through innovations, improvements in technologies, the private sector can contribute to increasing supply driven demand to increase mechanisation. Further, providing the effective service levels to ensure sustainability of machinery through the availability of replacement parts, trained service staff plus making them available at competitive and economical prices are important elements that the private sector must ensure. Providing credit and financing is yet another important dimension in increasing the ownership and usage of farm machinery. Providing cost effective financing in a timely manner is critical for the farmer community.

Thus the role of the private sector can be stated as its responsibility to facilitate the delivery of inputs and services, so that farmers may engage

in sustainable and profitable agricultural production (CTA, 1997)

2.3 Trade & Investment Policy on Agriculture

Trade and Investment are powerful engines for growth and sustainable development. The expansion of trade across the Asia-Pacific region in recent years has been a key driver of economic dynamism and rising prosperity[3]. But not all individuals and communities have been able to benefit from the growth, and too many barriers to inclusion remain.

Encouraging inclusive and sustainable growth are key strategic initiatives in the fight against poverty. Thus enabling an environment that facilitates trade and attracts investment are two important facets in promoting inclusive and sustainable growth. Through trade and investment, enterprises are formed, knowledge and technology are spread, jobs are created, providing more stable sources of income and giving people more access to health, education and opportunities to create a better life for themselves and their families contributing to the achievement of Sustainable Development Goals.

Efforts to boost agriculture, to meet the growing demand for food production vis-à-vis global population increase is said to remain chronically underfunded in many developing countries (Wickramasinghe et al, 2012). A concerted effort will therefore be required to enhance production volumes as well as investment in agriculture production, to achieve estimated food production levels in the future. Wickramasinghe et al, 2012 posits that policy reforms and investment play an important role in agricultural transformation and growth supplemented by country contexts such as, land holdings, skills and education, research and development, infrastructure, fiscal and monetary regulations. Whilst it may not be easy to separate the impact of specific national policies to the overall transformation process, it will nevertheless be useful to identify the highlights of agricultural transformation taking place and general policy guidelines that are driving the agricultural transformation process in the developing countries.

A study conducted by Wickramasinghe et al (2012) covering Brazil, Indonesia and the Republic of Korea, revealed several useful insights from their experiences albeit whilst pursuing their own individual paths of transformation. Such experiences, whilst being unique in respect to their individual countries also revealed several common themes, which were useful for the development agencies.

Effective trade and investment policy can lead to better outcomes, including higher growth and improved standards of living. Given the importance of agriculture in poverty reduction and enhancing the income levels of farmers in general, the policy and the institutional environment governing agricultural trade has an important influence on a country's development strategies (World Trade Organisation, 2014). In the case of growth in food production, a blueprint for the successful agricultural transformation does not exist; rather, each country will need to develop a different pattern according to its different social, economic, and environmental conditions.

Mechanization of agriculture as a profitable and sustainable input into agriculture is one such important area, where government initiatives need to focus on. Prior research shows that, to realize full potential of mechanization in agriculture, investment in agricultural mechanization and the development of associated support systems are required (Houmy et al, 2013).

As shown by Wickramasinghe et al, trade & investment policies in Brazil, Indonesia and the Republic of Korea, transformed traditional, subsistence agriculture to conservative, yet modernized commercial scale production anchored by productivity gains and production increases, whilst reducing unproductive labour, additional land utilization, and dependency on government subsidies. According to the study, the agriculture output of Brazil grew by 243% between 1970 and 2006 following its transformation process, whilst the inputs used only grew by 53%; 124% growth in total factor productivity. Brazil has emerged as the 2nd largest exporter (FAO 2012, as quoted by Wickramasinghe et al, 2012), with its annual export values reaching US$ 62bn in 2010. In the case of Korea too, food production had increased fourfold within six decades, whilst the area cultivated declined by over a half a million hectares (Choi, 2012, Table 2.3, as quoted by Wickramasinghe et al, 2012) reflecting an increase in productivity as well production. All of these achievements have been attributed to the numerous policy frameworks of trade & investment the two countries have created and implemented rigourously.

On a similar note, Houmy et al, (2013) argued as to how an enabling

3 ESCAP website at <http://www.unescap.org/our-work/trade-investment-innovation>.

environment can facilitate the enhancement of mechanization in agriculture productivity and production gains. They posited that an enabling environment would influence the investment in new technologies, which in turn will lead to generate higher income, and in turn will lead to a higher demand in agricultural mechanization. The increase use of mechanization together with the improved use of other inputs will lead to higher productivity and in turn generate higher incomes for farmers. The increase in demand for agricultural machinery will lead to increase in supply (role of the private sector) and consequently a wider and even perhaps a better choice to the farmers, particularly to smallholders. As volumes of machineries increase, the cost of ownership (capital and running costs) can be expected to come down making mechanization more affordable in the hands of the firm. Credit and finance mechanisms, incentives on capital investment and technology transfers, capacity building, institutional support & extension services, encouragement of national manufacturing capacities, monetary policies on trade (specifically for agriculture machinery), price intervention, infrastructure policy, national research and development policy etc are amongst several others that we can learn from each other's experience in a study of this nature.

The Asia-Pacific region is industrializing at a rapid pace and as this phenomenon progresses, we will experience a shift in labour to industry, a reduction in the land available for agriculture and a likely drop in the share of agriculture in GDP. Countries in the Asia-Pacific region face significant challenges to achieving the 2030 Agenda for Sustainable Development. In the context of agricultural development, these challenges include persistent poverty, reduced availability of agricultural labour, demographic changes that result in larger proportion of women in agriculture as well as ageing agricultural workers, inefficient agricultural value chains, degradation of natural resources and the environment, and impacts of climate change.

Promoting sustainable agricultural mechanization in Asia and the Pacific is both promising and challenging. The Asian and Pacific region has made great progress over the past six decades in transforming farm power situation from over 90% from animate sources in the 1960s to over 60% from mechanical sources in 2014 in many countries[4]. However, the development level of agricultural mechanization in the Asia-Pacific region is comparatively low with vast disparity among countries and different districts within the same country. Big gaps also exist among different crops and different stages of production. In addition, there are some inherent constraints and challenges in developing sustainable agricultural mechanization in the region as below:

Small Land Holdings and High Proportion of Smallholders – About 90% of the World's small farms (<2ha) are in the Asia and the Pacific region[5]. The average size of land holdings in Asia is only about 1 ha. Meanwhile, the large number of smallholders usually does not have investment capacity and cannot afford even small machines.

Limitations on Manufacturing – Aside from a few countries like China, India, Japan, Thailand and South Korea, which have well developed industry for agricultural machinery manufacturing, the majority of the countries in the region have limited capacity to manufacture machinery and equipment as needed.

Weaknesses in Policy Environment – Sustainable agricultural mechanization is one of the important drivers for development of the whole agricultural value chain. An enabling policy environment is required for the rapid development of agricultural mechanization and to leverage its full potential for food and livelihoods security, particularly in rural areas. However, in many countries in the region, the necessary strategies and policies are either not yet developed or formulated in isolation without considering the overall agricultural and rural context, thus lacking the desired impact.

Inadequate Regional Coordination – The Asia-Pacific region faces a diverse range of challenges and opportunities with respect to sustainable agricultural mechanization development. Many of these, such as climate change and limitations on technology transfer are cross-border in nature but gaps in existing mechanisms for regional coordination limit a cohesive and synergistic response. Moreover, there is a need for greater cooperation to share knowledge, experiences and learning so that innovative approaches and solutions can be quickly scaled up.

Limited Institutional Capacities – There are important capacity gaps that are constraining the development of agricultural mechanization, particularly in Least Developed and Landlocked Developing Countries. Existing skills and capacities of various stakeholders including policymakers, researchers, practitioners, entrepreneurs

4 FAO (2013), Climate Smart Agriculture Sourcebook, available at http://www.fao.org/docrep/018/i3325e/i3325e.pdf

5 Singh G. and Zhao B. (2016), "Agricultural Mechanization Situation in Asia and the Pacific Region", Agricultural Mechanization in Asia, Africa and Latin America, Vol. 47, No. 2, P21.

and farmers are inadequate in many countries and targeted capacity development efforts are required to plug the gaps.

One of the future priorities of the CSAM is to facilitate measure for trade and investment that will facilitate the growth in intra-region for agricultural mechanization. Given the constraints mentioned above, an enabling trade and investment policy environment will:

- Strengthen the role of the private sector and enhance local assembly/manufacturing capacity;
- Increase a country's capacity to access and adopt innovative technologies;
- Increase the availability of affordable financing measures for small farmers to adopt mechanization;
- Increase the capacity to access scientific & technological research and processing techniques for setting up manufacturing appropriate farm machinery;
- Enhance the transfer of technology and know-how to less industrialised countries; and
- Increase the availability of affordable & sustainable agricultural mechanisation across the region via-intra trade through zero taxes and tariffs.

The mix of countries selected for this comparative study includes, both manufacturing as well as trading nations. For the membership of ReCAMA, the understanding of the national policies promoting the transformation of agriculture of each other will be important in several ways. It will help;

- Learn from success stories and possibly adapt such policy frameworks via dialog with key stakeholders;
- Facilitate the promotion of trade between member countries via removal of barriers, that may inhibit the free flow of equipment; and
- Identify opportunities for potential investments in increasing agriculture production.

We expect the findings of this study to contribute to the wider debate on investment in agriculture and food production, where policy development can be guided as a means to responding to the emerging challenges in our pursuit of achieving food security. Given the limitations of expanding extent-wise, agricultural growth will have to rely mainly on increase in productivity, supported in particular by appropriate investments in physical, human and knowledge capital (OECD, 2013).

Chapter 3: Case Studies of Selected Member Countries of the Regional Council of Agricultural Machinery Associations in Asia and the Pacific (ReCAMA)

This study has compiled information on the Trade & Investment Policies on mechanization of agriculture in China, India, Nepal, Sri Lanka, and Thailand with the aid of an annotated questionnaire to retain uniformity. China, India and Thailand have a large manufacturing base for agriculture machinery, whilst Nepal and Sri Lanka are net importers of such machinery. The comparative study enables us to compare and contrast both common themes and diversions respectively across these five selected countries. This should assist the respective agriculture machinery associations (representing the private sector), the policy makers and development institutions to engage in a dialogue, whereby policies conducive for enhancing trade & investment in agricultural mechanization can be further improved. For those member countries that are at an early stage in mechanization of agriculture, this report should provide useful insights and guidelines to design their own country specific policies.

The choice of countries selected for this study; two of the worlds larger economies (China and India) with extensive manufacturing bases in agriculture machinery, Thailand also with a substantial manufacturing base for agriculture machinery and an emerging economy in the size of Nepal and Sri Lanka, who are a net importers of agriculture machinery, provides us with an opportunity to understand how the policy regime works in these different contexts.

This report brings together the salient features in agriculture policy, investment policy, investment promotion and facilitation, infrastructure development, trade policy, financial sector development, risk management and public-private-partnerships with emphasis on mechanization of agriculture. This we hope will lead to a broad discussion amongst member countries to facilitate enhanced cross border trade & investment through policy development.

Photo by Hao Jianxin

China

3.1 Trade and Investment Policies on Mechanization of Agriculture in China

3.1.1 Introduction

China is a country with a large rural population. Agriculture plays an important role in Chinese economy. Although China has 9.6 million square kilometres of land area, the area of arable lands is only 1.225 million square kilometres, accounting for about 7% of the world's arable lands. The arable lands in China are mainly in the plains and basins of the monsoon region of eastern China. Planting industry is China's most important agricultural production sector, with rice, wheat, corn, potatoes as the main food crops and cotton, peanuts, rape, soybeans and sugar cane as the economic crops. In 1949, China's agricultural foundation was so weak that the grain produce was only 113.18 million tons, and the cotton produce was 444 thousand tons. After the land reform from 1950 to 1953, the farmers had land ownership, which greatly aroused their enthusiasm and the agricultural production has developed by leaps and bounds. In the first five-year plan period (1953-1957), the agricultural output increased by an average of 4.5% per year. This period is called the first "golden age" of China's agricultural development. Since the rural reform in 1978, a new form of collective economy has been applied under the framework of collective ownership, and market-orientation. The reform brought tangible benefits to the peasants, liberated and developed rural productive forces, promoted agriculture especially the rapid growth of grain production and the continuous optimization of agricultural structure, which made remarkable achievements in Chinese agriculture. At present, China's production of grain, cotton, rapeseed, tobacco, meat, eggs, aquatic products, vegetables rank first in the world.

Table. 3.1 Output of Major Agricultural Products from 2010 to 2014 (Unit: ten thousand tons)

Year	Rice	Wheat	Corn	Bean	Potatoes	Cotton	Peanut	Rapeseed	Sugarcane
2010	19576.1	11518.1	17724.5	1896.5	3114.1	596.1	1564.4	1308.2	11078.9
2011	20100.1	11740.1	19278.1	1908.4	3273.1	659.8	1604.6	1342.6	11443.5
2012	20423.6	12102.4	20561.4	1730.5	3292.8	683.6	1669.2	1400.7	12311.4
2013	20361.2	12192.6	21848.9	1595.3	3329.3	629.9	1697.2	1445.8	12820.1
2014	20650.7	12620.8	21564.6	1625.5	3336.4	617.8	1648.2	1477.2	12561.1

Source: 2015 Statistical Yearbook of China

3.1.2 National Agricultural Policy

Agriculture is the primary industry of the national economy. China has always attached great importance to agriculture, rural areas and farmers. At the beginning of each year, the State Council issues the Document NO.1 for the top priority issues over the year. Since 2004, consecutively for 13 years, the Document NO.1of the State Council was on issues concerning agriculture, rural areas and farmers, or in short "three rural issues". Agricultural mechanization, as part of the agricultural policy, has also been paid an unprecedented attention. China has accelerated the development of agricultural mechanization and achieved remarkable results through the improvement of laws and regulations and the implementation of a series of supporting policies.

In 2014, China's total power of agricultural machinery reached 1.144 billion kilowatts. The comprehensive mechanization level of tilling, planting and harvesting has reached 61.6% in 2014. The level of mechanized tilling, planting and harvesting levels has reached 77.5%, 50.8% and 51.3% respectively. The level of mechanization of main farm products increased greatly, among which the comprehensive mechanization level of wheat tilling, planting and harvesting increased from 86.5% in 2008 to 93.7% in 2013, achieving the basic whole-process mechanization of the production; the

comprehensive mechanization level of rice tilling, planting and harvesting increased from 51.2% in 2008 to 76.5% in 2014; the comprehensive mechanization level of corn tilling, planting and harvesting increased from 51.8% in 2008 to 81.4% in 2014.

Generally speaking, China introduced the relevant supporting policies from the following aspects:

The first is to improve laws and regulations, strengthen legal protection. Since 2004, the Law of People's Republic of China on the Promotion of Agricultural Mechanization (abbreviated as the Promotion Law) and the Regulations on the Supervision and Management of Agricultural Machinery Safety (abbreviated as the Regulations) have been promulgated to define the guiding strategies, basic principles and development goals of agricultural mechanization. The "Promotion Law" and the "Regulations" also brought forward the main tasks and measures to promote the development of agricultural mechanization, and stressed the responsibility of local governments at all levels and relevant departments to accelerate the development of agricultural mechanization. Based on the "Promotion Law" and the "Regulations", various local laws and regulations such as the Regulations on the Promotion of Agricultural Mechanization and the Regulations on the Administration of Agricultural Machinery have been introduced and revised. The Ministry of Agriculture has issued the Measures for the Appraisal of Agricultural Machinery. At present, the legal system of agricultural mechanization with Chinese characteristics has been formed with the "Promotion Law" and the "Regulations" as the core, supplemented by local regulations and departmental rules and regulations. This has fully mobilized governments, enterprises and farmers in developing agricultural mechanization, guided the standardization of safe production of agricultural machinery, promoted the rapid and healthy development of China's agricultural mechanization.

The second is to continuously increase policy support. The rapid development of agricultural mechanization is supported by the central and local governments. In 2004, the Document NO.1 on Several Policies of the State Council of China to Promote Farmers to Increase their Income proposed that: "To raise the level of agricultural mechanization, to subsidize farmer individuals, farm workers, farm machinery specialists and service organizations which directly engage in agricultural production to purchase and update large-scale agricultural machinery ". Three policy papers has been issued under the State Council to speed up agricultural mechanization, and they together have played important roles in guiding the development of agricultural mechanization. In 2004, the Ministry of Finance and the Ministry of Agriculture started to implement the subsidy of purchasing agricultural machinery. The purchase subsidy invested by central government increased from USD10.29 million in 2004 to USD3.49 billion in 2014, with a cumulative investment of USD17.65 billion. This stimulated local governments and farmers to invest USD43.31 billion. The number of subsidized farmers is 18.2 million, and that of subsidized machinery is 22.5 million pieces. Hence, this greatly improved the level of agricultural mechanization, promoted the transfer of surplus rural labor force, enhanced the comprehensive agricultural production capacity, developed modern agriculture, increased the income of farmers, promoted the rural economy and promoted social progress of rural areas. In 2010, the State Council promulgated "Some Opinions of State Council on Promoting Sound Development of Agricultural Mechanization and Agricultural Machinery Industry" to continue supporting the development of agricultural mechanization and agricultural machinery industry.

The third aspect is to encourage the development of renting and custom hiring services of agricultural machinery. Agricultural machinery service organizations play an important role in the demonstration and promotion of new machinery equipment and new technologies, optimization of the industry structure, improvement of farmers' efficiency and benefits of using machinery. China attaches great importance to the development of agricultural mechanization service organizations, and steadily increases the numbers of such organizations, promotes sound development of agricultural machinery services and the flourish of new agricultural management and the constant innovation of business service model through market orientation, policy guidance, demonstration and project support. Previously, the traditional agricultural machinery households and village-level operations teams were the main players for machinery services. Nowadays, large agricultural machinery cooperatives and agricultural enterprises become the main operator; meanwhile some leasing enterprises and joint-stock organizations of agricultural machinery appear in the market. The traditional simple machinery services of cultivation and reaping turned into comprehensive operations services, such as "one-stop" operations, and land trusteeship. The government strengthens the unified management of all kinds of operators by means of industrial and commercial registration, cross-district operations, training certification, to standardize the management of service organizations.

To guarantee rapid, sustained and healthy development of agricultural mechanization, China has initially established a

series of supporting policies including purchase subsidies, tax reliefs, credit concessions, operating subsidies, farm machinery insurance, subsidy for construction of agricultural machinery trail and sheds.

3.1.3 Agricultural Mechanization

Since 2004, China's agricultural market has maintained booming both for production and sale volume for many years. The import and export of agricultural products continue to grow, and from 2006 the trade deficit turned into trade surplus.

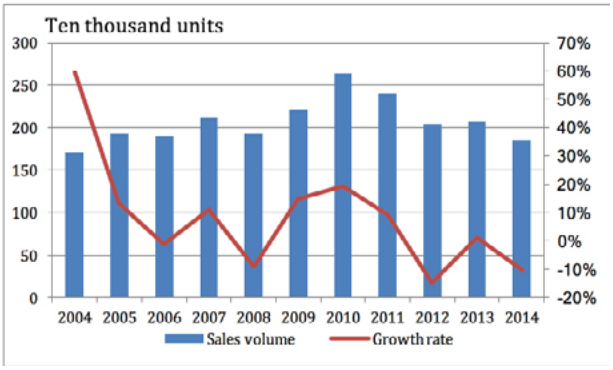
Tractor Market

Tractor market in China continued to maintain the total sales of more than 1.7 million per year, of which large and medium-sized tractor market continued to grow rapidly for many years, and small tractor market has showed a downward trend since 2011.

Tractor market runs high for 11 years

From 2004 onwards, China's total tractor market sale has maintained at more than 1.7 million units per year, especially from 2004 to 2010, the market sale continued to grow, and in 2010 reached a record high with the year sale of 2.633 million units.

Chart 3.1 Trend of Tractor Market from 2004 to 2014

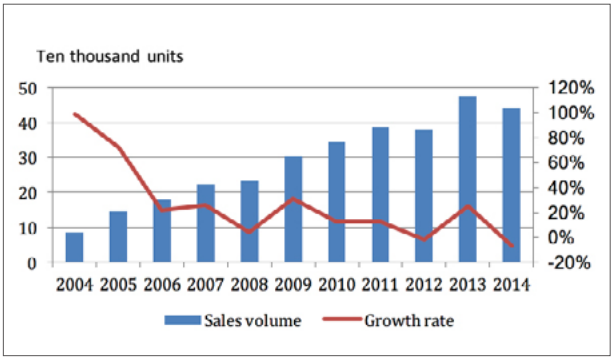


Source: China Agricultural Machinery Distribution Association (2016)

Large and medium-sized tractor market grows rapidly for many years

Since 2004, large and medium-sized tractor has developed rapidly in China. 85 thousand units of large (>100hp) and medium-sized (20-100hp) tractor was sold in 2004, which soared to 442 thousand units in 2014, with an average annual increase of 18.0%. From the year-on-year sales of large and medium-sized tractors, the five consecutive years from 2004 to 2008 witnessed the substantial growth with the annual sale of 200 thousand units. In 2009 the sale grew to 300 thousand units; while in 2013 it grew to 400 thousand units.

Chart 3.2 Trend of Large and Medium Tractor Market from 2004 to 2014

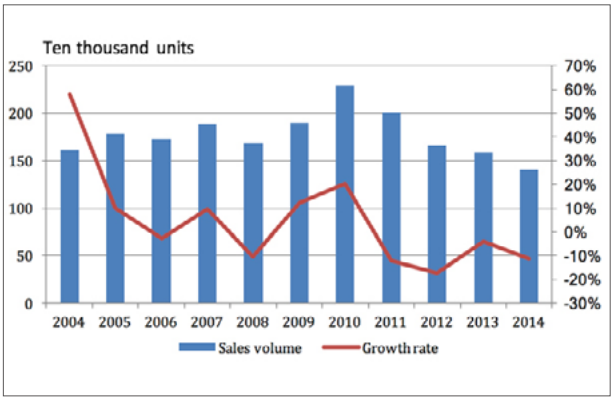


Source: China Agricultural Machinery Distribution Association (2016)

Annual sale of small tractors maintains at more than 1.6 million units for many years

Overall, China's small tractor (<20hp) market shows an upward trend year by year from 2004 to 2010, but the sale has been declining since 2011.

Chart 3.3 Trend of Small Tractor Market from 2004 to 2014



Source: China Agricultural Machinery Distribution Association (2016)

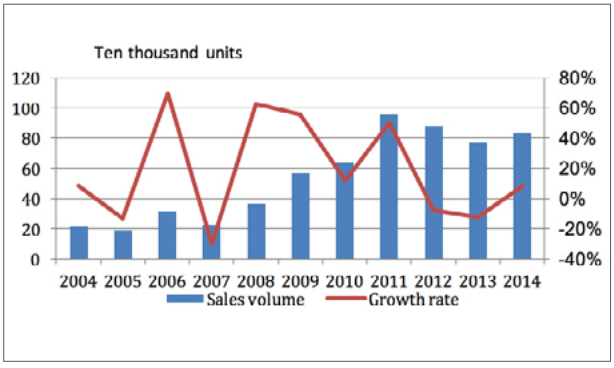
Harvesting Machinery Market

China's harvesting machinery market shows an upward trend year after year, in which corn harvester has showed the fiercest growth since 2010.

Harvesting machinery market is rising year by year

The market sale of harvesting machinery increased from 217 thousand units in 2004 to 833 thousand units in 2014, with an increase of nearly 4 times. Especially in 2014, with the overall downward trend in the industry, the harvesting machinery market still developed steadily, and the annual sales of various types of harvesters reached to 833 thousand units, with an increase of 8.4%.

Chart 3.4 Trend of Harvesting Machinery Sale from 2004 to 2014

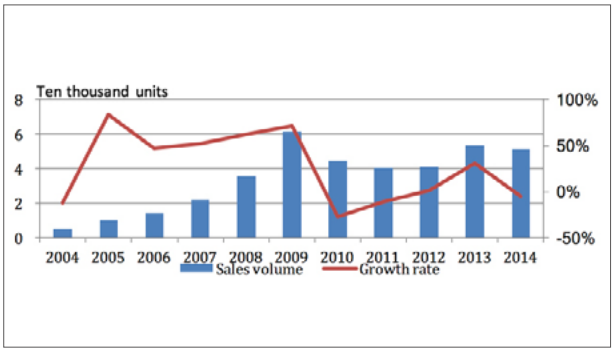


Source: China Agricultural Machinery Distribution Association (2016)

Wheeled grain combine harvester (wheat harvester) market is rising year by year

Wheeled grain combine harvester (wheat harvester) market overall shows an upward trend year after year. 2009 was the highest sale year with the annual sales of 61 thousand units while in 2014 the annual sales is 51 thousand units, with a decrease of 4.6% over the previous year.

Chart 3.5 Trend of Wheat Combine Harvester Market from 2004 to 2014

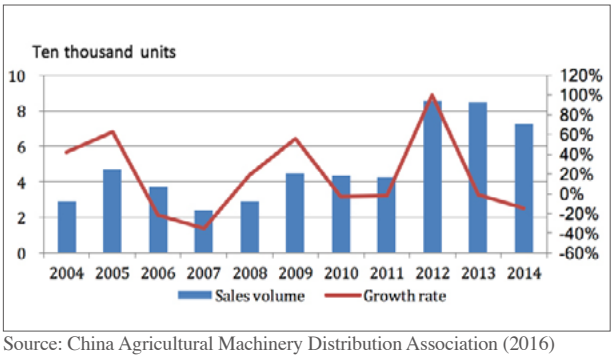


Source: China Agricultural Machinery Distribution Association (2016)

Rice combine harvester market is increasing year by year

Rice combine harvester market also shows an upward trend year by year. 2012 was the highest in terms of sale, and the market has declined since 2013.

Chart 3.6 Trend of Rice Combine Harvester Market from 2004 to 2014

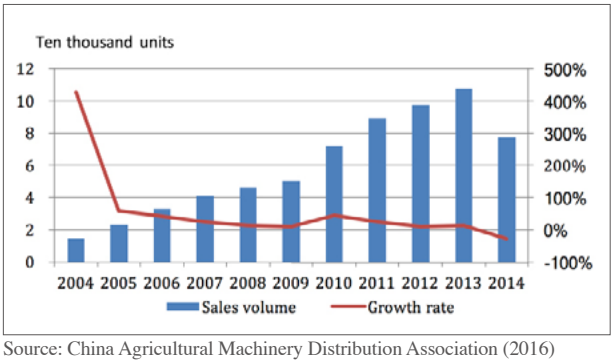


Source: China Agricultural Machinery Distribution Association (2016)

Demand for Trans-planter market is increasing steadily

Since 2004, China's trans-planter market demand has increased steadily. 2013 ranks the highest for sales that reached 108 thousand units. The market fell in 2014 with a decrease of 28.7%.

Chart 3.7 Trend for Trans-planter Market Demand from 2004 to 2014



Source: China Agricultural Machinery Distribution Association (2016)

3.1.4 Agricultural Machinery Manufacturing Industry

Since 2004, the central government continued to implement positive "three rural" policies, which effectively promoted the agricultural machinery manufacturing industry. At present, there are more than 8,000 agricultural machinery manufacturing enterprises in China, including the OEMs (Original Equipment Manufacturers) and cooperative production plants, forming complete agricultural machinery manufacturing industry chain with a considerate scale and manufacturing capacity.

After 10 years of development, the agricultural machinery manufacturing industry chain has further improved since 2004. In 2014, there were more than 2207 large-scale enterprises, accounting for 27.6% of the total agricultural machinery enterprises, and 80% of the business revenue of the industry. The

large-scale enterprises have become the backbone of agricultural machinery manufacturing industry.

The product structure of the agricultural machinery manufacturing industry has been improved meeting the needs of China's agricultural production, including farming, animal husbandry machinery, agricultural products processing industry, forestry, fishing machinery, agricultural transport machinery, and renewable energy equipment. Among them, there are 65 categories, 337 mid-categories and 1374 sub-categories. The planting machinery is the focus of the development of China's agricultural machinery manufacturing. According to the Classification on Plant Mechanical Products of China, the machinery manufacturing industry is able to produce 14 categories, 113 mid-categories, 468 sub-categories and more than 3,500 kinds of products in the machinery industry category. The main product categories are: agricultural tractors, tillage machinery, planting and planting machinery, seedling planting machinery, seedling preparation machinery, cultivators, plant protection machinery, harvesting machinery, field operation machinery, grain drying machinery, farmland capital construction machinery, irrigation and drainage machinery.

The output of major agricultural products, such as large and medium tractors, combine harvester, trans-planter, planter, and grain dryer etc., increased rapidly and further accelerated the technological progress, which promoted the pace of agricultural product structural adjustment. For example, in 2004, the total output of the backbone tractor enterprises was 1.82 million units, of which there were 101 thousand medium and large tractors, accounting for 5.5%; by 2014, the total output of backbone enterprises tractors was 948 thousand units, of which there were 297 thousand medium and large tractors, accounting for an increase to 31.3%. In the past 10 years, the average annual growth rate of medium and large tractors of key enterprises has reached 11.4%, while that of small enterprises has decreased from 1.716 million units in 2004 to 651 thousand units in 2014, with an average annual decrease rate of 6.1%.

3.1.5 Agricultural Trade Policies

Chinese agricultural trade policy includes three areas: tariff, import and export quota management and domestic support.

Firstly, in the aspect of tariff, in the framework of the "WTO Agreement on Agriculture", China has achieved the reduction of import duty on grain, no provision of subsidies for agricultural products exported, and announced the list of all import and export of state-owned trading enterprises and goods. The average tariff rate for Chinese agricultural products was reduced from 23.2% in 2001 to 15.1% in 2010. The general tax rate for farm machinery stipulated by the General Administration of Customs in 2016 is as follows: 20% for all types of tractors; 30% for seeders; 30% for all kinds of harvesting machinery, threshers, lawn mowers, agricultural product cleaning machinery (individual grain, seed and dried bean cleaning machines are excluded). MFN (Most-Favored-Nation Treatment) rates vary from 4% to 9% depending on the goods.

Secondly, in the aspect of import and export quota management: since 2002, China has planned and published the catalogue and total volume of export commodities with quota, covering agricultural products such as hogs, live cattle, live chickens, sawn timber, rushes and rush products, etc. In 2004, import tariff quota management was introduced for wheat, maize, rice, soybean oil, rapeseed oil, palm oil, sugar, cotton, wool and top wool, including initial distribution and redistribution.

Thirdly, in the aspect of domestic support policy: after the accession to the WTO, the agricultural subsidy policies (Amber Box measures) that China is still implementing include: direct subsidies for grain, general subsidies for agricultural production supplies (for the purchase of seeds, farm machinery and other means of production), subsidies for growing superior grain cultivators, farm machinery purchase subsidies, minimum purchase price subsidies, temporary purchasing and storage subsidies, target price subsidies and target price insurance subsidies, etc.

In terms of farm machinery, the national regulatory provisions require gradually increase the capital investment and promote the development of agricultural mechanization through fiscal support, tax incentives, financing aid and other measures. At present, the farm machinery purchase subsidy policy has been implemented in all agriculture and animal husbandry counties (farms), the farm machinery subsidies include 11 categories, 43 sub-categories and 137 items products produced in China. The specific subsidy standards are as follows: (1) General subsidy of farm machinery shall be no more than 30% of the average selling price of the product last year, and no more than USD7,353[6] per machine in principle; (2) Milking machinery and dryer no more than USD17,650

6 USD 1 = RMB 6.8

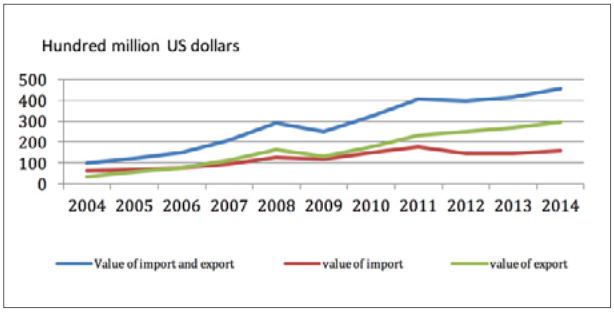
per machine; (3) 100hp or above large tractors, high-performance green fodder harvesters, large no-tillage seeders, large combined harvesters, large rice soaking and germination control equipment no more than USD22,060 per machine; (4) 200hp above tractor no more than USD36,760 per machine; (5) Large sugar cane harvesting machine no more than USD58,820 per machine; (6) Large cotton picking machine no more than USD88,240 per machine.

The above agricultural trade policies benefited the development of agricultural mechanization. China's farm machinery import and export trade maintained steady growth for 11 years from 2004 to 2014. Aside from meeting the needs of domestic market, Chinese farm machinery products started to show its competitive advantages in the international market.

3.1.5.1 Continued Growth of the Total Value of Import and Export of Agricultural Machinery

China's total value of import and export of various agricultural machinery in 2004 was 7.19 billion US dollars, and reached to 45.49 billion US dollars in 2014, with an average annual increase of 16.2%. The amount of agricultural export has maintained sustained growth for many years, and since 2014, the imports of agricultural machinery has reduced.

Chart 3.8 Value of Import and Export of Agricultural Machinery from 2004 to 2014

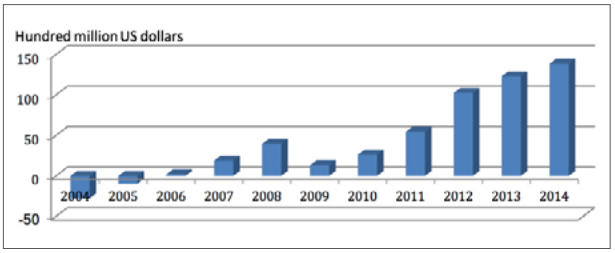


Sources: General Administration of Customs of China (2015)

3.1.5.2 Trade Surplus

In 2004, the value of import and export deficit of agricultural machinery was 2.78 billion US dollars, and it reduced to 960 million US dollars in 2005. In 2006, the agricultural machinery import and export value reversed and achieved a trade surplus of 190 million US dollars. In 2007, the export value of agricultural products reached the highest of 11.49 billion US dollars with an increase of 50.9%, and achieved trade surplus of 1.87 billion US dollars. The growth rate was higher than the increase of electromechanical products by 18.6%. In 2009, due to the international financial crisis, there was a slowdown in agricultural machinery export, but in 2010 the growth regained. Agricultural machinery exports in 2014 reached 29.67 billion US dollars, with an increase of 10.4%. From 2004 to 2014, agricultural machinery export value grew with an average annual rate of 23.3%.

Chart 3.9 Changes in Trade Balance from 2004 to 2014

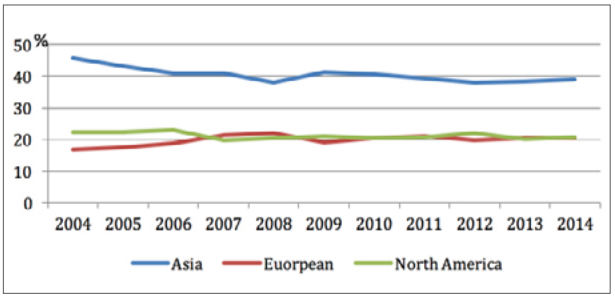


Sources: General Administration of Customs of China (2016)

3.1.5.3 Diversification of Export Market

The Asia-Pacific region is China's traditional agricultural export destination. From 2004 to 2014, export to Asia showed a downward trend. The export value to Asia in 2004 was 1.68 billion US dollars, accounting for 45.9% of its total export value; while in 2014 the export value was 11.612 billion US dollars, indicating an 39.1% decrease. Export to the European and North American markets maintained a steady upward trend. Europe has the largest potential for China's agricultural machinery products: in 2004 the exports were 620 million US dollars, accounting for 16.8% of the whole year export value; while in 2014 the export increased to 6.07 billion US dollars, achieving 20.5% annual growth. The United States is China's largest single agricultural machinery export market, from 2004 to 2014, the export value accounted for around one fifth of the whole year export value.

Chart 3.10 Proportion Changes in Agricultural Machinery Export from 2004 to 2014



Source: General Administration of Customs of China

3.1.6 Agricultural Investment Policies

The Chinese government gives consideration to both "Going Global" and "Bringing-In" in the formulation of agricultural investment policy. On the one hand, it is encouraged that the agricultural enterprises (including farm machinery manufacturing enterprises) to make foreign agricultural investment through various financial means. Firstly, governments in various levels offer direct subsidies, discounts or other support policies to serve the needs of the enterprises' engagement in international cooperation on agriculture, human resource, high-tech R&D and other areas. Secondly, China Development Bank granted USD 29.41 billion to support the agricultural modernization including oversee investment. Thirdly, the Export- Import Bank of China provides various support overseas investment projects including credit concessions, release of credit limit, extension of the loan period and other methods. Fourthly, the State Administration of Foreign Exchange facilitates the agricultural investment by simplifying the process of using foreign exchange funds.

On the other hand, the Chinese government actively creates an enabling agricultural investment environment for both domestic and foreign enterprises and ensures fair competition. The approval of foreign-invested enterprises is simplified in terms of registration requirement. For example, the registration procedures have been accelerated by 90% in terms of paperwork; and the examining and approval process could be done in 3 working days or less. While continuing to reduce the foreign investment restrictions, the Chinese government encourages the foreign investors to enter into the agricultural machinery industry, and invests in the development and manufacturing of new agricultural product processing and storage equipment; agricultural facilities and equipment; high-performance rice trans-planters; low fuel consumption, low noise and low emission diesel engines and other farm machinery.

It can be seen that the Chinese government has attached great importance to optimize the investment environment of farm machinery industry. The farm machinery and equipment included in the benefited catalogue can also enjoy import tariff exemption and other preferential policies; and corporate income tax relief is granted to western investors in those areas. The tax incentives for foreign-invested enterprises include: the implementation of preferential corporate income tax rate, reduction and exemption from corporate income tax, exemption from import equipment tariff and import value-added tax, etc.

3.1.6.1 Preferential Corporate Income Tax Rate

The income tax rate for foreign-invested enterprises is usually 33%, but the following industries and regions can enjoy a far lower preferential tax rate, which is 15%:

- Foreign-invested enterprises established in special economic zones
- Productive foreign-invested enterprises established in Pudong New Area
- Productive foreign-invested enterprises established in a state-level economic and technological development zone
- Foreign-invested enterprises established in the national hi-tech industrial zone and recognized as high-tech enterprises
- Foreign-invested enterprises in the fields of infrastructure, such as energy, transportation, ports and terminals

24% preferential rate applies to:

- Productive foreign-invested enterprises established in the coastal economic open areas, coastal areas, riverside areas, open coastal cities and provincial capitals
- Productive foreign-invested enterprises established in the old urban areas of the special economic zones and the cities where the national economic and technological development zones are located.

3.1.6.2 Enterprise Income Tax Relief

The enterprises that enjoy enterprise income tax relief include:

- Productive foreign-invested enterprises with operation period more than 10 years shall be exempted for 2 years from the profit-making year and reduced by half for 3 years;
- High-tech foreign-invested enterprises will be exempted from tax for 2 years and the tax will be reduced by half for 6 years;
- In addition to the above-mentioned "two exemptions and three deductions", export-oriented foreign-invested enterprises may continue to pay 50% of the total enterprise income tax of export value accounts for more than 70% of total sales, and the enterprise income tax rate shall not be lower than 10%;
- Foreign-invested enterprises engaged in agriculture, forestry and animal husbandry, and foreign-invested enterprises located in remote and economically underdeveloped areas, after the expiration of the 5-year tax exemption period, the

enterprise income tax can be paid at 15% to 30% within the following 10 years upon the approval of the State Administration of Taxation;

- Enterprises with foreign investment in the central and western regions may pay enterprise income tax at a reduced rate of 15% for 3 years after the expiration of the 5-year tax exemption period;
- The foreign investor of a foreign-funded enterprise shall reinvest the profit made by the invested enterprise for at least 5 years. The taxpayer shall refund 40% of the income tax paid for the reinvested parts. Reinvested in the export enterprises, the reinvested part of the income tax shall be fully refunded;
- Foreign investors are exempted from income tax on profits from foreign- invested enterprises;
- The provincial governments have the authority to make their local income tax policies of foreign-invested enterprises in line with their actual situation.

3.1.7 Infrastructure Development

At the present stage, China is accelerating and strengthening agricultural infrastructure construction, benefiting the farm machinery industry with both financial and policy support.

Chinese agricultural infrastructure construction has several funding sources. The national finance expenditure is increasing on agriculture and water conservancy, transportation, electric power facilities, scientific research and agricultural technology promotion, etc. At the same time, the state finance has set up specific funds for agricultural land development and agricultural comprehensive development (fields, water, roads, forests and so forth), small farmland water conservation. In 2014, the national fiscal expenditure for comprehensive agricultural development was USD8.25 billion, a 66% increase than 2010. In addition, the state provides financial support for the agricultural infrastructure construction through the establishment of agricultural policy banks (China Rural Development Bank), and granted a total amount of USD2.03 billion loan in 2015. The state encourages the involvement of social capital in the construction and ensuring reasonable profit of the social capital supporting the local governments to conduct overall contracting of the rural infrastructure projects.

To promote agriculture modernization, China plans to carry out high standard farmland construction project in terms of improving farmland irrigation and drainage facilities, tractor-ploughing roads, transmission and distribution facilities, agricultural equipment storage facilities and other fields. Agricultural infrastructure construction is regarded as an important element of "Improving the weak chains" in the overall national planning. And, local governments at all levels are requested to improve the construction and maintenance of agricultural infrastructure.

Under the Law of the People's Republic of China on Promotion of Agricultural Mechanization, farm machinery-related agricultural infrastructure construction is the responsibility of the local governments. The Ministry of Finance, the Ministry of Agriculture and other central government departments provide supports mainly on major construction projects at the main grain producing areas, especially the major grain-producing counties. Local governments at all levels are in charge of developing pertinent supporting policies according to their local conditions.

Firstly, construction of tractor-ploughing road: the tractor-ploughing roads constructed by local governments at all levels are generally connected with the rural road network, so as to achieve multiple usages of one road. For this purpose, the local governments have taken various supporting measures, for example: (1) arrange construction fund in the fiscal year budget at all levels; (2) arrange construction fund in the major project planning at provincial level related to transportation, agriculture, farm machinery, land, poverty alleviation and others; (3) encourage farmers to invest and engage in tractor-ploughing road construction, grant incentives and subsidies, and explore the model of "Run by local people and subsidized by the governments"; (4) the municipal agricultural sector is responsible for the design, reporting, inspection and acceptance of tractor-ploughing road; (5) conduct technical specification of all kinds of tractor-ploughing road in different conditions (agricultural demonstration park, characteristic industrial base, family farms, etc.); (6) form professional maintenance team to ensure the function of tractor-ploughing roads.

Secondly, the construction of farm machinery storage shed. The central government supports the construction of farm machinery storage shed. The national-level "Farm Machinery Parking Field, Storage and Shed Construction Standard" is in the stage of comments solicitation. The support of local governments at various levels mainly focuses on standardization and guidance, for example: (1) introduce the pertinent regulations of farm machinery storage shed including machinery storage, parts warehouse, oil depot, equipment parking field and agricultural tools shed; and construction standards (2) encourage and guide the village-level farm machinery service organizations and farmers to construct

farm machinery storage shed.

Thirdly, the construction of large greenhouse facilities: local governments support the development of facility agriculture, and generally provide subsidies for the greenhouse through agricultural machinery purchase subsidy. For example: in 2016, the subsidy in Fujian Province included two types of large intelligent temperature control greenhouses, three types of large greenhouses and one type of intelligent greenhouse, and listed in detail the height, cement column diameter, main skeleton materials, supporting irrigation method and other construction standards of the greenhouses, with subsidies ranging from USD11,030 to USD22,060 per hectare; in 2016, Zhejiang Province provided subsidy for three types of stand-alone steel-framed greenhouses, four types of connective steel-framed greenhouses and glass greenhouses, for no more than 30% of the average selling price in 2015. In 2016, Beijing and other places provided the subsidy of no less than USD441.2 per hectare for sunlight greenhouses, no less than USD7.4 per mu (1 hectare equals 15 mu) for large greenhouses; and old greenhouse modification projects can also apply for fixed amount subsidy.

In addition, the government supports the farm machinery maintenance and after-sales service network construction, but the specific layout planning, maintenance management norms, etc. are still under discussion.

3.1.8 Conclusion

In China, agricultural mechanization experienced a high-speed development in the last decade thanks to making and improving laws and regulations, and implementing a series of supporting policies.

The first and foremost is to improve the legal framework and regulations. The “Promotion Law” and the “Regulations” provides the overarching guidance for the development agricultural mechanization in China. They identify main tasks and supportive measures, and specify the responsibility of the local governments at all levels and relevant departments. In line with the guidance and provisions of the “Promotion Law” and the “Regulations”, the provinces and cities have revised their specific supporting policies and regulations taking into account their local conditions. The Ministry of Agriculture has issued methods of testing and evaluation on agricultural machinery and other departmental administrative rules.

Up to now, the legal system of agricultural mechanization in China has been formed, the core of which is the “Promotion Law” and the “Regulations”, supplemented by local regulations and departmental rules. It fully arouses the enthusiasm of governments, enterprises and farmers for the development of agricultural mechanization, supports fast, healthy and sustainable development of agricultural mechanization in China.

The second is to continuously increase policy support. The rapid development of agricultural mechanization is supported by the central and local governments in China. In 2004, the Document No.1 on Several Policies of the State Council of China to Promote Farmers to Increase their Income proposed that: “To raise the level of agricultural mechanization, to subsidize farmer individuals, farm workers, farm machinery specialists and service organizations which directly engage in agricultural production to purchase and update large-scale agricultural machinery “.

In 2004, the Ministry of Finance and the Ministry of Agriculture started to implement the subsidy of purchasing agricultural machinery. The purchase subsidy invested by central government increased from USD10.29 million in 2004 to USD3.49 billion in 2014, with a cumulative investment of USD17.65 billion. This stimulated an investment of USD43.31 billion from the local governments and farmers. There are 18.2 million farms who have received subsidies; and the subsidized machinery reaches 22.5 million. Hence, this greatly improves the level of agricultural mechanization, promotes the transfer of surplus rural labor force, enhances the comprehensive agricultural production capacity, develops modern agriculture, increases the income of farmers, promotes the rural economy and social progress of rural areas.

China has initially established a series of supporting policies, such as machinery purchase subsidies, tax reduction, preferential credit, job subsidies, agricultural machinery insurance, roads and fields and sheds of agricultural machinery storage construction, which ensure the rapid, sustainable and healthy development of agricultural mechanization.

Every year since 2004, the Chinese government issues national agricultural development guidance, basically including the related contents of promoting innovation, promoting high-tech and appropriate agricultural technology. The Chinese government emphasizes that the enterprises play a key role in agricultural technological innovation and application.

In order to ensure the smooth implementation of the investment

in agriculture, the Chinese government has formulated a series of laws, regulations and policies, creating an enabling environment for both domestic and oversea investors.

There is no cross-border agricultural trade barrier. China has signed free trade agreements with ASEAN, South Korea, Pakistan and many surrounding countries to promote the free circulation of commodities, including agricultural products.

The current regulatory system of China can effectively protect the benefit of all agricultural investors, so that investors can get financial support from financial institutions. The main providers of rural financial services are state-owned financial institutions, and the financial products vary in different regions and institutions.

The governmental management departments are in charge of developing strategies and policies ensuring the sustainable development of agricultural mechanization from global perspectives. Research institutions, extension organizations and other public services institutions carry out research and development of agricultural mechanization technology, new technology promotion and application, etc. The private sector with enterprises as the main component involve into design, research, developing and manufacturing, and sales of agricultural machinery, as well as providing after sale and maintenance services, etc.

India

3.2 Trade and Investment Policies on Mechanization of Agriculture in India

3.2.1 Overview of the Agriculture Sector

Indian agriculture has marked its prominence at a global level. Globally, India ranks second in farm output. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth (Singh, 2015a). This is evident from the increasing contribution of services and the manufacturing sectors to the GDP. Agriculture and allied sectors contribute approximately 14% to GDP and 50% of labour force. Service sector contributes 59% to GDP and industry 27% (Anonymous, 2015). About 60% of the households are dependent on agriculture. Rapid urbanization and growth of other sectors promising employment are impacting the farm labour availability. In India, 63% holdings are below 1 ha accounting for 19% of the operated area while over 86% holdings are less than 2 ha accounting for nearly 40% of the area. Fragmentation of operational farm holdings is yet another major concern in this respect and the average size of holdings has shrunk from 2.82 ha in 1971 to 1.15 ha in 2011. The story of the development of agricultural mechanization in India is both fascinating and in many ways, quite remarkable. The country has moved forward over the past six decades from one in which it then faced severe food shortages to where today it has become an exporter of many food commodities and a major exporter of other industrial products, including agricultural tractors and machienry.

Now, mechanization is required in every unit operation of agricultural production, post-harvest, food processing and rural living. Indian farmer is fast adapting farm mechanization than ever before. Farm mechanization not just reduces labour and time but also reduces losses and cuts down production cost. Mechanization supports the optimal utilization of resources (e.g., land, labour, and water) and expensive farm inputs (seeds, fertilizers, chemicals). Judicious use of time, labour and resources helps sustainable intensification (multi-cropping) and timely planting of crops, which can give crops more time to mature leading to increase in productivity. The use of machinery also helps in reducing losses, pollution and drudgery. Farm mechanization in association with improved crop inputs have shown improved yields by 10-15% (Table 1). It has been further estimated that the use of proper equipment can increase the productivity by up to 30% and reduce the cost of cultivation by about 20% (Anonymous, 2015). It is evident from the Table 3.2.1 that 15-30% saving is experienced in seeds and fertilizers, 20-30% in saving time and labour and enhances 5-10% cropping intensity through farm mechanization. There are various benefits of farm mechanization such as it helps in conversion of uncultivable land to agricultural land through advanced tilling techniques, decrease work load on agricultural work force, improvements in safety of farm operations and encouraging youth to join farming to work and live in rural India.

The overall level of Farm Mechanization in India is about 40-45% (i.e. tillage about 40%, seeding and planting about 30%, plant protection about 35-45% and harvesting and threshing about 60-70% for rice and wheat and less than 15% for other crops); (Table 3.2.2) The level of mechanization varies greatly by region. States in the north such as Punjab, Haryana and western Uttar Pradesh have a high level of mechanization (70-80% overall; 80-90% for rice and wheat) due to high productive land as well as declining labour force and also full support by state governments. The eastern and southern states have a lower level of mechanization (35-45%) due to smaller and more scattered land holdings. In the north-eastern

states, the level of farm mechanization is extremely low mainly due to hilly topography, high transportation cost, and socio-economic conditions of the farmers.

Table 3.2.1: Contribution of agricultural mechanization (Estimated values)

Benefits	Value
• Saving in seed	• 15-20%
• Saving in fertilizer	• 15-20%
• Saving in time	• 20-30%
• Reduction in labour	• 20-30%
• Increase in cropping intensity	• 5-20%
• Higher productivity	• 10-15%

Table 3.2.2: Level of Farm Mechanization in India
(National level is about 40-45%)

Operation	Percentage
Soil working and seedbed preparation	40
Seeding and planting	30
Plant protection	34
Irrigation	37
Harvesting and threshing	60-70% for wheat and rice and less than 15% for others

In India, farm mechanization played a significant role in pulling out country from starving situation (after independence) to a commendable position. Farm mechanization contributed to increasing in gross cultivated area (165 M ha in year 1965-66 to 195 M ha in year 2013-14) and yield (productivity based on net sown area increased from 0.64 t/ha in year 1965-66 to 2.15 t/ha in 2014-15); (Table 3.2.3) For adoption of a higher level of technology to perform complex operations within time constraints and with comfort and dignity to the operators, mechanical power becomes essential. Thus, the extent of use of mechanical power serves as an indicator of acceptance of higher level of technology on farms. It is apparent from Table 3.2.3 that the cropping intensity increased with increase in per unit power availability. It was 114% with power availability of 0.32 kW/ha during 1965-66 that increased to about 142% with an increase in power availability of 2.14 kW/ha in 2014-15. Net sown area per tractor shows the reverse trend during the same period, which was about 2162 ha/tractor in 1965-66 and reduced to 24 ha/tractor in 2014-15. Government of India through Sub-Mission on Agricultural Mechanization giving more emphasis on increasing the reach of farm mechanization to small and marginal farmers. Indian Council of Agricultural Research, State Agricultural Universities, Central Institute of Agricultural Engineering, Krishi Vigyan Kendras (KVKs) are the key initiators in promoting agricultural mechanization. Mechanization is promoted through R&D, field demonstrations, subsidies to farmers, and bank loans. These initiatives are driven by a strong integrated network of state institutions engaged in adoption, development, piloting and facilitating commercialization of agricultural machinery. Table 3.2.4 gives the status of agricultural machinery industries in India.

Table 3.2.3: Cropping Intensity and Power Availability on Indian Farms

Year	Cropping intensity (%)	Food grain productivity (t/ha)	Power available (kW/ha)	Power per unit production (kW/t)	Net sown area per tractor (ha)
1965-66	114.00	0.636	0.32	0.50	2162
1975-76	120.30	0.944	0.48	0.51	487
1985-86	126.80	1.184	0.73	0.62	174
1995-96	130.80	1.499	1.05	0.70	82
2005-06	135.90	1.715	1.49	0.87	45
2010-11	140.50	1.930	1.78	0.92	34
2011-12	141.50	2.079	1.87	0.90	31
2012-13	140.90	2.129	1.94	0.91	29
2013-14	142.00	2.111	2.02	0.96	27
2014-15	142.00	2.150	2.14	1.00	24

Power per unit area is total power available in million kW divided by total cultivated area (142 million ha)

Source: Singh (2015)

Table 3.2.4: Agricultural Machinery Industries in India

S. No.	Equipment manufacturers	Number of units	
		2000-01	2016
1.	Tractors	14	21
2	Power tillers	7	7
3.	Agricultural tools and implements	6980	5000
4.	Seed drills and planters	1450	2500
5.	Combine harvesters	15	48
6.	Reapers	45	60
7.	Threshers	3500	6000
8.	Plants protection equipment	160	300
9.	Earth moving machinery and parts	188	150
10.	Diesel engine	200	200
11.	Village craftsmen (Rural industries)	million	>1 million
12.	Irrigation Pumps	600	600

Source: Anonymous (2013); Kale (2015)

3.2.2 Investment Environment and Policy

There are no sectoral policies (e.g. agriculture, education, trade, infrastructure or finance) aligned with agricultural investment strategies. Agricultural investment in mechanization sector is by private parties. Government of India has ensured that laws, regulations and policies for agricultural investment and their implementation and enforcement are clear, accessible, and transparent and do not impose unnecessary burdens on domestic and foreign agricultural investors. Domestic and foreign agricultural investors are free to make an investment in

agricultural mechanization with permission from central and state Governments. The investment procedure is online and easy. Any enterprise interested in investing in agricultural mechanization in India should contact State Government or Union Territories where they would like to invest. First, they have to register with the State Government and thereafter the investor can either lease or rent the land or in the case where it is a joint venture, the Indian partner can provide land and one can start developing required infrastructure and commence the project.[7]

There are no restrictions specific to foreign investment in agriculture under "Make in India Programme". It's open and eases to doing business in India. The Government of India has established a Foreign Investment Promotion Board (FIPB) in the Ministry of Commerce and Industry, Government of India (Anon., 2016) who looks into these types of problems. As such there is no dispute to agricultural sector particularly as regards land tenure, because either land can be taken on lease for 99 years or can be bought. Foreign Investment Promotion Board (FIPB) of the Ministry of Commerce and Industry is the authority for investment decisions. However, this board will no longer exit after April 1, 2017 and automatic route will be followed. This route allows Foreign Direct Investment (FDI) without prior approval by Government or Reserve Bank of India. Once the FIPB is abolished, the onus of approving the FDI proposals would be on the Ministry of Agriculture & Farmers Welfare and regulatory authorities concerned (Anonymous, 2016). FDI in agriculture sector is permitted up to 100% under the automatic route, subject to certain conditions mentioned in Consolidated FDI Policy.

For small holders, Central Government and State Governments have initiated the establishment of Custom Hiring Centres in different part of country to meet the requirement of farm operations on small and marginal farms and to some extent on medium and large farms who cannot own the machines. TRRINGO.COM Ltd. Established by Mahindra and Mahindra Tractors Ltd. is one such organization started doing custom hiring business of agricultural machines just like Ola and Uber taxies. TAFE Ltd. has also started similar custom hiring business in the country.

3.2.3 Trading Environment & Policy

There are no cross-border agricultural trade barriers. The ASEAN–India Free Trade Area (AIFTA) is a free trade area among the ten member states of the Association of Southeast Asian Nations (ASEAN) and India (Anonymous, 2003). The Framework Agreement laid a sound basis for the eventual establishment of an ASEAN-India Regional Trade and Investment Area (RTIA), which includes Free Trade Agreement (FTA) in goods, services, and investment. The India, the Governments of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao People's Democratic Republic, Malaysia, the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Viet Nam are the member States of the Association of Southeast Asian Nations. Most Favored Nation (MFN) tariff rates include in-quota rates. Sri Lanka is also expected to join this group by 2019.

As regards Import policy of the Government of India; on import of spares and components of Agricultural Implements full duty is levied by Indian customs comprising of Customs duty part as well as Excise duty part (Anonymous, 1985). In case of import of finished Agricultural Implements the Excise duty part that is Countervailing Duty (CVD), chargeable on Assessable value is NIL the Customs duty part that is Basic Customs Duty (BCD) chargeable on the same is 7.5% and additional duty chargeable is 4%. As regards Export policy of Government of India; Exporters of Agricultural Implements can avail benefit of Duty Drawback on Free On Board(FOB) value of the goods so exported which can be referred to under Chapter 84 of Customs tariff of Government of India. Details are as below:

1. As per first schedule to Central Excise Tariff Act, 1985, "Agricultural, Horticultural or Forestry Machinery for Soil Preparation or Cultivation; Lawn Or Sports-Ground Rollers" fall under Chapter Heading 8432. This chapter heading includes different types of ploughs, harrows, rotary tillers, seeders, planters and transplanters, cultivators, weeders, hoes (including rotary hoes), manure spreaders, fertilizer distributors, other machinery of similar types etc. and their parts. As per Central of Excise Tariff, these items attract Nil rate of excise duty. In other words, no duty is attracted in this case.
2. Similarly, as per first schedule to Central Excise Tariff Act, 1985, "harvesting or threshing machinery, including straw or fodder balers; grass or hay mowers; machine for cleaning, sorting or grading eggs, fruit or other agricultural produce" fall under Chapter Heading 8433. This chapter heading includes different types of mowers for lawns etc, haymaking machinery, straw or fodder balers, various types of harvesting machinery or threshing machinery (including combine harvester – threshers), machines for cleaning, sorting or grading eggs, fruit or other agricultural produce etc and their parts. As per Central of Excise

7 Invest India, available at <http://www.investindia.gov.in/investment-policies/>.

Tariff, these items attract Nil rate of excise duty. In other words, no duty is attracted in this case.

3. However, recently, certain parts & components of these implements are being classified by Central Excise department under some other headings which attract excise duty than as parts of the agricultural implements, as per details given below:
    a. PTO shafts & Gear boxes (used in Agricultural Implements like Rotary Tillers, Rotary Slashers, Rotary Harrow, Post Hole Diggers & Balers). As per Excise department these parts & components are classified under Chapter heading 8483 and attract a duty of 12.36%.
    b. Hooks (used in Agricultural Implements like Harrows & Agricultural Trailers). As per Excise department these parts & components are classified under Chapter heading 7318 and attract a duty of 12.36%.
    c. Springs (used in Agricultural Implements like Cultivators, Harrows & Rotary tillers). As per Excise department these parts & components are classified under Chapter heading 7320 and attract a duty of 12.36%.
    d. Spindles & hubs (used in Agricultural Implements like Disc ploughs, Disc Ridgers & Disc harrows). As per Excise department these parts & components are classified under Chapter heading 8448 and attract a duty of 12.36%.
    e. Other parts & components used in Agricultural Implements falling under other headings of Central Excise Tariff and attracting central excise duty as per their respective Chapter headings. The Government has also given exemption to in-house manufacture of intermediate goods for use in the manufacture of Power Tillers falling under chapter heading 8432.

Government of India has implemented Goods and Services Tax (GST) since July 1, 2017. Under this all manual and animal operated farm tools and equipment have been exempted from GST. However, tractor and power operated farm equipment have been brought under 12% GST including imported equipment. Some equipment and parts & components of agricultural machinery have 18% GST also.

The Government of India has launched Pradhan Mantri Fasal Bima Yojana. Under this crop insurance scheme, if the farmer loses the crop due to any natural activity, then the 25% of the total loss will be provided instantly. The remaining amount will be paid after proper assessment of the situation. Farmer will pay only 2% as premium, while all the remaining will be done by the government. The premium rates are: i) Rabi Crop (Winter crop)– 1.5% premium; ii) Kharif Crop (Rainy season crop) – 2% premium; iii) Baagwani Crop (Horticultural crops) -5% premium; and iv) Tilhal Crop (Oilseeds crops) – 1.5% premium.

The Government of India has developed Farmers' portal to assess day-to-day agricultural commodity prices. Farmers are free to sale their commodity anywhere in India through Kisaan Kranti. Kisaan Kranti is an attempt to bring prosperity to the Indian Farmers by giving them an opportunity to sell their produce at the best rates nationwide. Agricultural extension services provide advice on Co-operative arrangements among agricultural producers to help implement collective risk management strategies. These agricultural extension services are available with Centre as well as State Governments, NGOs, Government institutions/universities.

The Government of India as well as all state Governments., Indian Council of Agricultural Research (ICAR), State Agricultural Universities and other related organizations encourage farmers for diversification of crops to cultvation of vegetable and fruits, go far animal husbandry, aquaculture, fisheries, and cash crop as a risk management instrument giving higher prices.

India imports and exports various kind of agricultural machinery every year. Tractor export started with 4567 units (2.38% of total sale) from year 2003-04. It has been observed that about 8 to 10% tractors are exported every year since 2003-04 onwards. Table 3.2.5 gives export of tractors since 2010-11. Table 3.2.6 gives import of power tillers since 2010-11. Total export of agricultural machinery including tractors and power tillers during 2013-14 was of US$ 1045.9 million whereas import was of US$ 440.59 million which is almost two and half times less (Chart 3.2.1). Tractors are exported mostly to USA, China, Australia, Latin America, the Middle East and South Asia. Power tillers are imported mainly from China. Table 3.2.7 gives the details of import and export of agricultural commodities.

Table 3.2.5: Export of Tractors

Year	Production (Numbers)	Import (Numbers)	Export (Numbers)	Domestic sale (Numbers)	Total sale (Numbers)
2010-11	481872	Nil	62872	482237	545109
2011-12	536297	Nil	70772	536886	607658
2012-13	527680	Nil	62890	527782	590672
2013-14	634098	Nil	62677	634151	696828
2014-15	612994	Nil	75469	551370	626839
2015-16	571565	Nil	77485	493764	571249

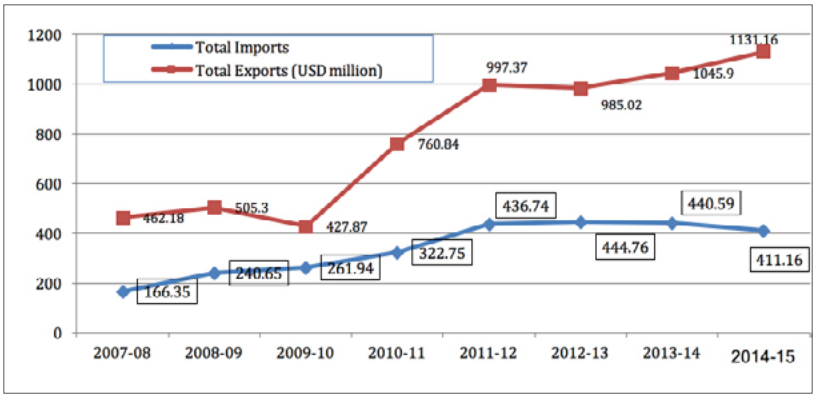
Source: Singh (2016); Tractor Manufacturers Association (TMA)

Table 3.2.6: Import of Power Tillers (Two wheel tractors)

Year	Production (Numbers)	Import (Numbers)	Export (Numbers)	Domestic sale (Numbers)	Total sale (Numbers)
2010-11	38500	16500	-	55000	55000
2011-12	39482	17392	-	56874	56874
2012-13	32812	13288	-	46100	46100
2013-14	40748	11103	-	51851	51851
2014-15	39500	11500	-	51000	51000
2015-16	40500	14500	-	55000	55000

Source: Singh (2016); VST Tillers Tractors; Power Tillers Manufacturers Association (PTMA)

Chart 3.2.1: Export-Import of Agricultural Machinery (US$ million)



Source: Kale (2015)

Table 3.2.7: Imports and Exports of Agricultural Commodities in India
(Value in INR Crores; 1 USD – INR 66)

Year	Agricultural imports	Total national imports	% agricultural imports to total national imports	Agricultural exports	Total national exports	% agricultural exports to total national exports
1990-91	1205.86	43170.82	2.79	6012.76	32527.28	18.49
2000-01	12086.23	228306.64	5.29	28657.37	201356.45	14.23
2010-11	57334.32	1683466.96	3.41	117483.61	1142921.92	10.28
2011-12	82819.15	2345463.24	3.53	187609.33	1465959.39	12.80
2012-13	109610.68	2669161.96	4.11	232041.11	1634318.84	14.20
2013-14*	105149.00	2714181.50	3.87	268469.05	1894181.95	14.17

Provisional data estimated by Government; Source: Anonymous (2014)

3.2.4 Infrastructure & Financial Development

In India infrastructure policies are aligned with agricultural investment objectives in the area of (a) floriculture, horticulture, apiculture and cultivation of vegetables & mushrooms under controlled conditions; (b) development and production of seeds and planting material; (c) animal husbandry (including breeding of dogs), pisciculture, aquaculture, under controlled conditions; and (d) services related to agro and allied sectors are allowed for FDI. Private investors in the agricultural sector may approach desired sector. There are many agencies controlled by Central Government and State Governments such as Food Corporation of India (FCI); Department of Agriculture & Cooperation Mechanization and Technology Division and other related institutions responsible for infrastructure project design, development and maintenance. Central and State governments, Government institutions and other related NGOs and organizations attract private investors through meetings/ seminars/ conferences/ exhibitions for development and supply of agriculture-related infrastructure.

The Government of India has a clear strategy for irrigation infrastructure development. Ministry of Water Resources of the Government of India and similar departments at State Level are responsible for the development, operations and maintenance of such infrastructure shared between Government, water users and farmers. The Government of India has already formed a group of qualified people to look into the development of irrigation projects in the country including the linking of some of the rivers.

Bharat Nirman is a time-bound business plan for action in rural infrastructure. Under Bharat Nirman, the Government of India provides the road connections to almost all the villages above 1000 population and all 20,867 habitations above 500 populations in hilly and tribal areas. The main thrust of research and development (R&D) in the roads sector is to build a sustainable road infrastructure. Rural transport is concerned with transporting goods and people within the village, between villages and urban areas, linking village roads with district roads, state highways and national highways, railways, ports, airports and to storage facilities, and the movable cold storage system (trailers/containers) to transport perishable agricultural produce from one place to other to reduce losses.

Government of India has developed a strategy to ensure access to reliable and affordable energy supply in rural areas. Ministry of Power has introduced the scheme Rajiv Gandhi

Grameen Vidhyutikaran Yojana (RGGVY) in April 2005, which aims at providing electricity in all villages and habitations and provides access to electricity to all rural households. Under RGGVY, electricity distribution infrastructure is envisaged to establish Rural Electricity Distribution Backbone (REDB) with at least a 33/11KV sub-station, Village Electrification Infrastructure (VEI) with at least a distribution transformer in a village. This infrastructure caters to the requirements of agriculture and other activities in rural areas including irrigation pump sets, small and medium industries, khadi and village industries, cold chains, healthcare and education and IT. Subsidy towards capital expenditure to the tune of 90% is provided, through Rural Electrification Corporation Limited (REC), which is a nodal agency for implementation of the scheme. Electrification of un-electrified Below Poverty Line (BPL) households is financed with 100% capital subsidy in all rural habitations. The Management of Rural Distribution is mandated through franchisees. The services of Central Public Sector Undertakings (CPSU) are available to the States for assisting them in the execution of Rural Electrification projects.

Financial market requires collateral security in the form of immovable asset or equal to the value of the assistance required. Government of India gives credit guarantee up to INR 20 million to Micro, Small and Medium Enterprises (MSME) agricultural investors. Collateral requirements do not prevent some agricultural investors to access credit from formal financial institutions. Credit information systems are available with Centre as well State Governments and anyone desired can access to such information.

Today private bankers are providing the credit to farmers only and national banks are not providing any financial assistance. The informal financial sector, including community savings, middlemen and retailers, have important role in providing credit to farmers. The role of microfinance and leasing are also available in the country. Recognizing the importance of agriculture sector in India's development, the Government and the Reserve Bank of India (RBI) have played a vital role in creating a broad-based institutional framework for catering to the increasing credit requirements of the sector such as NABARD. National Bank For Agriculture & Rural Development (NABARD) is set up as an apex Development Bank by the Government of India with a mandate for facilitating credit flow for promotion and development of agriculture, cottage and village industries. Agricultural policies in India have been reviewed from time to time to maintain pace with the changing requirements of the agriculture sector, which forms an important segment of the priority sector for lending of scheduled commercial banks (SCBs) and target of 18% of net bank credit, has been stipulated for the sector. Two innovations, viz., micro-finance and Kisan Credit Card Scheme (KCCS) have emerged as the major policy developments in addressing the infirmities associated with the distributional aspects of credit in the recent years. The KCCS has emerged as the most effective mode of credit delivery to agriculture in terms of the timeliness, hassle-free operations as also adequacy of credit with minimum of transaction costs and documentation. The cooperative banks had a major share (51.5%) in providing loans to farmers followed by commercial banks (36.9%). About 95% of tractor sales are on credit. Credit is extended by commercial banks, State Land Development Banks, and Regional Rural Banks.

3.2.5 Conclusion

As such there is no Agricultural Mechanization Policy in India. However, Government of India has implemented a Sub-Mission on Agricultural Mechanization in XII Plan with the objectives of increasing the reach of farm mechanization to small and marginal farmers and to the regions where availability of farm power is low; promoting 'Custom Hiring Centres' to offset the adverse economies of scale arising due to small landholding and high cost of individual ownership; creating hubs for hi-tech & high value farm equipment; creating awareness among stakeholders through demonstration and capacity building activities; and ensuring performance testing and certification at designated testing centers located all over the country.

There are no sectoral policies (e.g. agriculture, education, trade, infrastructure or finance) aligned with agricultural investment strategies. Agricultural investment in mechanization sector is by private parties. The Government of India has ensured that laws, regulations and policies for agricultural investment and their implementation and enforcement are clear, accessible, and transparent and do not impose unnecessary burdens on domestic and foreign agricultural investors. Domestic and foreign agricultural investors are free to make an investment in agricultural mechanization with permission from central and state Governments. The investment procedure is online and easy. There are no restrictions specific to foreign investment in agriculture under Make in India Programme. It is open and eases to doing business in India. The Government of India has established a Foreign Investment Promotion Board (FIPB) in the Ministry of Commerce and Industry, Government of India who looks into these types of problems. As such there is no dispute to agricultural sector particularly as regards land tenure, because either land can be taken on lease for 99 years or can be bought. Foreign Investment Promotion Board (FIPB) of the Ministry of Commerce

takes investment decisions. However, this board will no longer exit after April 1, 2017 and automatic route will be followed. This route allows FDI without prior approval by Government or Reserve Bank of India. Once the FIPB is abolished, the onus of approving the FDI proposals would be on the Ministry of Agriculture & Farmers Welfare and regulatory authorities concerned. FDI is 100% in agriculture and plantation (Anonymous, 2016).

Central Government and State Governments have initiated the establishment of Custom Hiring Centres in different part of country to meet the requirement of farm operations on small and marginal farms and to some extent on medium and large farms who cannot own the machines. TRRINGO.COM Ltd. Established by Mahindra and Mahindra Tractors Ltd. is one such organization started doing custom hiring business of agricultural machines just like Ola and Uber taxies. There are no administrative, fiscal or regulatory barriers to the movement of agricultural commodities across the country. It is absolutely free. The Government of India has already developed digital platforms where prices of agricultural commodities are known and one is free to sale his produce anywhere in the country where good prices are ensured.

There is no cross-border agricultural trade barrier. The ASEAN–India Free Trade Area (AIFTA) is a free trade area among the ten member states of the Association of Southeast Asian Nations (ASEAN) and India. The Framework Agreement laid a sound basis for the eventual establishment of an ASEAN-India Regional Trade and Investment Area (RTIA), which includes FTA in goods, services, and investment. The India, the Governments of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, the Lao People's Democratic Republic, Malaysia, the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Kingdom of Thailand and the Socialist Republic of Viet Nam are the member States of the Association of Southeast Asian Nations. Most Favoured Nation (MFN) tariff rates include in-quota rates. Sri Lanka is also expected to join this group by 2019.

Government of India has implemented Goods and Services Tax (GST) since July 1, 2017. Under this all manual and animal operated farm tools and equipment have been exempted from GST. However, tractor and power operated farm equipment have been brought under 12% GST including imported equipment. Some equipment and parts & components of agricultural machinery have 18% GST also.

Financial market requires collateral security in the form of immovable asset or equal to the value of the assistance required. The Government of India gives credit guarantee up to INR 20 million to MSME agricultural investors. Collateral requirements do not prevent some agricultural investors to access credit from formal financial institutions. Credit information systems are available with Centre as well State Government and anyone desired can access to such information.

The Government of India has launched Pradhan Mantri Fasal Bima Yojana. Under this crop insurance scheme if the farmer loses the crop due to any natural activity, then the 25% of the total loss will be provided instantly. The remaining amount will be paid after proper assessment of the situation. Farmer will pay only 1.5 - 2% as premium, while all the remaining will be done by the government. The premium rates are: Rabi Crop (Winter crop)– 1.5% premium; Kharif Crop (Rainy season crop) – 2% premium; Baagwani Crop (Horticultural crops) -5% premium and Tilhal Crop (Oilseeds crops) – 1.5% premium.

Photo by Tan Honglin

Nepal

3.3 Trade and Investment Policies on Mechanization of Agriculture: Nepal

3.3.1 General Background

Formerly known as the Kingdom of Nepal, the country changed its name to the Federal Democratic Republic of Nepal, with the adoption of the Constitution of Nepal 2072 by the House of Representatives of the People on September 20, 2015. The approved Constitution is the fundamental law of the country, and it is constituted by 37 divisions, 304 articles and 7 annexures. Taking as a base the new Constitution, the country is now structured into 7 federal provinces, and Kathmandu as its capital.

Nepal is a mountainous and predominantly agrarian land-locked country of 28.98 million people located in the southern slopes of the Himalayas, bordering the Tibet Autonomous Region of People's Republic of China in the North and India in the South, the East and the West. [8] In the north, we can find the great Himalayan range that has eight of the 14 highest peaks in the world above 8,000 meters including the highest peak of the world Mt. Everest of 8848 meters.The hilly and the mountainous regions account for 83 percent of the total land area of 147,181 sq. km, while the terai plain accounts for 17 percent of the area. Within its very small stretch, Nepal possesses immense ethnic, cultural, climatic and biological diversities.

3.3.2 Overview of the Agriculture Sector

Traditionally Nepal is an agrarian country, agriculture contributing around 33.1 percent of total national GDP and more than 66 percent of total employment. Agriculture occupies around 18 percent of total land area of the country, of which less than 50 percent of cultivated area is irrigated. It is the backbone of rural livelihood. Major agricultural products include paddy, wheat, maize, barley, millet, potato, lentils, tea, sugarcane, coffee, ginger and large cardamom; and some of these are also exportable products (Please see Table 3.5.1 and 3.5.2)

However, the average growth rate of this sector in last 10 years remained at 2%.[99] Agriculture is important for Nepalese economy not only for providing consumable product but also for raw materials to industries and tradable items. Significant numbers of industries in Nepal are based on agricultural products. Similarly, agricultural products occupy a considerable share in Nepal's export. Realizing the importance of agriculture for national livelihood, promoting employment and income generation, earning foreign exchange, ensuring food sufficiency and meeting the need for consumption and trade, the Government implemented and completed a long-term Agriculture Perspective Plan (APP) for 20 years in 1995. Currently, the Government has approved the Agriculture Development Strategy (ADS) for next 20 years. Both the Trade Policy 2009 and the Nepal Trade Integration Strategy (NTIS) 2010 have identified several agricultural products such as lentils, tea, coffee, ginger, large cardamom, jute etc. as potential goods for export. The organic farming is emerging as a potential sector for generating income and export. The Government is planning to promote further the production and marketing of these products in order to increase agro and industrial production, income, employment and trade. In this regard, development

8 Country Economy - Nepal, available at: <http://countryeconomy.com/demography/population/nepal>.

9 Ministry of Finance of Nepal, available at: <http://mof.gov.np/uploads/document/file/Final%20Economic%20Survey%202071-72%20English%20(Final)_20150716082638.pdf>.

of Sanitary and Phytosanitary Services (SPS) laboratories in major customs points is highly essential. However, there is still a need to create an internationally recognized accreditation mechanism to standardize such laboratories.

Table 3.3.1: Area of Food Crops and their Production Details

Crops	Fiscal Year 2014/15			Fiscal Year 2013/14		
	Area (Ha)	Production (MT)	Productivity (MT/Ha)	Area (Ha)	Production (MT)	Productivity (MT/Ha)
Rice	1425346(-4.1)	4788612(-5.1)	3.360(-1)	1486951(4.7)	5047047(12)	3.394(7)
Maize	882395(-5.0)	2245291(-6.0)	2.431(-1.1)	928761(6.3)	2283222(9.8)	2.458(3.4)
Wheat	762373 (1.0)	1975625 (4.9)	2.591 (3.8)	754474 (-0.7)	1883147 (-0.0)	2.496(0.8)
Millet	268050 (-1.2)	308488 (1.2)	1.151 (2.6)	271183 (-1.2)	304105 (-0.5)	1.121(0.7)
Barley	28053 (-0.4)	37354 (7.3)	1.332 (7.8)	28173 (-2.8)	34824(-5.8)	1.236(-3.1)
Buckwheat	10819 (2.9)	10870 (5.2)	1.005 (2.2)	10510 (-1.6)	10335 (2.8)	0.983 (4.4)
Pulse	326400 (-0.7)	353500 (0.3)	1.083 (1.0)	328738(-0.7)	352473(0.3)	1.070(1.0)

Source: Ministry of Agriculture Development (2016)

Note: Number in Bracket denotes growth in percent as compared to that of previous fiscal year

Table 3.3.2: Area of Cash and Industrial Crops and their Production Details

Crops	Fiscal Year 2014/15			Fiscal Year 2013/14		
	Area (Ha)	Production (MT)	Productivity (MT/Ha)	Area (Ha)	Production (MT)	Productivity (MT/Ha)
Potato	190228 (-7.5)	2842000(0.9)	14.940(9.1)	3205725 (9.4)	2817512(2.3)	13.696(-0.1)
Vegetables	245368(-3.8)	3629000(6.1)	14.790(10.2)	254932(3.5)	3421035(3.6)	13.419(0.1)
Fruits	111686 (1.5)	1186369(22.9)	10.622(21.2)	110086(8.5)	965044(2.8)	8.766(-5.2)
Tobacco	1724 (-2.8)	2227 (4.4)	1.292 (1.7)	1773(-2.8)	2200(-9.5)	1.257(-6.9)
Sugarcane	66600 (1.4)	3063000 (2.2)	45.991(-0.7)	65000(0.8)	3020000(3.1)	46.461(2.3)
Jute	11400 (0.4)	16530 (11.0)	1.450 (10.5)	11350(0.4)	15750(1.6)	1.388 (1.2)
Tea	19350 (0.4)	22500 (5.2)	1.163 (4.7)	19100(0.2)	19610(2.0)	1.027(1.8)
Coffee	1925(0.7)	450 (4.7)	0.234 (3.9)	1765(0.9)	375(2.5)	0.212(1.6)

Source: Ministry of Agriculture Development (2016)

Note: Number in Bracket denotes growth in percent as compared to that of previous fiscal year

The National Planning Commission (NPC) is the apex advisory body of the Government for formulating a national vision, periodic plans and policies for development. It is headed by the Right Honorable Prime Minister. The NPC assesses resource needs, identifies sources of funding, and allocates budget for socio-economic development. It serves as a central agency for monitoring and evaluating development plans, policies and programs. The NPC also serves as an intellectual hub for the exchange of new development ideas and proposals from scholars, private sector, civil society, and development partners. Ministry of Agricultural Development (MoAD) is the apex body for overall responsibility for the growth and development of agriculture sector. The Department of Agriculture of Ministry of Agricultural Development (MoAD) is the implementing agency, which has 12 professional directorate and various projects related to agriculture mechanization in the country such as the High Value Agriculture Project (HVAP), Rising Income of Small and Medium Farmers Project (RISMFP), and the Project for Agriculture Commercialization and Trade (PACT).

The manufacturing of agricultural machinery is beginning to grow in small scale, with small tools, ploughs, attachments, threshers etc. being locally manufactured. Almost all of the agricultural machinery

requirements are imported from different countries. These machineries are subject to 1% customs duty and zero VAT. The table below shows the import volumes in the year 2014/15:

Table 3.3.3: Agricultural Machineries imported in the year 2014/15

Item	Unit	Quantity	Values (NRs 000)	Source
Ploughs	Pcs.	41,610	8,884	China, India
Disc harrows	,,	3,952	36,773	India
Cultivators/harrows	,,	1,89,974	6,90,670	,,
Seeder/planter/transplanters	,,	6,408	14,872	India, China
Threshers	,,	21,358	4,80,053	India, China, USA, Japan
Tractors	,,	16,693	58,38,984	China, India
Reaper/harvesters	,,	3,557	44,327	,,
Fertilizer distributers	,,	25,827	2,281	,,
Combine harvesters	,,	78	66,521	,,
Cultivation machineries	,,	8,063	2,212	,,
Mowers	,,	51	609	China, India, Taiwan
Hay making machines	,,	57	750	India
Fodder balers	,,	27	1,415	India, China, Japan, Korea
Cleaning, sorting and grading	,,	511	4,520	China, India
Animal feed making	,,	1,76,232	3,23,756	Germany, Netherlands
Grain cleaner/grader	,,	24,903	3,78,556	,,
Milking machines	,,	207	6,629	China, India
Milling machineries	,,	4,541	3,29,125	Germ, Indonesia, Turkey

Source: Department of Customs

3.3.3 Agricultural Policy and Strategy

Nepal has sector wise policies for properly implementing related plans and programs. In agriculture, there are more than 20 different policy formulations, including: National Agriculture Policy 2061 (2004), Agri Business Promotion Policy 2063 (2006), Agriculture Biodiversity Policy 2063 (2006), National Tea Policy 2057 (2000), National Coffee Policy 2060 (2003), Dairy Development Policy 2064 (2007), National Seeds Policy 2056 (1999), National Fertilizer Policy 2058 (2001), Irrigation Policy 2060 (2003), Poultry Policy 2068 (2011), Pasture Policy 2068 (2011), Floral Promotion Policy 2069 (2012), National Land Use Policy 2069 (2012), National Cooperatives Policy 2069 (2012), Commerce Policy 2065 (2008), Climate Change Policy 2067 (2010), Industrial Policy 2067 (2010), Supply Policy 2069 (2012), Science and Technology Policy 2069 (2012), Biotechnology Policy 2063 (2006.), Agricultural Mechanization Promotion Policy, 2071 (2014), etc.

3.3.3.1 *National Agriculture Policy 2061 (2004)*

The National Agriculture Policy, 2061 follows an objective of creating an enabling environment for agriculture-led rural development. It emphasizes competitiveness of the agricultural sector encouraging farmers to go for commercial production. The policy divides farmers into two groups – small and large ones and aims to provide more resources to the small farmers. Farmers who own less than four hectares of land are labeled as resource poor farmers. They enjoy government assistance provision to boost their productivity. The policy aims at increasing productivity and promoting availability of natural resources to leverage them in the interest of farmers with limited resources.

The long-term vision of the agricultural sector is to bring improvement in the living standards through sustainable agricultural development by transforming subsistence agricultural system into a commercial and competitive agricultural system. The policy aims at achieving high and sustainable economic growth through commercial agriculture system contributing to food security and poverty reduction. It emphasizes:

- increased agricultural production and productivity,
- making agriculture competitive in regional and world markets with commercial agriculture system,
- conserving, promoting and utilizing natural resources, environment and bio diversity

3.3.3.2 *Agricultural Development Strategy (ADS) (2015)*

For the overall development of agriculture in the country, the Government of Nepal (GoN) has approved the Agricultural Development Strategy (ADS) on 26 July, 2015. It is a 20-year strategic planning from 2015 to 2035. Before ADS, the plans and programs in agriculture ware guided by the Agricultural Prospective Plan (APP) which ended on 2015.

The vision of ADS is "a self-reliant, sustainable, competitive, and inclusive agricultural sector that drives economic growth, and contributes to improved livelihoods and food and nutrition security leading to food sovereignty."

The ADS activities will have impact on three groups of farmers (commercial, subsistence and landless). Commercial farmers are directly affected by most of the ADS measures and in some cases, the impact is direct and obvious, for example in the case of irrigation, mechanization, value chain development, and exports.

The role of the private sector is well defined in the Agricultural Development Strategy (ADS), in which it identifies that the private sector is the major player to boost agricultural mechanization in the country. Components and Activities Proposed by ADS for promoting agricultural mechanization are the following:

Mechanization Output	Components
A range of options accessible to farmers through private sector	Information dissemination/awareness creation, demand stimulation, concessionary financial arrangements, capacity building and revise regulation and taxes to support mechanization, piloting voucher scheme
Components	**ADS Proposal**
Information dissemination	(a) Conduct social marketing campaigns on a cost sharing basis with 2-wheel tractor importers and dealers emphasizing the advantages of a 2-wheel tractor for the traditional forms of cultivation, harvesting etc. (b) Conduct three separate campaigns; viz., one each for the mountainous, hilly and terrain regions, with the aim of creating awareness to farmers of the potential options and choices.
Improve customer access to finance	Promote commercial banks to finance dealers to on-lend to their customers under two options: (i). Extend credit on commercial terms to dealers (ii). Access cheaper credit from the Rastra Bank's "deprived sector" lending programme (cooperatives and micro-finance institutions).
Capacity building of service and maintenance providers	(a) Support dealers to increase the technical capacity of existing smaller workshops that are scattered through the countryside, rather than setting up their own repair workshops. These workshops could also stock spare parts and act as small brokers for around 30-35 dealers operating in major commercial centers. (b) Support dealers to offer technical training for 1,000 farmer/service providers to enable them to become local experts in the impacts of mechanization (additional germination rates, cost saving implications, the advantage of zero leveling, the impact of seed drills etc.)
Enable the business environment for leasing agricultural equipment	(a) Provide legal clarification (ruling) that the Banking Institutions Act does not restrict nonbanking institutions to engage in leasing; (b) Establish a pledge registry (under the Secured Transactions Act or under by amendment to the Contracts Act) to allow securing the financing for leasing operations by leasing companies.
Revise regulation and taxes to support mechanization	(a) Waive the VAT amount and import duty on spare parts to reduce the proliferation of sub-standard spare parts brought illegally across the border and promote business of local dealers and sub dealers. (b) Remove the 5-year restriction on change of ownership of 2-wheel tractors, to encourage mechanization (c) Impose full VAT on the purchase of 4-wheelers but not on 2-wheelers. Most 4-wheel tractors are used exclusively for commercial transport rather than for agriculture. (d) Reduce the road tax for Power Tillers. Currently, the levy is US$28 for Tractors and US$22.3 for Power Tillers, which is clearly a disincentive for a Power Tiller buyer, if it is to be used solely for agriculture. [10]
Pilot a voucher scheme	Entail provision of a 30% subsidy on all attachments for 2-wheelers and 4-wheelers, to increase the rate of attachment usage (seed drills, reapers, laser levelers, planters etc.). This would last just 3 years and be accompanied by the above mentioned social marketing campaign.

10 USD=NPR 103.22 as of June 24, 2017

3.3.3.3 ***Agricultural Mechanization Promotion Policy, 2071 (2014)***

Apart from ADS, GoN released the Agricultural Mechanization Promotion Policy, 2071, (AMPP) on 29th August 2014.

The vision of the AMPP is "to contribute to the national development through agriculture mechanization and transform the present agriculture system to modernization and commercialization."

It has visualized 4 main objectives to achieve agricultural mechanization in the country:

1. To increase productivity through appropriate agricultural mechanization as per the economic and geographical need of the country in order to develop the sustainable, competitive and commercial agriculture sector;
2. To develop the services and business of agriculture machineries through the coordination among the government, private sectors and cooperatives in order to increase the access of the farmers and the business people;
3. To identify and promote women and environment friendly agriculture machineries; and
4. To establish and strengthen the organizational structural to develop, quality standardization, regulation, monitoring and promotion of agriculture machineries for agricultural mechanization.

The Agricultural Mechanization Promotion Operational Strategy along with implementation plan and budget estimate is in final stage for effective implementation of AMPP for the betterment of traditional agriculture transforming to commercialization.

3.3.4 Investment Environment and Policy

There are several sectoral policies that aligns with agricultural investment strategies. Some of the majors are:

- The Foreign Investment and One-Window Policy, which was formulated in 1992 in order to increase private sector participation and generate additional opportunities for income and employment, particularly in the area of industrial production. The policy aims to increase productivity by importing foreign capital and modern technology management and skills to increase the competitiveness of Nepalese industries in international markets.
- The Nepal Trade Integration Strategy (NTIS) 2010, is an outcome of the government's efforts to expand Nepal's trade, particularly export businesses. It highlights the relationships between the agencies concerned and establishes sectoral linkages to make the trade sector more competitive.
- The Trade Policy, 2009 aims to create conducive atmosphere for competitive trade at the international level. The policy aims to reward the major exporters of Nepalese products and major importers to expand and promote trade. Foreign investors and non-resident Nepalese nationals are encouraged to establish an international production network through out-sourcing, contract of services, and production with the view to reap the benefits of cost-effective production opportunities.
- The NPC has instructed the Ministry of Finance (MoF) to increase the investment in agriculture. And the MoF has directed Nepal Rasta Bank (NRB), which is the governing national bank and the apex body for regulating all the banks and financial institute. NRB has directed all the banks and financial institute to invest at least 15% in agriculture and energy sector of their total loan portfolio. Apart from this, GoN subsidies 5% of the total interest for agricultural loans from fiscal year 2015/16, which is a great and outstanding effort of the government to attract domestic investors. Usually, collaterals are required for loan, which prevents ample investment but some financial institutes. However, nowadays, the government have started financing projects without additional collaterals.

Table 3.3.4: Status of Credit Flow of Banks and Financial Institutions
(Rs. In Millions)

Types of Credit	2012/13	2013/14	2014/15
Farming Related Service	6222.4	6686.9	7817.8
Tea	2130.1	3207.9	3324.8
Animal Husbandry and Animal Husbandry Related Service	12714.6	15442.2	18348.0
Forest, Fisheries and Slaughter Houses	4555.6	5791.3	1724.9
Other Agriculture and Agro-based Service	14161.1	19781.7	28964.4
Total	39783.8	50909.8	60179.8

Source: Nepal Rastra Bank

- Credit Information Bureau called "Karja Suchana Kendra Limited (KSKL)" established in May 1989, is one of the oldest in the South Asian Association for Regional Cooperation

(SAARC) region with the sole objective of restraining the growth of the Non-Performing Assets of the Banking and Financial sector of the country that was increasing alarmingly during the period. Later, it got registered as a Company in 2004 under the Company Act 2053 and started its operation as an independent and autonomous entity from March 2005 as regulated in NRB Act 2058, Article 88. It is a public limited company with banks and financial institutions holding majority of equity (90%) while the rest (10%) is held by Nepal Rastra Bank. KSKL currently has 62 promoter shareholders including 22 commercial Banks, 7 Development Banks, 32 Finance Companies and Nepal Rastra Bank.

- Investment Board Nepal (IBN), which was established in 2011 by the Investment Board Nepal Act. IBN is there to promote economic development in the country by creating an investment-friendly environment for big investment. The high priority pledged by the government to investment continued to result in an increased commitment of Foreign Direct Investment (FDI) in 2013-2014. The Department of Industry (DoI) granted approval to 300 joint venture projects with an FDI commitment of USD194 million compared to the previous fiscal year when 227 joint venture projects were approved with a total commitment of USD71.4 million.

Recently there was an international conference call "Investment Summit 2017" which was organized to attract investment in the country, In addition, the country is a member of the WTO, BIMSTEC, IMF, UN, SAARC, while participating in various projects, programs and bilateral dialogues, which are carried out to attract investments. There are no specific mechanisms, but line ministries are responsible for their concerns and there is certain procedure for firm and tax registration to run agriculture business. Foreign investments in agriculture are welcome in collaboration with a national partner since there is restriction to buy or lease land by foreign investors; and the best way is through FDI or grants.

Nepal has established some investment-friendly laws and regulations, yet practical problems remain undermining foreign investment, such as corruption, laws limiting the operation of foreign banks, practical limitations of profit repatriation, limited currency exchange facilities, and the government's monopoly over certain sectors of the economy, such as electricity transmission and petroleum distribution. The Competition Law of 2004 sets regulations to control anti-competitive practices, protect consumers against monopolies, promote fair competition for the growth of trade and commerce, and include provisions for the control of mergers and acquisitions that would create potential monopolies.

The Industrial Enterprise Act of 1992 states that "no industry shall be nationalized". To date, there have been no cases of nationalization in Nepal, nor are there any official policies that suggest official expropriation should be of concern to prospective investors. Nevertheless, companies can be sealed or confiscated if they do not pay taxes in accordance with Nepali law, and bank accounts can be frozen if there are suspicions of money laundering or other financial crimes. There have been no actions or shifts in government policies that indicate possible expropriations in the foreseeable future.

3.3.4.1 Investment Promotion and Facilitation

Commercial Banks and financial institutes are expected to promote and facilitate to promote and facilitate investment. The IBN was established to promote economic development by creating an investment-friendly environment. It does so by mobilizing and managing public-private partnerships (PPPs), cooperatives, and domestic and foreign private investment to accelerate industrialization and the development of infrastructure in the sectors such as hydropower, chemical fertilizers and integrated solid waste management. Foreign agricultural investors can make investment through FDI through IBN.

The Foreign Investment and Technology Transfer Act (FITTA) of 1992 has eliminated the minimum investment requirement while opening legal, management consulting, accounting, and engineering services to foreign investment with a 51-percent ownership limit. It also clarified rules relating to business and resident visas. In general, under the FITTA, all agreements related to foreign investment are governed by Nepali law and subject to arbitration in Kathmandu under the United Nations Commission for International Trade Law rules. However, foreign law can be applicable in cases where the foreign investment exceeds approximately USD 6 million and where the parties include this provision in their agreement.

Domestic investments are taken care by different offices of the MoAD from production to the market. Projects like PACT and HVAP encourage the investment of private sector, cooperatives, Public-private partnerships (PPPs), individual farmers for commercialization, value addition, diversification of products. The funding share of collective finance is generally 50-50 in some cases up to 80% from the government side. In big domestic investments, such as cold stores and warehouse, the commercial

bank finances for the establishments, while the government subsidies the interest in investments. The IBN is responsible for the FDI. IBN is seeking for the investors to establish chemical fertilizer factories in the country.

In some cases, government intervenes in input and output markets like chemical fertilizer, fuel, gas hence there is no full competitiveness in those markets. The market for other agricultural inputs including machines, seed, breed, pesticide, other than chemical fertilizer are free market with full competition. Agricultural outputs are free competitive market driven. Recently government has announced minimum support price of paddy so that the farmers will be secured about their production. The overall investment incentives to attract private sector investment in this sector is shown in Table 3.3.6.

Table 3.3.5: Supply Status of Agricultural Inputs for Production

Description	Fiscal Year						
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Chemical Fertilizer (MT)	3285	3157	42178	29604	146584	178461.6	232188.0
Improved Seed and Seedling (MT)	3781	3947	4337	4393	2964	3669.56	7290.0
Irrigation (Additional Ha)	14099	25850	30718	35748	47795	32180	19310.0
Agricultural Loan of Commercial Banks (In Rs. 10 million)	1388	1337.6	1429.1	1419.2	2340.7	3153.1	4027.0

Source: Economic Surveys of previous years and Nepal Rastra Bank (2015)

Table 3.3.6: Investment Incentives to Attract Private Investment in Agriculture

Category	Incentives and Subsidy Provision
Income tax	•• Income generated by the primary agro-producers other than a firm, company or partnership engaged in agriculture within the land limit prescribed by the Land Act, 1965 is exempt from income tax. Similarly, income earned by agriculture cooperatives engaged in silk farming, fruit farming, fruit producing and refining, animal husbandry, dairy industries, poultry farming, bee keeping, fishery, tea, coffee, medicinal herbs farming and processing, vegetable seed producing, rubber farming, agro forestry, cold storage for vegetables, animal fodders, pesticides, fertilizers and agricultural tools is exempt from income tax and dividend tax. •• Industry based in agriculture sector that provides direct employment to at least 100 Nepalese national during a whole year, the effective tax rate is 70% of applicable tax rate. •• Exemption of dividend tax in case special industry, industry based in agriculture and tourism sector capitalizes its profit (issues bonus shares) for the purpose of expansion of capacity of industry. •• 40% tax exemption for fruit based brandy, wine, cider-producing industries established at under developed areas specified by GON.
Value Added Tax	•• No value-added tax is levied on the primary and basic agricultural goods. •• VAT exemption facility for agro-based cold storages. •• VAT exemption for import of agricultural machineries and 13% in its spare parts •• VAT exemption for spare parts imported by jute industries on recommendation of Department of Industries. •• 25% VAT square off facility for all-purpose flour industries. •• 50% VAT square off facility for mustard oil and Vanaspati ghee producing industries, dairy industries and tea producing and refining industries. •• 90% VAT square off facility for sugar producing industries. •• There shall be VAT exemption in the premium paid for agriculture and livestock insurance.
Custom Duty Concessions	•• Fertilizers (As defined in chapter 31 of custom tariff 2015/16.) •• Raw jute imported by jute industries. (As defined in Chapter 53 of custom tariff 2015/16.) •• Import of partially oriented yarn (POY) and all kinds of manmade staple fiber by Industry registered in VAT •• 1% for import of agricultural machineries and 15% in its spare parts.
Others	•• Interest on loans extended for commercial vegetable, poultry, mushroom and herbs farming, fishery, dairy business, establishment of storage facilities, meat business and slaughter houses not to exceed 6%. •• 50% interest subsidy on loans acquired for the purpose of carrying out commercial farming in 10 hectares of land in hilly region and 20 hectares of land in the Terai region. •• 75% interest subsidy on loans extended by cooperatives operated by small and marginalized farmers. •• Any private or cooperatives borrowing loans to establish and operate cold storage and food storage facilities within the directives issued by the MoAD shall be provided with the exemption of 100% interest payment for a period up to five years.

3.3.5 Trading Environment & Policy

There are no administrative, fiscal or regulatory barriers for the movement of agricultural commodities across the country until now. But as stated above, Nepal is in the process of implementation of the new constitutions of the federal system concerning central, provincial and local governments. therefore, it is not clear until which date there will be barriers or not within the country.

Regarding the facilitation of the cross-border agricultural trade, the government has taken certain actions as required. Nepal has a special treaty with India - "Treaty of Peace and Friendship Between the Government of India and the Government of Nepal" since 1950. From that period, there was no restrictions in the movement of people and goods across the country. Various amendments are made time to time to update as per the situation.

Nepal has signed bilateral trade treaty with India and trade agreements with China, Bangladesh and Pakistan – the major export markets for Nepalese agricultural products. Besides these countries, Nepal has signed trade agreements with Sri Lanka, the United Kingdom, the United States, the Democratic People's Republic of Korea, the Republic of Korea, Egypt, Mongolia, and Romania. In addition, Nepal joined the South Asian Free Trade Area (SAFTA) and the Framework Agreement on the BIMST-EC (Bay of Bengal Initiative for Multi-Sectoral, Technical and Economic Cooperation) Free Trade Area in 2004. SAFTA members have gradually been reducing tariff to 0-5% on all tariff lines except the sensitive lists as per the trade liberalization program (TLP) of the Agreement. Nepal has agreed to sign the SAARC Agreement on Trade in Services (SATIS).

Nepal joined the World Trade Organization (WTO) on April 23, 2004. During its accession, Nepal made commitments on Trade Related Investment Measures (TRIMs), including for agriculture, goods, and services. While being a WTO member country, the rules and regulation of the WTO have been followed accordingly.

Nepal has an autonomous body called Beema Samiti (Insurance Board), which was established to develop, systemize, regularize and regulate insurance business under Insurance Act, 1992. There is Insurance Regulation, 1993 and Directives to regulate the activates of different 27 insurance companies, out of which, 8 companies provide life insurance while 17 provide non-life insurance and 2 provide both the services.

The Insurance Board has finally introduced the most awaited directive on agriculture and livestock insurance in the year 2012. This is the first agricultural insurance policy that has been introduced in the country and it is mandatory for all the non-life insurance companies to introduce this policy. In the directive, the Insurance Board introduces six insurance products for paddy, vegetables, potato, poultry (chicken and duck), fruits (orange and junar) and livestock at the beginning; now the Board is working to development insurance products for other related commodities. Government has subsidies of 75% in premium of crops and livestock insurance to encourage farmers for their investment security and attract in agriculture.

3.3.6 Infrastructure & Financial Development

Most of the hydropower is integrated with irrigation. Infrastructure investment priorities are identified by the government according to the needs of the country. At present, hydropower is the top priority, followed by road network construction, which are developed with different funding from the government, private sector, via FDI, PPP, etc. The Government assigns special responsibility to Nepal army to pioneer new road track.

The government has given special priority for irrigation development in the country. The task is under the responsibility of the Ministry of Irrigation (MoI), who is in charge of properly utilize and manage the water resource in the country. The main objective is to prepare irrigation related plans and policies and ensure the implementation of these policies for the efforts to achieve agricultural development targets. The related policies include Water Resources Act 2049, Irrigation policy 2070, Irrigation regulation 2060, to streamline the irrigation infrastructure development. The ADS has given special importance to irrigation to achieve its goal invigilated in the 20-year strategy. The Department of Irrigation (DoI) has a mandate to plan, develop, maintain, operate, manage and monitor different modes of environmentally sustainable and socially acceptable irrigation and drainage systems – from small to larger scale surface systems and from individual to community groundwater schemes. Its ultimate aim is to provide year-round irrigation facilities and services and to increase the irrigable area of the country to higher limits. The government maintains large irrigation projects whereas the user groups themselves maintain small schemes.

Nepal is the second richest country in inland water resources with 2.27% of the world water resources, from 6,000 rivers including rivulets and tributaries covering 818,500 Ha area with a total length of about 45,000 km. The perennial nature of rivers and the steep

gradient of the country's topography provide ideal conditions for the development of hydropower. Theoretical hydropower potential of the country is 83,000 MW as estimated in terms of electrical energy, of which around half (i.e. 40,000 MW) is considered to be technically and economically viable. However, till date only approximately 680 MW has been developed. The state-owned utility Nepal Electricity Authority (NEA) was founded in 1985. Its task is for the generation, transmission and distribution of electricity and the development and operation of electricity grid. Furthermore, the NEA is co-responsible for the preparation of energy planning and the education and training of professionals in the field of power generation, transmission and distribution. National grid for power supply has been constructed in most parts of the country including rural areas. However, due to rugged terrain and scattered settlement, it is difficult to connect all rural areas in national grid. Hence different government offices, NGOs/INGOs, and the Alternate Energy Promotion Center are implementing subsidy program for off grid energy technology at rural areas, like micro hydro, renewable energy such as solar, wind etc.

Decentralized system of governance is one of the fundamental policies to achieve development to the grass root level in Nepal. Two Acts have been enacted so far on decentralization: The VDC, Municipality and DDC Acts 1991 and the Local Self-Governance Act 1999. The former was a continuation of an earlier system with a different nomenclature while the later was designed on the basis of the report of the High-Level Decentralization Coordination Committee 1997. The Local Self-Governance Act 1999 has provisioned broad organizational structure, devolution of authorities, special provision to include women and disadvantaged communities, planned development process and judicial authorities to local bodies. Whether the Act has provided enough legal basis for the development of a capable, responsive and accountable local self-governance system is itself an issue. At present the Ministry of Finance regulated the budgetary mechanism for central and local government and there is a clear guideline and transparent procedures. There are two type of budgetary system, respectively for central and district levels. The central budgetary are responsible for the projects of national interest; whereas at district level, the District Development Committee prioritizes the development activities till grass root level, and agriculture is generally given high priority. Since Nepal is now going to have federal system, all the procedures mentioned above might be different in the coming years.

Access to formal financial sector support in rural areas is very limited, yet with high competition. Since formal financial sector has not yet reached to rural areas, the saving and credit cooperatives, middlemen and retailers are important at rural area. Microfinance and leasing companies are providing rural financing, group loan, personal guarantee loan without collateral. And they also train farmers in managing funds and account. There are various modes to attract private sector investment: PPP, capital contribution, capital subsidy, by BFI's for agricultural related infrastructure. The Government provides subsidies for agriculture loan, usually 5% of interest. Interest subsidies are generally provided for large investment such as for building cold storage, ware house, seed storage, and food storage etc.

3.3.7 Conclusion

Nepal is strategically located between India and China, two of the largest economies in the world. In 2015, the country adopted a new constitution that embraces multiparty democracy, federalism and private sector-led liberal economics. The government is committed to the promotion of foreign investment, providing a unique opportunity for FDI.

Nepal is classified as a 'least developed country' (LDC) by the United Nations. Its goal is to graduate from this status by 2022 and transit to a middle-income country by 2030. To achieve these targets, an economic growth rate of 7–8% and investment in infrastructure of USD 13–18 billion by 2020 will be required. The Ease of Doing Business Index 2017 by the International Finance Corporation (IFC), World Bank Group lists Nepal second only after Bhutan among all South Asian countries. The investment potential of Nepal, combined with these features, have caused an increase in interest of FDI in recent years.

Nepal has also put in place fiscal incentives and other arrangements to facilitate global trade. As a member of the World Trade Organization (WTO), it offers one of the lowest import duties in the region, has also signed Double Taxation Avoidance Agreements with 10 countries and concluded Bilateral Investment Protection and Promotion Agreements (BIPPAs) with 6 countries. Following the entry into force of the Nepal-India Trade and Transit Treaty, Nepal enjoys duty and quota free access to India's massive and growing market. China's rapidly growing economy also provides duty free access to approximately 8,000 products from Nepal.

As a result of its prolonged political transition and inadequate infrastructure, Nepal's economic growth rate remains at 3.8%, on average, for the past 10 years, which is below the South Asian average. Remittances continue to play a critical role in GDP growth

for consumption. In the fiscal year 2015/16, remittances comprised approximately 29.6% of GDP. Remittances help to increase aggregate demand in the local market, despite low economic growth. Over the last decade, disposable income has increased by 14.4% per year on average, which has led to a comparable increase in consumption. At present, with foreign currency reserves of USD 9.8 billion (as of July 2016), Nepal is in a good position to receive finance imports. However, the trade deficit, which reached 31.3% of GDP in fiscal year 2015/16, continues to be of concern. It is expected that FDI will stimulate domestic production and gradually close this gap. Despite the catastrophic earthquake of 25 April 2015 and the transport blockade of the border that followed, Nepal has begun to rebuild and continues to be a highly attractive destination for FDI in various sectors.

Modernizing the agricultural sector will require a significant amount of investment. Institutions that specialize in agricultural sector financing and related financial instruments will have to be developed and adapted. With the goal of enhancing the productive capacity of the private sector, the Government and the Central Bank have put in place a number of concessional financing schemes for the agricultural and energy sector. As of 2013, credits allocated to the agriculture sector through banking and financial institution (BFIs) amounted to $377.8 million. In order to facilitate credit flows to agricultural activities, the NRB has issued a directive to commercial banks to provide 20% of loans to productive sectors, including agriculture. According to the Agriculture Census, 22% of farmers reported taking credits and 42% of farmers reported the need for even more. As of 2014/15 total credit in agriculture is NPR 60.179 billion (i.e. USD 583 million).

Infrastructures such as irrigation canals, roads and electrical power are prerequisites for the nation's agricultural development. According to the Department of Irrigation, out of the country's 14.7 billion-hectare area, only 2.6 million hectares are arable and only 1.8 million hectares are irrigable.

Agricultural extension services focus on maintaining food quality, regulations, marketing and agribusiness development. These areas have been identified as constrains to agricultural commercialization and growth. The services principally should focus on new technologies that will lead to higher productivity. Presently, the government has given priority to other related areas such as profitability, sustainability, sustainable agricultural mechanization, post-harvest technology, grading, packaging and marketing. As a result, the country is greatly in need of infrastructures and facilities including agricultural farms, cold storage units, collection centers, laboratories (seed, soil and plant protection), agriculture & agricultural mechanization training centers, machineries manufacturing factory and plant quarantines that can support the extension of services. These are obvious opportunities for private investment.

Technological advancements in the agriculture sector open the door to private sector participation in manufacturing and the supply of agricultural-related equipment and tools. Local innovations, including modifying agricultural equipment to suit local conditions, also hold investment opportunities. Although the government provides a number of extension services, increasingly, commercial farmers are turning to the private sector to provide required services. In the agricultural sector, Nepal needs many improvements. For example, it needs to increase the volume and quality of products and to improve compliance with sanitary and phytosanitary standards. Finally, it needs to improve agricultural practices for agro-food and to improve designing, branding and merchandising, and packaging for processed goods.

The Government announces through the MoF the annual budget for plan and program to be implemented at the beginning of every fiscal year and get the approving from the House of Representative. Every year after budget speech, the government publish financial bill according to the approved budget for that particular fiscal year to change, decrease, increase, rebate, concession, subsidy in various tax, VAT, customs duty, revenue, charges and fees. In general, in the table 6 shows the income tax, VAT, custom duty concessions given by the government to attract private sector investment in agriculture.

As mentioned above in various sections, the country is now transforming to federal system and the local government election has already been announced for 14th. May, 2017. Laws, Rules and regulation of the country will be guided by new Constitution of Nepal 2072 (2015) after the full implementation of federal system.

As described throughout this chapter, Nepalese economic is an agrarian based economy, contributing 33.1% of national GDP with 66% of total employment in the industry. Yet agriculture production is not self-sufficient and the country's food sufficiency is supplemented by its imports. Average growth rate of agriculture is only 2.9% and the productivity of major food, cash and industrial crops are relatively low as mentioned in table 3.5.1 and 3.5.2. There are numerous policies, strategies, plans and programs in different economic sectors including agriculture. Even though agriculture machineries are import based as mentioned in table

3.5.3, Government of Nepal have given high priority for agricultural mechanization in recent years. Subsidy up to 50% for the purchase of agricultural machineries to individual farmers, groups and cooperatives has been initiated from last few years. This has encouraged the younger generation to continue in agriculture.

The Prime Minister's Agriculture Modernization Project (PMAMP) is one of the most ambitious programs for the next 10 years, funded by the government bringing all the stakeholder together, with a vision to increase productivity, employment generation, and self-sufficiency in production of major commodities in Nepalese agriculture.

FAO/Roberto Faidutti / FAO

Sri Lanka

3.4 Trade and Investment Policies on Mechanization of Agriculture: Sri Lanka

3.4.1 Overview of Sri Lankan Agriculture Sector

Agriculture has been one of the primary sectors in the Sri Lankan economy and continues to be so, even though the sectoral landscape is now beginning to see change. Agriculture will continue to play an important role in the country's planned socio-economic development programmes and its new role in the future is articulated in the new vision of the country. The sector has undergone a significant structural change in the form of a decrease in share of GDP, from 17.5% in 2005 to 7.9% in 2015, reflecting a shift from the traditional agrarian economy to a service driven economy. Yet, it continues to be the backbone of the country's economy, with nearly 28.1% of the labour force employed in agriculture. Furthermore, it is estimated that around 70% of the population living in rural and plantation areas are engaged in agriculture for their livelihood.

STRUCTURE OF THE ECONOMY	2010	2015
Share of GDP (%)		
Agriculture	8.5	7.9
Industry	26.6	26.2
Services	54.6	56.6
Taxes - Subsidier	10.2	9.3
Sectoral Growth (%)		
Agriculture	7.0 (a)	5.5
Industry	8.4 (a)	3.0
Services	8.0 (a)	5.3

Source: Central Bank of Sri Lanka (2016)

In Sri Lanka, the agriculture sector is largely carried out by the private sector and the role of the Government is limited to provision of infrastructure, maintaining the regulatory framework, extensions services and research & development activities.

The agriculture sector comprises of agriculture crops (paddy, coconut and other crops such as fruits, vegetables and other field crops, export crops), plantation crops tea and rubber, livestock, fisheries & aquatic resources, land and forestry sub sectors. Agricultural crops, Livestock and fishery constitute Agriculture Production as shown by Table 3.4.1. The production index, which measures the output of Agriculture and Fisheries sectors, recorded a growth of 6.4% in 2015 compared to a decline of 1.6% in 2014. Within the index, the sub-indices of paddy, coconut and other crops (fruits, vegetables and other field crops) increased, while tea and rubber sub ices declined in comparison to the previous year. The Livestock activities grew during the year, as reflected by the index, while a contraction was recorded in the Fisheries activities.[11]

Table 3.4.1: Agriculture Production, 2009- 2015

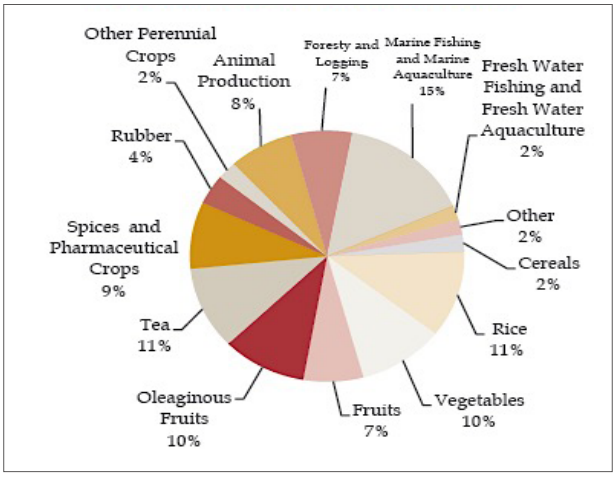
	2009	2010	2011	2012	2013	2014	2015
Production of main agricultural products ('000 tonnes, unless otherwise indicated):							
Paddy/rice	3,651.7	4,300.6	3,894.9	3,845.9	4,620.7	3,380.8	4,819.0
Tea, processed	291.0	331.4	327.5	328.4	340.0	338.0	329.0
Rubber	136.9	153.0	158.2	152.0	130.4	98.6	88.6
Manioc	..	282.8	292.7	291.4	301.1	302.5	324.1
Maize	129.8	161.7	137.8	202.3	208.3	240.6	261.1
Coconuts (million)	2,762.0	2,317.0	2,808.0	2,940.0	2,513.0	2,870.0	3,056.0
Minor export crops	112.3	124.1	118.4	120.6	129.8	117.0	133.8
Gross production of main agricultural products (US$ million):							
Paddy/rice	1,075.1	1,132.5	1,030.9	909.5	1,125.3	..	..
Tea	15,285.9	19,424.5	21,234.8	18,552.5	20,217.6	..	..
Rubber	24,258.3	30,345.2	34,711.0	28,651.2	26,226.1	..	..
Cassava (manioc)	6,729.5	6,820.2	8,881.7	8,916.6	9,669.3	..	..
Maize	4,601.6	5,600.9	5,364.4	7,125.8	6,580.4	..	..
Coconuts	458.5	599.8	573.1	641.5	987.7	..	..
Minor export crops	622.6	700.9	833.9	775.5	814.2	840.2	1,096.8
Average monthly production of certain livestock:							
Milk (million litres)	19.4	20.6	21.5	24.9	27.4	27.8	31.2
Cow milk	15.3	16.0	17.0	19.8	22.1	22.7	25.4
Buffalo milk	4.1	4.6	4.6	5.1	5.3	5.1	5.8
Eggs (number in million)	95.2	95.0	98.8	121.4	136.4	143.4	158.2

.. Not available.

Source: Data provided by the authorities; Department of Census and Statistics Sri Lanka; and FAO online information.

11 Central Bank of Sri Lanka, Annual Report 2015

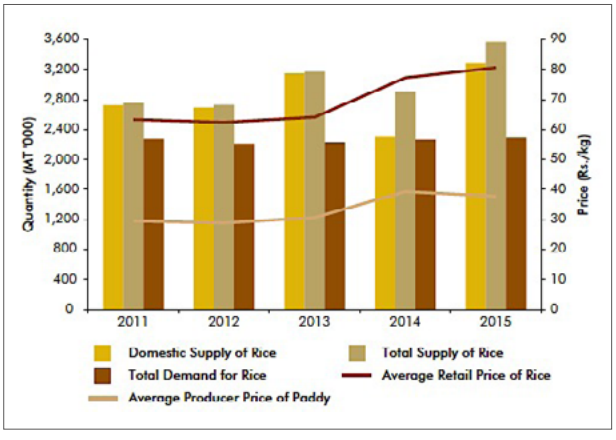
Chart 3.4.1: Agriculture Sector Composition - 2015



Source: Central Bank of Sri Lanka, Annual Report 2015

Paddy continues to be one of the primary crops cultivated in the non-traditional sector[12]. Outside Paddy, the Government's agriculture policy is aligned to the strategy of making Sri Lanka self-sufficient in maize, chillies, big onions, soya beans and potatoes by 2018 through crop diversification and productivity improvement. At the same time, efforts are being made to gradually shift farmers from subsistence farming to agri business through modernization of agriculture value chain.

Chart 3.4.2: Rice Supply and Demand



Source: Central Bank of Ceylon, Annual Report 2015

The present-day woes of the agriculture sector in Sri Lanka include low productivity, low level of technological innovation, inadequate credit flows, poor access to international markets, low levels of value addition, and inadequate use of quality seeds and planting material.

The Government has recognized that accelerated growth in the agricultural sector is essential to achieve self-reliance and food security at a national level and in addition to bring about equity in the distribution of income and wealth for poverty alleviation.

A structured and formalized policy statement, taking into consideration all stakeholder inputs for agriculture, is in the process of being constructed and therefore for the purpose of this report, one has to depend on the broad policy statements issued by the Government from time to time. There exist some broad outlines on the directions of the national agriculture strategy based on the present government's vision for the country over the next 5 years. This is indicated in the Public Investment Programme (PIP), which takes into account how the Government of Sri Lanka (GOSL) proposes to allocate funds for capital expenditure for the various sectors based on their development goals and objectives over the medium term.

In the past, successive governments in Sri Lanka have introduced a number of policies to increase agricultural production with a view to attaining food security in the country. Majority attention was given to infrastructure development such as irrigation schemes and to support services such as agricultural research, extension and education. Government interventionist policies have also provided subsidies such as the fertiliser subsidy and at times guaranteed prices for key agricultural commodities.

Although domestic agriculture meets around 75% of the country's food requirement, there is potential to produce the entire requirement within the country in terms of other field crops such as gram, potatoes, chillies and big onion, which is currently met partly through imports.

The current policy environment is dictated primarily by the new Government's vision to establish a transparent administration, restoration of democracy and taking the country towards the upper middle-income category. The strategy of the Government is based on the platform of a "Competitive Social Market Economic Model" aimed at achieving social equity through a series of policies that will promote competition and economic efficiency. The total public investment plan for the period 2017 to 2019 is estimated at Rs. 2,445 billion (US$ 16.27 billion)[13], of which the share of agriculture and industries is estimated at Rs. 127 billion (US$ 0.84 billion) (5.2%). The highest share has been allocated to economic infrastructure development related activities.

Thus, the Government's present policy direction states:

12 Tea, Rubber and Coconut are classified as traditional/plantation crops.

13 Calculated at current exchange rate of 1 US$= Rs. 150.28.

"Commercialization of agriculture sector with eco-friendly innovative technologies will contribute to achieve inclusive and sustainable economic growth, ensuring food security and food sovereignty of the nation and to sustain the drive of competitiveness of agriculture and agro based products in the international market" (Public Investment Programme, 2017-2020, Department of National Planning).

In line with this policy direction, the agriculture sector aims to:

- Increase the share of our agriculture produce in international markets, leveraging our competitive and inherent comparative advantages; and
- Encourage import substitution for food items which can be produced domestically.

Leveraging the full potential of competitive and comparative advantage of our agricultural products through modernized practices and commercialization of activities is therefore, one of the thrusts of the new policy framework. National food production programmes, development and establishment of agricultural mega zones and developing and integrating the value chain are amongst the major initiatives that are identified in the agricultural sector to be implemented in the medium term.

The policy focuses on the modernization of our agriculture practices. As an extension of this strategy, it is expected to establish 23 Agricultural Development Mega Zones under the theme of "Sri Lanka - The Global Home Garden" to make Sri Lanka's agricultural products globally competitive. To encourage private sector investment in the agriculture modernisation project, matching grants and credit guarantee facilities are proposed to be implemented. In the meantime, with the intention of preventing the use of highly toxic agrochemicals in farming sector, a three-year national program was launched in early March 2016 under the theme of "A Wholesome Agriculture - A Healthy Populace - A Toxin Free Nation"[14].

The public investment in agriculture is to be supplemented with private sector participation and through arrangements for Public-Private-Partnership (PPP) programmes. Government investments have been focused on increasing competitiveness in the agriculture sector through increased land and labour productivity, research development into existing markets and new market trends, infrastructure development and the introduction of innovative technologies. New policy initiatives are proposed to be implemented to facilitate and augment private sector investments in agriculture development, viz., inputs, production, processing, value addition and marketing.

Further, the focus will also be on import substitutions, particularly where such agricultural crops can be grown in the country, and the promotion of export agricultural products taking into consideration the comparative advantage Sri Lanka possess in specific instances. Consequently, based on the strategy of making the country self-sufficient in maize, soya beans, chillies, big onions, and potatoes by 2018, initiatives are proposed through crop diversification and productivity improvement while gradually transforming from subsistence agriculture to agri-business with access to export markets by 2020. It is proposed to establish an Agriculture Marketing Authority, whose role would be to fill the gaps in market by having effective backward and forward linkages in the value chain. Agro-clinics are proposed to be established with a view to providing new technical know-how and resolving issues faced by farmers.

The GOSL has identified national food production programmes, liquid milk production through dairy sector development, modernization of the fishery sector, modernization of irrigation sector and the establishment of mega agricultural zones with integrated value chain development as some of the key initiatives to be implemented in the medium term.

3.4.2 Agricultural Mechanization

The mechanization of agriculture commenced in the early 1950, with the introduction of tractors. The promotion of mechanization in agriculture in Sri Lanka was with the objective of expanding rice production in order to achieve self-sufficiency. Towards this endeavor, various Governments have from time to time introduced different policies to achieve the desired effects. Paddy cultivation being the most prominent and populous crop, attracted mechanization mostly along its supply chain, viz., land preparation, planting, crop management and harvesting.

Land holding per capita in Sri Lanka is small. Consequently, the power tiller or the two-wheel tractor as it is popularly known is one of the most popular machinery amongst farmers. The commonly used two-wheel tractor is the 12hp with the ride on seat, whilst the 8hp, walk-behind model is popular with small farmers and in locations where the ground conditions are too soft. The next most popular machinery is the tractor and the most common capacity

14 2017-2020 Public Investment Programme, Department of National Planning.

is the 45-47hp category. Since of late, Combine Harvesters of 65hp and above and Rice Transplanters have entered the market to complete the machinery range. In addition to these machines, Power sprayers, winnowers, threshers, de-huskers and a range of light machineries are also used in farming and are increasing its popularity by the day.

Sri Lanka does not have a large domestic manufacturing base. All of the heavy and large machinery such as Tractors, Power-tillers, Cultivators, Trans-planters, Power sprayers, Weeders, Combine Harvesters and some implements such as rotary tillers are imported. Local manufacture, which is carried out on a micro scale, are largely rural based and basic in technology. The only item that is done on a large scale and in an organized manner are Water pumps, manual sprayers, trailers and bowsers. The main importing partners of farm machinery in to Sri Lanka currently are, India and China. Europe has lost out from this market and Japan too is edging out gradually, mainly attributed to rising costs.

Table 3.4.2 Import of Tractors

Country of Origin	2011	2012	2013	2014	2015
	Quantity	Quantity	Quantity	Quantity	Quantity
India	6,196	5,861	2,779	1,190	3,618
Japan	90	154	596	191	476
Pakistan	170	125	88	58	18
Thailand	21	20	2		30
China	90	100	220	101	19
Others	86	30	24	17	5
Total	6,653	6,290	3,709	1,557	4,166

Source: Sri Lanka Customs (2016)

Table 3.4.3 Import of Power Tillers (Walk behind tractors)

Country of Origin	2011	2012	2013	2014	2015
	Quantity	Quantity	Quantity	Quantity	Quantity
China	11,773	7,630	5,614	1,547	4,200
Vietnam	2,049	1,920	2,472	1,368	3,136
Japan	4,227	2,666	1,144	1,089	724
India	4	86	2	38	47
Thailand	195		480	-	2
Indonesia	120			-	
Others	207	42	130	7	
Total	18,575	12,344	9,842	4,049	8,109

Source: Sri Lanka Customs (2016)

Table 3.4.4 Import of Combine Harvesters

Country of Origin	2011	2012	2013	2014	2015
	Quantity	Quantity	Quantity	Quantity	Quantity
China	1,724	1,830	960	454	900
India	302	6	49	-	89
Japan	18	28	23	95	33
Taiwan	240	195	156	48	48
Thailand	33	4	3	-	9
Others	2	1	-	-	-
Total	2,319	2,064	1,191	597	1,079

Source: Sri Lanka Customs (2016)

Table 3.4.5 Import of Seeders, Planters and Transplanters

Country of Origin	2011	2012	2013	2014	2015
	Quantity	Quantity	Quantity	Quantity	Quantity
China	33	74	53	46	75
India	4	4	1	22	1
Japan	1	0	25	0	5
South Korea	0	0	6	0	23
Others	1	3	7	6	16
Total	39	81	92	74	120

Source: Sri Lanka Customs (2016)

3.4.3 Investment Environment and Policy

Establishing an attractive environment for foreign direct investment (FDI)has been the country's priority since opening its economy, way back in 1977. Successive governments have brought about different types of incentives and tactics to attract FDI's, which has met with a mixed bag of results. During the last 5 years, the Government targeted to raise FDI to 3% of GDP, but only reached around 2% of GDP.[15] The Ministry of Development Strategies and International Trade determine the overall policy direction for FDI, whilst the task of facilitating FDI into the country lies with the Board of Investment (BoI). It is the government body authorized to enter into agreements with investors regarding tax holidays, tax concessions, and exemptions from customs duties.

15 Ministry of Finance, available at: <http://www.treasury.gov.lk/documents/58941/59617/Performance+Report+2015+-TIP.pdf/b218f39d-b7f3-4f24-90e5-4382a4c593ff>.

Chart 3.4.3: Foreign Direct Investments

Source: *Central Bank of Sri Lanka, Board of Investment and Colombo St*

There is not a special authority that deals exclusively with agriculture investments, though agriculture is identified as one of the key sectors for investment[16]. The BoI acts as the one stop shop for all investments, though investors need to deal with the relevant line ministries too for industry related approvals. Laws, regulations and policies are clearly spelt out by the Government through its relevant ministries, in regard to investments undertaken by, both local and foreigners. The Board of Investment act, Land (Restrictions on Alienation) Act, Exchange Control Act, Finance Act, Customs Ordinance, Companies Act etc, are a few examples of such legislation.

The BOI Act has two types of approval for foreign investments: under Section 16, which provides for the approval of foreign investment without fiscal incentives, subject to normal Sri Lankan laws; and under Section 17, which involves approval of projects and the entering into agreements with the BOI to grant exemptions to certain laws allowing incentives. It was established in 1978 and thus possess 38 years of experience behind them. They are well equipped and staffed to deliver its mandate but have been hampered in the recent past due to inconsistencies in Government policy as regards to FDI's. Today, ventures established under the BOI are said to employ 470,000 people, accounting for nearly 65% of Sri Lankan exports and 86% of country's industrial exports, a significant achievement.

The agriculture sector, both for the domestic market and for value added exports, has been targeted for investment under the BOI. The government looks for specialised investment to improve productivity, level of technology innovation, access to international markets, use of quality seeds and planting materials and to improve overall value addition at domestic level. Though, explicit mention is not made for investments for manufacturing agriculture machinery, opportunity does exist and investment approvals can be obtained for establishing a manufacturing base for light farm machineries.

Investment incentives are offered on a scaled basis, with provision for SME's to avail such opportunities with a minimum investment as low as Rs. 25 million (US$ 165,000/-). The procedures are streamlined within the BOI so as to ensure a smooth passage of investment approval for the investor. The BOI offers a One-Stop-Shop concept for the investor, where they coordinate and facilitate the necessary approvals from the relevant line ministries[17].

The specific restriction to foreign investment in agriculture is in the growing and primary processing of tea, rubber, coconuts, cocoa, rice, sugar and spices. In general, there is a restriction on the sale, transfer or lease of land, to a foreigner, or foreign company, which will affect agriculture investments.

Ownership of land is with individuals, or companies. In addition, state land in the rural areas are leased out to village communities under a license scheme, solely for the purpose of carrying out agricultural activities. The ruling Government during 1970-77, acquired the tea, rubber and coconut plantations that were previously owned by British multinationals during the colonial era. These plantations were vested in the Government in 1975 and managed by state owned enterprises for nearly 15 years. However, with the opening up of the economy and with change of policy direction, the same plantations were subsequently given out on long lease to competitive bidders from the private sector on management basis.

Sri Lanka currently has 24 bilateral investment treaties, also known as Investment Protection Agreements (IPAs) with several countries. These IPAs generally include provisions on scope and definition of investment, admission and establishment, national treatment, most-favoured-nation treatment, fair and equitable treatment, compensation in the event of expropriation or damage to the investment, guarantees of free transfers of funds, and dispute settlement mechanisms (both state-state and investor-state). It must be noted that since economic liberalization policies began in 1978, the government has not expropriated a foreign investment.

Foreign investors are treated equally with domestic investors and can benefit from the wide range of incentives provided by the BOI or from the Treasury. In general, there are no specific

16 Invest Sri Lanka, available at: <http://www.investsrilanka.com/home>.

17 Invest Sri Lanka - Investor Queries, available at: <http://www.investsrilanka.com/#investerQuery>.

mechanisms that are established for public consultations. However, the Government does carry out regular dialogues by way of round table conferences, public seminars and one-to-one discussions with trade chambers and similar institutions from time to time, to gain input in regard to enhancing the investment environment.

Pertaining to dispute settlements, Sri Lanka's legal system reflects diverse cultural influences. Criminal law is fundamentally British. Basic civil law is Roman-Dutch. Sri Lankan commercial law is almost entirely statutory. The law reflects colonial British law, but amendments have largely kept pace with subsequent legal changes in the United Kingdom. Several important legislative enactments regulate commercial matters: the Board of Investment Law; the Intellectual Property Act; the Companies Act; the Securities and Exchange Commission Act; the Banking Act; the Industrial Promotion Act; and the Consumer Affairs Authority Act.[18]

3.4.3.1 Public-Private Sector Participation in Agriculture Mechanization

Agricultural mechanization first introduced to the country in 1952, with the introduction of the tractor, Massey Ferguson 135 model, popularly known as the 'Grey Furgie' by Brown & Co Ltd, a private sector organization. Since then, the growth of mechanization in agriculture has been driven by the private sector supported by the Government through facilitating with importer friendly policies.

The public sector does not get involved with the introduction of mechanization, other than to provide the require stimulus. The Ministry of Agriculture will facilitate and intervene as and when required to ensure that the policies are conducive to the private sector and the farming community, to ensure cost effective importation of agriculture machinery.

The demand for agricultural mechanization is demand driven in Sri Lanka. Over the last 65 years, the private sector has, based on demand, introduced a range of farm machineries which include power tillers, tractors, paddy trans-planters, paddy combine harvesters, reapers, cultivators, power sprayers, water pumps and a portfolio of implements. These machineries are imported direct by the private sector and then distributed island-wide through channel partners (also private entrepreneurs) along with after sales service support during warranty periods. The necessary spare parts for supporting these machineries are also imported by the private sector and distributed through established channel partners.

The Department of Agriculture (DoA), under the Ministry of Agriculture (MoA), have begun encouraging the use of mechanization in agriculture amongst farmers through its extension services. Field trials, demonstrations etc are carried out at village level, in conjunction with the private sector. During the last 5 years, the Department of Agriculture has also invested a part of their budget to purchase and offer modern farm machinery to farmers through farmer societies on a subsidized basis.

The Farm Mechanization Research Centre (FMRC) of the DoA, is responsible for carrying out research on the use of appropriate machinery for agriculture and additionally it also has the mandate to carry out testing and certifying of imported farm machinery for applicability and suitability in the country.

A new initiative, to modernize the Sri Lankan Agriculture Sector under the auspices of the MoA, and funded by the World Bank will be launched as a Public Private Partnership project, scheduled to be implemented in the first half of 2017. The project aims to promote agriculture diversification and modernization of the agriculture sector through a series of initiatives. The project is being designed to support agriculture productivity, improving market access, and enhancing value addition of smallholder farmers and agricultural businesses. The key components of the project include agriculture value chain development and productivity enhancement and diversification demonstrations and will carried out as PPP project. Opportunities will arise to introduce mechanization of agriculture across the entirety of its value chain, where the private sector firms can work in collaboration with government and farmer organizations for mutual benefit.

3.4.4 Trading Environment & Policy

Sri Lanka, since its unilateral trade liberalization (1977) has initiated extensive reforms to its trade policy regime with a view to establishing a strong economic foundation taking in to account its capacities, constraints and national realities. These reforms, while placing the country in a stronghold in its economic development frontier have also contributed towards its significant achievements in the social development frontier where Sri Lanka is placed at a high rank in the Human Development Index (HDI) while comfortably surpassing most of the Millennium Development Goal targets set for 2015. In the

18 Department of State of Sri Lanka, available at: <https://www.state.gov/e/eb/rls/othr/ics/2016/sca/254491.htm>.

Global Competitive Index 2014/15, Sri Lanka ranks 73 among 144 countries ahead of many emerging economies and also improving its record in a range of criteria since 2012/13[19].

The Department of Commerce of the Ministry of Development Strategies & Internal Trade is largely responsible for carrying out Sri Lanka's trade policies. The Department plays a key role in coordinating and integrating Sri Lanka's bilateral, regional and multilateral trade policy objectives and their implementation.

At present, Sri Lanka is focusing on long-term strategic and structural development, as it strives to become an upper-middle-income country. The new Unity Government is in the process of formulating and initiating several new measures with a view to leapfrog the economy with particular emphasis on infrastructure development, enhancing investment and developing a competitive and predictable economic policy framework. These measures coupled with a stable political environment is expected to boost investment and export-led economic growth while paving way towards achieving the country's long term macroeconomic objectives of equitable distribution of income and poverty alleviation.

The GOSL has undertaken several initiatives to facilitate cross-border trade, in particular by reducing regulatory and administrative border procedures. Sri Lanka grants preferential tariffs to a range of goods under its bilateral and regional agreements on reciprocal basis. Most recently, the GOSL commenced negotiations in 2016 on comprehensive free trade agreements with India, China and Singapore. With a view to deepening and widening Sri Lanka's economic ties and trade prospects with India, negotiations are being held on a new Indo–Sri Lanka Economic and Technology Cooperation Agreement (ECTA). Concurrently, GOSL is carrying out negotiations with China to set up a comprehensive FTA that will encompass goods, services, investment, customs cooperation, technical barriers to trade, sanitary and phytosanitary measures, and safeguards. It is reported that trade under reciprocal preferential agreements are minimal, amounting to a mere 3.4% of imports in 2014[20]. This phenomenon is attributed to the fact that many of the concessions offered by Sri Lanka has now fallen under the tariff lines that are currently MFN duty free.

The market access gained under prevailing FTAs/RTAs is considered to be significant. South Asian Preferential Trade Agreement (SAPTA), South Asia Free Trade Area (SAFTA), Asia Pacific Trade Agreement (APTA), India – Sri Lanka Free Trade Agreement (ISFTA), Pakistan Sri Lanka Free Trade Agreement (PSFTA) and the Global System of Tariff Preferences (GSTP) are currently active. Under the ISFTA agreement both, India and Sri Lanka maintain negative lists, in respect of which no concessions can be granted; in the case of Sri Lanka, 1,220 lines at the 6-digit level are affected. India also retains tariff rate quotas (TRQs) under ISFTA on a number of items including tea, pepper, clothing, and coconuts, many of which are major Sri Lankan exports. Under the PSFTA agreement, Sri Lanka maintain a negative list of around 700 lines, which include agriculture amongst several other categories of industrial products. Sri Lanka has also submitted its application to receive preferential treatment from the EU under the Special Incentive Arrangement for Sustainable Development and Good Governance of the EU Generalized Scheme of Preferences.[21]

Sri Lanka does not apply variable levies or seasonal tariffs. However, agricultural tariffs and Special Commodity Levy rates are modified (or waived) by the Minister of Finance in certain instances according to domestic market conditions, viz., demand and supply situation; these tariff changes could have the same results as a seasonal tariff. For instance, rice, one of the staple diets of the country, carries a high tariff on imports, since Sri Lanka's production of rice is near self-sufficiency. However, in situations where production of rice has been hampered by prolonged droughts, the GOSL has relaxed its tariff structures to importers to meet the shortfall in supply.

In general, there is no intervention of the Government in input and output markets. Markets operate under competitive conditions and are driven by the forces of supply and demand. However, in the case of paddy, the Government does step in from time to time offering minimum guarantee prices and purchase limited quantity of stocks from farmers on a need-to-intervene-basis. Apart from this, Agricultural commodities move freely across the country with no Government intervention. Though different provinces are managed independently under the provincial system of governance, there is no hindrance to the free movement of agricultural commodities across the country.

In 2007, GOSL introduced a Special Commodity Levy on certain agricultural products upon importation. The Special Commodity

19 Trade Policy Review report by Sri Lanka submitted to the World Trade Organization in September 2016

20 Trade Policy Review report by the World Trade Organization secretariat in September 2016

21 Trade Policy Review report by Sri Lanka submitted to the World Trade Organization in September 2016

Levy Act was enacted to encourage local industries.22 The levy, when applied to a number of selected essential commodities, replaces all other import duties, taxes and levies on the commodities concerned. The Ministry of Finance is the authority that can introduce, amend or remove the levy on particular commodities. The levy is generally applied on a selected group of agricultural commodities such as fish, potatoes, peas, oils, onions, and sugar, and rice (on special occasions), which are subject to the effect of seasonality. Apart from this, most other agricultural commodities are imported into the country with minimal or no restrictions at all, to cater to the local consumption demands.

As per WTO sectoral definitions, average tariffs on agricultural products are higher than those for non-agricultural products. During the period 2010 to 2016, the average applied MFN tariff on agricultural products declined slightly from 25.6% to 25.3% respectively.

Sri Lanka has bound 37.5% of its tariff lines at the HS eight-digit level. All agricultural lines (WTO definition), except whale oil (HS15043010), sperm oil (HS15043020) and other (HS15043090), are bound compared with 26.3% of non-agricultural lines. Most bound rates are ad valorem; there are 50 alternate bound tariff rates. Bound rates range from 0% to 75%. Nearly half of all bound tariffs are bound at 50%. The average bound tariff is 34%. The average bound tariff for agricultural products (WTO definition) is 50.3%, while the average bound rate for non-agricultural products (WTO definition) is 22.8%.23 In particular, under the Pakistan-Sri Lanka free trade agreement concessions were granted by Sri Lanka on 5,511 tariff lines covering agricultural and industrial products such as meat, fish, vegetables, minerals, chemicals and plastics, wood and paper, textiles and clothing, steel products, and machinery and equipment.

The GOSL recognises the importance of rebuilding the economy and establishing an attracting environment for foreign direct investment. The Board of Investment (BoI) is the sole authority under whose purview the investment regulatory framework is implemented. Investments in the agriculture sector has been targeted to improve productivity, level of technology innovation, access to international markets, develop quality seeds and planting materials and improve overall value addition, with exports markets in mind. The type of incentives given varies depending on the level of investment made, commencing from a minimum of Rs. 25 million (US$ 165,000/).

Table 3.4.6 Tariff Structure as at 31st December, 2015

No	Tariff Rate	No. of Tariff Lines (HS 2012 : 8 Digits)	Percentage
1	Free	3,922	56.31
2	15%	1,324	19.01
3	30%	1,457	20.92
4	75%	03	0.04
5	85%	01	0.01
6	125%	05	0.07
7	Specific	67	0.96
8	Specific & Ad-valorem	186	2.67
Total		**6,965**	**100.00**

Source: Department of Trade and Investment Policy, 2015

Investment restrictions apply in the growing and primary processing of tea, rubber, coconuts, cocoa, rice, sugar and spices.

The GOSL offers a range of incentives to exporters. Fiscal incentives include income tax concessions, concessions under the Nation Building Tax and the Ports and Airports Development Levy, VAT exemptions, deferment and zero rating (Table 2). In addition, Sri Lanka customs operates a duty drawback scheme, a Temporary Importation for Export Processing (TIEP) Scheme and a manufacture in bond scheme, all with the objective of promoting exports.

The Temporary Importation for Export Processing (TIEP) Scheme allows direct and indirect exporters to import inputs without payment of fiscal levies. The TIEP scheme has two sub-schemes: One category allows for the importation of raw materials, components, parts and packaging materials, exempt of duties. Exporters need to be approved by the Director General of Customs to operate under the scheme. The other category covers the importation of capital goods, appliances, spare parts, intermediate materials (excluding raw materials), transport and handling equipment, and breeding stock (for agricultural projects), which are eligible for whole or partial exemption of customs duties, import surcharge, Export Development Board Cess, and excise tax.

Export restrictions related to agricultural products are minimal and are maintained in accordance with UN sanctions or international conventions (e.g. CITES). According to the EDB, agricultural products that are currently prohibited from exports include

22 Special Commodity Levy Act No. 48 of 2007. Viewed at: http://www.documents.gov.lk/Acts/2007/Special%20 Commodity%20Levy%20-%20Act%20No.%2048/Act%2048E.pdf.

23 Trade Policy Review report by the World Trade Organization secretariat in September 2016

Cinchona bark, Live fish (prohibited species) and protected plants listed under the Fauna & Flora Protective ordinance. Apart from this there are no known prohibition of exports of agricultural products.

3.4.4.1 Risk Management

Effective risk management instruments are important to mitigate risks arising from significant weather, disease and price-related risks that agricultural sector faces. Such instruments can ensure agricultural investors stability in their income and create a predictable environment favourable to investment.

Sri Lanka has two main agricultural insurance schemes: the Farmers' Trust Fund and the Agricultural and Agrarian Insurance Board (AIB). The AIB, operating pursuant to the Agricultural Insurance Act No. 27 of 1973, is mainly involved in issuing insurance schemes to reduce the risks for local agriculture; these include crop insurance, livestock insurance, and agricultural equipment insurance. Crop insurance is available in three forms: crop insurance under the fertilizer subsidy; loans by Government and commercial banks; and cultivation carried out under direct investment[24]. Underwriting activities and computation and payment of compensation are the major functions of the Insurance Board. Taking out insurance is a pre-condition for obtaining loans; this allows banks to take on riskier agricultural investments. If the agricultural investment fails due to a risk, the AIB pays compensation to the bank and reduces the investors' liability. Agricultural loans are given out on preferential rates. In addition to crop insurance, the Insurance Board implements a social insurance and a pension scheme for farmers. In some years, the Government provides a grant to cover operating expenses.

The Farmers' Trust Fund, established in 1994 to empower small-scale farmers, is particularly aimed at: agricultural development and the welfare of small-scale farmers through access to credit facilities; input supply; providing relief from farm indebtedness; granting credit to improve marketing facilities; improving technological awareness; assistance in agro-processing; and launch of special agricultural projects. The main income for this fund comes from the National Lottery Board; diverted through the state consolidated fund/treasury. In addition to that, the Farmers' Trust Fund has fixed deposits, treasury bills, and interest gained against credit facilities granted to small farmers. Farmers have to submit project proposals through agricultural authorities to the Secretary to the Ministry of Agriculture for evaluation and approval (Trade Policy Review, World Trade Organization, 2016)

In 1999, the Central Bank of Sri Lanka (CBSL) initiated a formal system of forward contract titled "Govi Sahanaya" (relief to farmer) whereby the seller agrees to sell (a farmer or farmer society in this case) and the buyer to buy a given quantity of agricultural produce on a given future point of time at an agreed price. Such forward buying schemes have been in existence for different commodities and continue to do so, albeit informally. Hence this was the first time such a scheme was being introduced in a formal manner. In addition to the buyer and seller, provision was made for a bank to participate as a facilitator of the contract. The forward contract derives its legal status from the Sale of Good Ordinance enacted in 1896. The role of the banking sector, largely, was to provide supporting finance to both parties; viz., providing finance to facilitate cultivation to the farmer and to the buyer for purchasing and stocking. These funds were given on preferential rates under refinancing schemes provided by the CBSL.

However, after operating this scheme for nearly a decade, the rate of adoption was observed to be low and the interest subsidy provided was withdrawn[25]. Research (Wijesooriya and Champika, 2015) has revealed that the major causes for violation of the forward contracts being low quality harvests, side selling when open market prices are high and delays in procurement process. At present, there isn't a Government mechanism for regulation or coordination of contract farming practices. What prevail are schemes that are operated mostly by large scale Corporate buyers, who develop their own forward contract mechanisms together with farmer communities in rural areas.

Co-operative arrangements through extension services are yet another mechanism through which risks can be mitigated. In Sri Lanka, there are no known cooperative arrangements built in amongst producers with the sole objective of mitigating risks. In Sri Lanka, the extension services are primarily in the hands of the public-sector agencies. The main Institutions are; Department of Agriculture & Mahaweli Authority of Sri Lanka; Tea Research Institute; Rubber Research Institute; Coconut Research Institute; Sri Lanka Cashew Corporation; Sugarcane Research Institute; Department of Export Agriculture and the Department of Animal Production and Health

24 Agricultural Insurance Board, available at: <http://www.aib.gov.lk>.

25 Agriculture Forward Contracts as Pre-Harvest Commodity Marketing: Problems and Prospects, 2015.

These institutions are responsible for extension activities and the relevant extension and training Center undertakes activities in extension, training, communication and agricultural education and examination. Due to decentralization in 1989, agriculture and livestock sectors, including extension services, were devolved to provincial departments of agriculture and livestock. Some of the private companies that sell agricultural inputs, machinery and equipment, or are involved in plantation agriculture and that trades or exports certain commodities like tea, do provide advisory services for selected growers. These advisory services are normally not fee-based but rather a marketing tool to promote companies' products or to ensure the quality of raw produce that relevant companies buy from its producers. Many companies work with farmers under contracts. Some companies have mobile services and some have sales offices in many parts of the country[26].

Risks can be mitigated through crop diversification too. In Sri Lanka, the GOSL is promoting the implementation of indigenous food production programmes with the objective of ensuring food security whilst minimizing importation of food crops. Towards this endeavour special attention has been given to cultivation of non- paddy crops including, fruit, vegetables, yams, pulses and seeds. The DoA plays an active role in crop diversification. The crop plans are communicated to village level through experienced staff of the DoA at district level, and through a well-organized network of extension officers at the grass-root levels. All of these Government extension services are concentrated at the Agrarian Services Centre, located at village level. Cropping plans are drawn up for the two main seasons based on the country's diverse agro climatic regions.

Under the National Food Production Programme 2016-2018, one of the primary objectives is to ensure self-sufficiency in traditional local foods and thereby save valuable foreign exchange spent on importation of food. Accordingly, a range of crops has been identified where production is to be enhanced which is a natural diversification from existing crop patterns. In addition to this, the DoA too, based on market conditions, agro climatic conditions, water availability and other measures, recommend the cultivation of mixed crops, both, from a perspective of improving farmer profits as well as managing risk of solely dependent on a mono crop.

26 Global Forum for Rural Advisory Services, available at: <https://www.g-fras.org/en/world-wide-extension-study/92-world-wide-extension-study/asia/southern-asia/319- sri-lanka.html#extension-providers>.

3.4.5 Infrastructure & Financial Development

3.4.5.1 Infrastructure Development

Well-developed rural infrastructure, including good irrigation networks, transportation & storage systems, a reliable access to energy and to information and communication technologies, can effectively attract private investors in the agricultural sector and increase agricultural competitiveness.

The infrastructure development priorities are identified and implemented in line with the five development goals that falls within the national policy of the present Unity Government. As such, investments in agricultural infrastructure and the industry as a whole has been aligned with the goals to enhance income levels of people and the development of rural economies. The identification of priorities in infrastructure development is spelt out in the Public Investment Programme of the Government of Sri Lanka and implemented through the different line ministries.

In regard to sharing of responsibilities for infrastructure project design, provision and maintenance between central government and local level authorities, the decentralized capital budget is the key initiative towards decentralization of resource allocation from the central government to the provinces and to the districts. It represents an attempt at directing a part of the national budgetary resources to the grass root level as decided by the local authorities to meet the regional development needs. This development programme provides a great opportunity for rural people to take part in decision making and for meeting their needs by utilizing the funds under the direction of members of parliament. The Government has spelt out its strategy for irrigation and water resources development in its PIP 2017-2020 strategy. Accordingly, construction of new multipurpose irrigation schemes and trans-basin diversions, enhancing water retention capacity of existing reservoirs/tanks ads conveyance systems have been placed on priority.

The Water Resources Board is responsible for groundwater exploration and development, and the Mahaweli authority of Sri Lanka is responsible for the water and related infrastructure development in the declared Mahaweli project regions and also other major basins, which have been declared by the government as special areas.[27] All of these state institutions operate at National level. At local level, Provincial Councils, Municipal Councils, Urban Councils and Pradeshiya Sabhasare the institutions that

27 The Mahaweli project is Sri Lanka's biggest river basin development project.

perform several water-related functions at implementation levels. These functions include local water supply and sanitation, small-scale and provincial irrigation and drainage activities, and environmental protection.[28]

The right to extract water is normally linked to the land rights, and therefore appropriation and extraction is based on land ownership. This also applies to groundwater, which without regulation or physical impediments to extraction, is said to have led to over exploitation. Surface water extraction is mostly done by the State for Irrigation, water supply and hydropower. There are many local customs and traditions that affect water governance. Most of them are related to agriculture and irrigation. Water rights include formal rights embodied in official titles, permit, entitlements, and seasonal irrigation schedules, while less formal rights are based on customary patterns and rights implicit in social norms and practices. For example; Under irrigation schemes, a cultivation meeting attended by farmers and Government officials, is held before each season. The decisions taken at the meeting include the date of water issue and period of issue. The decisions taken at the cultivation meeting are legally recognized, and therefore infer a right to use water (UNESCO World Water Assessment Programme Secretariat, 2006).

The PIP 2017-2020 focuses on developing the overall transportation infrastructure, viz., transport (road and rail), port and aviation of the country. The largest allocation of public expenditure for the current term is for infrastructure development including transport infrastructure.

Plans for developing vertical integration of supply chains have been drawn up under the modern agriculture project that is scheduled to be implemented in the first half of 2017, with World Bank funding via PPP programme. At present the degree of vertical integration of the supply chain is poor in the country.

In regard to energy supply, the total installed capacity and electricity generation of Sri Lanka is 3,392MW and 12,357GW respectively. Sri Lanka's electricity requirement is said to increase at an average rate of 5-7% annually and the demand is expected to rise with industrial and commercial sector development. Consequently, the additional installed capacity required for each year is estimated at 150-200MW (Departmenrt of National Planning, 2015) .

28 Pradeshiya Sabhas or local government is the lowest in the Governance structure in Sri Lanka.

The electrification level (access to electricity) is almost 98% at present and the Government plans to reach 100% by the end of 2017. The Government has drawn up plans to ensure energy security by diversifying energy resources and energy mix considering economic costs, environmental impacts and convenience to customers. The generation of sustainable and renewable energy is top most on the priority list of the Government.

3.4.5.2 Financial Sector

The financial sector of the country is in an advanced stage of development, structured and regulated to cater to current global requirements.

The Central Bank regulates and supervises banks and other financial institutions and payment systems to promote the financial system stability. Legal provisions governing the regulation and supervision are set out in the Monetary Law Act, Banking Act, Finance Companies Act and Payments and Settlement Systems Act. In addition, the Exchange Control Act empowers the Central Bank to regulate foreign exchange transactions as well in order to preventing financial instabilities arising from unfavourable mobility of foreign capital.

The financial system in Sri Lanka is dominated by banks and state ownership. In 2015, the banking sector comprised 25 Licensed Commercial Banks (LCB) and seven Licensed Specialized Banks (LSB) that accounted for 59% of the total financial system assets, of which the state-owned banks contributed to more than 44%. Further, the nonbank financial sector is made up of 46 financial companies and seven specialized leasing companies that account for only 7% of total financial system assets.

The CBSL from time to time, engage in activities promoting access to finance with a view to enhancing financial inclusiveness and balanced growth in the economy. In such instances the CBSL coordinates credit delivery through refinance schemes and interest subsidy/credit guarantee schemes, to strategic sectors of the economy. Such business ventures include agriculture, livestock, micro and SME sectors, just to name a few. In 2015, of the total credit exposure in the banking sector, the credit distribution to the agriculture & fishery sector was 9.1% (Central Bank of Sri Lanka, 2015). This was as a result of the CBSL initiative to direct the banking system to provide a mandatory 10% credit to the agriculture sector. Agriculture and livestock sectors have been a regular recipient of concessionary credit facilities approved by the CBSL.

In Sri Lanka, even though not explicitly stated, it is the expected norm amongst all banks, to demand collateral from prospective investors who wishes access credit. The difficulty of providing collateral is mostly faced by micro and SME organizations, who therefore are at the mercy of the informal financial sector, who offer short term credit at very high interest rates

The credit information system is managed through the Credit Information Bureau of Sri Lanka (CRIB) which is the first Credit Bureau in the South Asian region, established by the Credit Information Bureau of Sri Lanka Act No. 18 of 1990. An initiative of the Central Bank of Sri Lanka and the Ministry of Finance, CRIB was a response to the 1980's debt crisis in the country.

CRIB is a public-private partnership, with the Central Bank holding the majority of equity while the rest is held by the Commercial Banks, Specialized Banks, and other financial institution regulated by the Central Bank and a few other institutions declared as lending institutions by the Hon. Minister of Finance (Credit Information Bureau of Sri Lanka, 2016). The CRIB engages in collecting and collating credit and financial information on borrowers and prospective borrowers of lending institutions and provide credit information on request to shareholder lending institutions and simultaneously to borrowers to whom such information relate to.

The economic liberalization policies in 1977, which contributed to the accelerated economic growth led also to favorable developments in the financial sector. The financial sector at present consists of Licensed Commercial Banks, Licensed Specialised Banks, Registered Finance Companies, Primary Dealers, Leasing Establishments, Merchant Banks, Savings and Loan Associations, Venture Capitals, Unit Trusts, Contractual Serving Institutions such as Employees Provident/Trust Funds and Insurance Companies. These institutions form a competitive financial market in the country while providing a variety of domestic and international financial services.

The total number of bank branches island-wide stood at 6583 (Central Bank of Sri Lanka, 2015) compared with 2375 branches in 2010, signifying the growth in the sector and wider representation geographically. This wide spread bank branch network has improved the level of competition, both in terms of attracting deposits as well as providing credit facilities across all sectors. In particular reference to the agriculture sector, this sector offers credit for both, working capital requirements as well as for capital expenditure, including equipment/machinery. Credit facilities do not vary by region but certainly do vary by the size of the firm and his capacity to repay.

The informal financial sector too is active and yet plays a prominent role in providing credit to farmers. Unlicensed (self-proclaimed) finance institutions, money□lenders, indigenous bankers, pawnbrokers, retail traders, landlords, friends and relatives constitute the intermediaries in the informal financial market in Sri Lanka. Poorer households, which are generally excluded from formal financial institutions still rely on such informal sources to fund their credit requirements for agriculture purposes.

The informal sector does play an important role by stepping into a lender's shoes to provide credit support, otherwise not available to farmers (mostly individuals) who do not have sufficient savings to support their cultivation practices. Credit comes in the shape of seed material, fertilizers, pesticides and weedicides supplies, the cost of which, including an interest component is recovered, either from the harvest itself or sales proceeds from the harvest.

Apart from this segment, the non-banking financial institutions that include Licensed Finance Companies (LFC's) and specialised Leasing Companies (SLC's) also play an important role in providing credit, particularly for agriculture machinery, transportation vehicles and plant & machinery etc. A total of 1216 branches are estimated to be available in all the provinces at the end of 2015 (Central Bank of Sri Lanka, 2015). These institutions, in view of the business model they operate, are able to respond to farmer requirements much faster, and in more flexible manner though at a higher interest rate. For farmers who have very little to offer by way of collateral, the non-banking sector institutions are a welcome in their village, where credit can be obtained with the aid of two guarantors. The cooperative societies, development banks, the Grameen movement and state programmes like Samurdhi constitute the microfinance institutions, who too, play an important role in affording credit support at rural level. There are maximum ceilings on the quantum loan that is given at any one time by the microfinance institutions, but nevertheless plays an important role in the rural economy in particular. They operate side by side with the banking sector as well as the non-banking sector and have grown considerably in the recent years.

In accordance with Section 108(1) of the Monetary Law Act No.58 of 1949, the Central Bank of Sri Lanka (CBSL) acts as the agent of the GOSL or acts on behalf of the GOSL in guaranteeing the loans granted by banking institutions, which are qualified to receive guarantees under special development programmes. An amendment was made to Section 108 of the Monetary Law Act

as 108A in 1974 to extend the guarantees to loans, advances or other accommodation granted to small-scale enterprises by credit institutions operating in Sri Lanka. This has facilitated the operation of guarantee schemes by the CBSL in respect of loans granted to small enterprises and agricultural activities.

3.4.5 Conclusion

Agriculture continues to be one of the important sectors of the economy, in spite of its declining contribution to the GDP in recent past, considering the fact that 28.1% of the labour force is employed in agriculture. The absence of a comprehensive national agriculture policy is evident by the overall relatively weak policy environment of the country. However, under the directions of the new Minister of Agriculture, a comprehensive national policy on agriculture is in the process of being drawn up, aligned with the country's national food security programme. The primary aims of the proposed policy framework being drafted are to; modernize agriculture with eco-friendly innovative technologies; increase productivity; adopt environmental friendly and healthy food products, and to promote competitive agro based products with international markets in sight. The policy focuses on establishing mega zones for agriculture development across the country and this will open up opportunities for investment in the various stages of the value chain. The growth in modernized agriculture will be driven with private sector investment and supplemented by public sector investment in infrastructure development in areas such as irrigation schemes, land alienation for cultivation and road network development in rural areas.

Sri Lanka embraced mechanization way back in 1952, when Massey Ferguson brand tractors were introduced to replace the traditional animal driven implements. Since then the country has progressed deeper market penetration of mechanization, with both the tractor and the power tiller (hand tractors), which has reached near maturity. The notion of mechanization has now been extended to beyond land preparation, to seeding and planting, crop management, spraying and crop harvesting. The institutional support for mechanization comes from the Department of Agriculture, whilst the importation, marketing, distribution and after sales maintenance are taken care by the private sector. The DoA's current 5-year plan in operation, is vigorously promoting the diversification of crops (from the traditional paddy cultivation) to mitigate risks associated with adverse weather patterns on the one hand, and on the other, encouraging the farming community and the private sector to expand the use of mechanization across the value chain to improve the overall levels of productivity. Opportunities exist for manufacturing countries to partner Sri Lankan enterprises in promoting a full range of machinery and implements that will promote the mechnization of the agriculture across the entirety process of the value chain in food production.

Like in the case of agriculture policy, investment policy in the country too is not relevant to meet the present-day needs. The authority for foreign direct investments in Sri Lanka is the Board of Investment. The present Government is keen to attract FDI's into the country and are presently encouraging investors to come in to support a portfolio of sectors including agriculture. When it comes to land policy, the policy guidelines are ambiguous and this is one of the major constraints in developing commercial scale agriculture in the country, but the present Government is looking at this aspect objectively and intend to open up large blocks of land that are hitherto uncultivated or under-utilized, on public private partnership basis. Despite this shortcoming, investments flow into the country fairly smoothly and are supported by the 24 bilateral investment treaties Sri Lanka has signed with several countries. The only restriction on investment that is applied is in the growing and primary processing of the traditional crops, tea, rubber and coconut. At present, the investment climate is ripe for enterprises who could transfer technology know-how in producing quality seed and planting material, bio-fertilizer manufacture, and cultivation of high value crops for marketing internationally. Incentives are offered based on the size of the investment and the level of technology that is transferred.

During the last decade, major infrastructure development projects were carried out concentrating on building the road network (linking rural areas with urban cities), capacity development of the sea ports and air ports and power & energy. In the field of agriculture, the Government continues to invest in expanding the irrigable land by investing in developing irrigation projects. This is achieved by constructing damns in strategic locations and then channeling the water to regions through underground tunnels where cultivable lands can be increased. Under the existing schemes, the total irrigable extent is 744,983 hectares.

The trading environment in Sri Lanka is relatively free, having being one of the foremost in the region to liberalize trade in 1977. There are no restrictions to movement of goods within the country. Restrictions on cross border trading where agriculture is concerned applies to the primary crops (tea, rubber and coconut) and to a few restricted items that come strictly under the purview of the quarantine department. Agriculture machinery has, except for a very short duration in the recent past, always received preferential

status with minimal or zero duty structures. This has been a major boost to the industry and makes the product more affordable when considering the depreciating Rupee against major global currencies. However, on the negative side are the cost of spare parts for agriculture machineries, which carry a duty structure from 15% to 40%.

Sri Lanka has signed free trade agreements with its' immediate neighbors, India and Pakistan which facilitate the importation of a range of agriculture machineries under preferential conditions. At present, negotiations are underway to sign similar agreements with China and Singapore too. Sri Lanka is a signatory to the APTA too.

As with trade, the financial sector too is liberalized to a great extent. Under the Central Bank of Sri Lanka, we find a well-structured group of state banks, private commercial banks (local and foreign), and institutions in the non-banking category. Competition amongst financial institutions is healthy yet intense, and consequently the branch network has penetrated deep into the villages providing easy reach to farmers. In the case of licensed commercial banks, the CBSL has stipulated a minimum exposure of 10% of the total loan portfolio to cover agriculture. Leasing takes precedence over loans, when it comes to financial agriculture machineries. The ease of documentation, speed of evaluating credit worthiness and release of funds makes leasing a popular vehicle by which farmers purchase their agriculture machinery. In spite of the spread of the branch network, the informal finance sector still plays an important role in financing agriculture equipment. Farmers who are unable to provide the required collateral or those who are not linked with the banking sector are the customers for these informal finance systems.

Most commercial banks are yet shy to provide financing for agricultural projects in general, unless there is sufficient cover given by way of collateral. This is mainly because of the risks associated with natural causes that make agriculture a high-risk industry. These natural risks are mitigated to a certain extent through two main agricultural insurance schemes that are available under the Agricultural Insurance Act. The Department of Agriculture also plays an active role via its extension services, educating farmers to cultivate a balanced portfolio of crops thereby mitigating the risks associated with growing a mono crop. Contract farming and buy-back arrangements, between farmer organization and private sector enterprises are another way through which credit risks are mitigated. Credit is provided to farmers based on the value of the project, which facilitates the projection of future cash flows based on contract prices and expected harvests.

Finally, Public-Private-Partnership projects carried out from time to time under various donor funded programmes, have also helped farmers in improving their agricultural practices, including mechanization. At the time of conducting this study, a major agriculture modernization project on PPP basis is being planned to be executed in mid-2017, with the aid of World Bank funding. Opportunities exist, for Sri Lankan enterprises, either by themselves or in partnership with foreign expertise to take part in this project, which will be spread over the next 5 to 7 years. Introduction of new technology and other modern agricultural practices are primary aims of this project. All in all, the environment for trade and investment in agriculture and mechanization in particular looks very good in the immediate future.

Thailand

3.5 Trade and Investment Policies on Mechanization of Agriculture: Thailand

3.5.1 Overview of Thailand Agriculture Sector

Thailand has total area of 320 million rai (1 rai = 0.16 hectares) of which 146 million rai or about 46% of the total area are for agricultural uses. However only the 20% of these areas are irrigated. Among these total planted areas 48% are used for rice cultivation, 24% for orchard and perennial crops, 21% for upland field crop, only 1% for vegetable and ornamental plants and the rest for other agricultural uses.

Table 3.5.1: Agricultural Area and Yield of Main Products in 2015

	Planted Area (1000 rai)	Harvested Area (1000 rai)	Production (1000 ton)	Yield per rai (kg)	Farm Value (mil. Bht)
Rice	62,315	59,308	27,060	456	272,467
Maize	7,157	6,945	4,611	664	35,781
Cassava	9,320	8,961	32,358	3,611	71,835
Sugar Cane	n.a.	9,591	106,333	11,086	90,383
Para Rubber	23,332	18,846	4,466	237	197,263
Oil Palm	4,397	4,276	11,016	2,576	44,505

Source: Office of Agricultural Economics (2016), Agricultural Statistics of Thailand 2015, www.oae.go.th

Table 3.5.2: Husbandry in 2015

	1000 heads
Cattle/Buffaloes	5,853
Dairy Cows	608
Swine	7,675
Poultry	289,663

Source: Office of Agricultural Economics (2016), Agricultural Statistics of Thailand 2015, www.oae.go.th

According to the National Economic and Social Development Board's 20 Years Strategic Plan 2017-2036 (2016) and the Strategy of Department of Agriculture Extension 2017-2021 (2016), Thailand is in transition from agriculture to industry and services; the proportions of agriculture, industry and services in 2000 were 9.9%, 25.4% and 64.7%, whereas in 2014 were 7.2%, 28.5% and 64.3% respectively. There are many reasons for these significant changes, notably are soil degradation, under-supply of irrigation and lack of flood control, expansion of urbanization, dependency on imported technology and mechanization, the inability of farmers to cope with technology advancement and the aging society that reduces the workforce in agriculture. As the result, in the 12th Plan, the productivity of agricultural sector is forecasted to contract an average of 0.8% per year in average, while industrial is expected to grow 2.0% and the services sector grows 3.0%.

The aging of agricultural workforce may be the most crucial factor of all. The population of Thailand in 2016 was about 66 million, growing slowly at only an annual average of 0.5% during the last decade, resulting in a declining rate of labor force in agricultural sector at 1.9% annually in the same period. This declining rate accelerated to 5.3% per year in the last 5 years. In 2016, only 11.7 million people (about 31% of the labor force) were employed in agriculture sector. However, with the opening of the ASEAN Economic Community in 2015, that allows the transfer of labor force and other inputs

for agriculture bases from neighboring countries, the situation is expected to improve.

Because of the declining productivity, the government has introduced Thailand 4.0 policy in 2015 aiming to boost up the economy. Summarily, Thailand's economic development can be separated into 3 stages: Thailand 1.0 is the traditional agriculture and cottage industry, Thailand 2.0 is the investment in light and import substitution industry utilizing natural resources and cheap labor, Thailand 3.0 is the heavy and export oriented industry relying on foreign direct investment. Thailand 4.0 aims to transform and develop value-based economy using indigenous natural and cultural resources and creating innovation, technology and high value services. For agricultural sector, Thailand 4.0 aims to switch from traditional farming to smart farming producing premium quality foods and ingredients using advanced technology in seed, feed, vaccine, machinery, biotech, management and other technologies. To implement the policy, the government aims to provide farmers with knowledge of technologies and innovation through networks of domestic and foreign universities, coupled with private sector investment in the area, financial supports, and government funds for infrastructures as needed.

The 20 Years Strategic Plan 2017-2036 aims to bring the farmers out of poverty trap by proving them with the tools to become modern and innovation-driven agricultural entrepreneurs or Smart Farmers that have good management knowledge and capability to lower production costs and add value to their agricultural products by through innovation and mechanization. The ultimate target is to position Thailand as a center of agriculture and food, in particular as an organic and safe food producing-country, using innovative and environmental-friendly technology.

To achieve the Smart Farmers' targets in the plan, the restructure of the agricultural sector is inevitable. The governmental policies in transforming this sector are as follows:

- Traditional small and medium farmers must be transformed into a modern enterprise (Smart Enterprises);

- Modification of Production Structure: Thailand needs to modify the primary agricultural production into high value and world class-standard quality by utilizing supply chain of primary materials from neighboring countries and rearrange production-chain in accordance with potential market demand and areas from upstream to downstream;

- The small farms ownership needs to be integrated into a large organization (Big Plot Farming) such as cooperatives or enterprises in order to have economies of scale in providing infrastructure, machines, seeds and modern knowledge and technology, especially the risk management in market mechanisms as well as the knowledge of sufficiency economy and sustainable agriculture;

- The present traditional farmers must be transformed into modern agriculture entrepreneurs equipped with management skills and appropriate technology (Smart Farmers);

- Increase productivity and revenue of small farmers: research and development of agricultural production that focuses on a reasonable level of local technology, in line with the areas that are needed to be enhanced in order to ensure farm revenue and reduce costs of agricultural inputs;

- Promotion of environmental friendly investment and boosting productivity: the farmers and investors need to adjust to the green supply chain / green value chain, and build a solid economy based on the biological diversified environment and biotech in order to promote sustainable agriculture;

- The government must adjust its capabilities to enhance the agricultural promotion (Smart Officer and Smart Office);

- Promotion for the development of emerging businesses with high potential, especially in S-Curves agriculture and biotechnology products (High Potential Startups);

- Creating equality of access to resources by pushing the Water Resource Act and land reform;

- Boosting the capacity to adapt to climate changes and disaster risk management by developing both domestic and international database and system alarms on climate change and natural disasters, with a focus on flood protection;

- Enhancing efficiency of agricultural extension to be Smart Officer and Smart Office by using MRCF agricultural systems, where

  M= mapping data analysis in the area

  R= remote sensing data for coordination / communication services

C= community and stakeholders' participation

F= focus on field service with specific goals and clear aims

The short-term objectives of the policy implementation (1 year):

- Pre-Harvest Measures: The measures will focus on increasing yields and reducing the costs by supporting the access to seeds, fertilizers, pesticides, farm rents and loans. During this period, the government will start on training and credit support schemes to introduce the farmers on the benefits of big plot farming, mechanization and agricultural tools, the management and modification of plants and animal husbandry to suit the soil and climatic conditions;

- Post-Harvest Measures: The measures will focus on improving the management capacity of farmers' groups and cooperatives on harvesting, value-added product processing, stabilizing prices, financial and marketing linkages, and the expansion of outlets for consumers through public-people policy where public, private, and academic sectors are officially invited to join the social enterprises to generate benefits from local agribusiness; and

- Support Measures: The measures will focus on reducing the burdens of interest payments to farmers by debt suspension and lowering interest rates.

The medium-term objectives of the policy implementation (1-3 Years):

- Reform of the cooperative system, in particular on good governance, transparency, and efficiency;

- Arrange funds to tutor entrepreneurs and improve the capabilities of the agricultural sector;

- Evaluate the agricultural price stabilization mechanisms, such as insurance schemes, future market and on-line marketing of agricultural products;

- Knowledge development and management, such as the establishment of Smart Farmer Academy for technology training, farm-management as well as safety and environmental standards;

- Encourage innovation to increase productivity, quality, safety, and develop environment-friendly and traceability system;

- Promote entrepreneurship in agro-business, such as facilitating startup innovative products, developing cluster of agro-services and developing agro-tourism business.

The long-term objectives of the policy implementation, (3-5 years):

- Land reform;
- Develop digital agricultural services, such as big data, cloud services, and precision technologies;
- Reform production chain from focusing on agricultural inputs to production for consumers; and
- Develop technology and management of water system.

As shown above, the key success factor is to nurture Smart Farmers who have the entrepreneurship to apply their knowledge and experiences in marketing, modern production management and technology. The government aims to develop the younger generations into Smart Farmers to be the change-leaders to then initiative changes at the local level.

- Focus on training of young farmers to become Smart Farmers;
- Develop a new generation of farmers from different professions who are interested in agro-business mentored by existing farmers with knowledge and experiences.

The schemes of Smart Farmers development will include:

- Creation an ecosystem for the development of Smart Farmers;
- Education and Training;
- Access to financial capital;
- Development of database and information systems in agriculture;
- Linking supply and demand chains, from producers to consumers; and
- Creation of clusters effect.

In sum, Thailand is attempting to transform its traditional agricultural practice into a modern and innovation-driven agricultural sector by creating Smart Farmers who have good management knowledge and capability to lower production costs and add value to agricultural products by using technology and mechanization. The government policies target mainly on the establishment of learning / training centers to create Smart Farmers,

promoting big plot farming to create Smart Enterprises, and enhancing efficiency of public offices to be Smart Offices. The ultimate target is to position Thailand as a center of agriculture and food, in particular as a country producing organic and safe food, using innovative and environmental-friendly technology.

3.5.2 Agriculture Mechanization

At present the private sector is mainly responsible for agriculture mechanization and providing services for the large numbers of smallholders. However, according to the 20-year Strategic Planning, the government will support the integration of small farms into Big Plot Farms so that the large-scale mechanization can be achieved. There are some trials by the government to use Private-Public Partnership to promote agriculture mechanization, such as the community rice mills, but most of the projects failed to receive fruitful results.

During 2011-2015, the export value of agricultural machines is USD 661 million per year in Thailand, with an annual growth of 13% and the import value is USD 1,544 million per year, decreasing 0.6%.

Farm tractor and walking tractor contributes 35% of the export value followed by pump and blower accounting for 27%, and harvester, thrasher / combine harvester contributes to 13%. It should be noticed that the growth rate of harvester, thrasher and combine harvester is very high at 51% per year, and the growth rate of the farm tractor and walking tractor is 35% per year.

For imports, pump and blower contribute 47% of the total value followed by farm tractor and walking tractor at 20% and conveyor crane elevator for 19%.

Table 3.5.3: Import and Export of Agricultural Machinery

	Export of Agri Machinery (m.USD)					Import of Agri Machinery (m.USD)				
	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Conveyor crane elevator	71.4	109.7	47.2	35.2	34.8	226.5	327.8	307.7	375.6	252.1
Pump and blower	165.5	183.6	168.9	195.4	186.6	600.4	783.4	760.7	784.9	696.6
Separation and extraction	26.8	42.7	40.4	36.9	29.9	46.5	39.3	47.2	47.6	35.6
Pressing, rolling and bending	6.5	6.1	5.6	5.9	4.1	36.4	38.5	24.7	32.4	38.4
Mixer	0.8	3.5	3.2	3.0	2.5	1.4	3.3	2.4	4.9	9.8
Farm Tractor and Pedestrian Tractor	138.7	203.7	242.3	269.4	307.3	348.5	438.9	352.2	228.7	206.4
Farm implements	31.2	34.9	42.7	44.9	41.9	18.3	27.9	32.5	33.2	22.9
Harvester, Thrasher and Combine Harvester	36.9	56.9	66.0	91.8	192.2	39.1	37.0	39.9	28.7	39.0
Dryer	2.8	4.3	4.9	4.0	3.9	61.0	50.5	49.0	44.9	38.0
Agricultural vehicle	8.7	2.1	4.6	4.7	1.7	3.4	6.4	9.1	7.3	8.8
Hand Tool for agriculture	10.1	10.0	9.0	9.4	8.7	4.8	5.2	5.2	5.1	5.3
Total Agri Machine	499.4	657.5	634.8	700.7	813.6	1,386.4	1,758.1	1,630.7	1,593.4	1,352.8

Source: UN Comtrade and Ministry of Commerce (2017)

Parts for Agriculture Machinery

During 2011-2015, the export value of agricultural machinery parts is USD245 million per year on average, with an annual growth rate of 14.7%; while the import value is USD 556 million per year, growing 14.1% per year.

Pump and blower contributes 32% of the export value followed by transmission system at 18%.

Farm tractor and walking Tractor contributes 26% of the import value followed by pump and blower at 22%.

Table 3.5.4: Import and Export of Agricultural Machinery Parts

	Export of Parts of Agri Machinery (m.USD)						Import of Parts of Agri Machinery (m.USD)				
	2011	2012	2013	2014	2015		2011	2012	2013	2014	2015
Engine and motor	0.0	0.0	0.1	0.2	0.3		0.9	4.1	4.4	0.6	0.7
Conveyor crane elevator	5.0	4.1	6.3	5.3	6.1		4.1	4.5	3.8	3.7	5.5
Pump and blower	53.0	69.3	88.2	96.9	90.7		107.4	109.6	116.5	120.2	150.3
Cutting and grinding	6.1	7.9	9.3	11.5	14.8		31.0	34.8	34.7	31.1	30.6
Separation and extraction	3.9	8.3	5.1	10.1	11.1		3.8	5.3	5.8	7.2	4.7
Transmission system	26.5	36.6	37.9	55.8	70.6		25.5	51.8	58.6	46.9	46.4
Supporting parts: container	33.7	40.9	46.6	51.4	47.6		77.9	95.3	88.3	91.5	86.7
Farm Tractor and Pedestrian Tractor	0.3	9.9	13.5	16.8	15.9		0.9	180.6	209.2	158.4	165.4
Farm Tractor and Pedestrian Tractor	26.8	29.3	31.7	30.9	23.7		8.0	14.4	11.8	9.2	6.6
Farm implements	4.8	3.1	3.6	5.3	5.3		14.6	16.1	18.0	13.9	13.1
Harvester, Thrasher and Combine Harvester	3.8	3.4	4.5	7.7	7.5		8.9	14.2	13.9	7.7	9.0
Dryer	0.2	0.1	0.1	0.2	0.2		5.5	2.8	3.7	6.8	14.0
Agricultural vehicle	8.9	6.2	7.9	5.3	6.2		59.5	84.3	98.0	60.8	56.4
Total Parts for Agri- Machinery	173.1	219.2	254.7	297.3	300.0		347.9	617.8	666.8	558.1	589.4

Source: UN Comtrade and Ministry of Commerce (2017)

Domestic Sale Value of Agricultural Machinery and Parts

In 2011, Thailand's domestic sales of agriculture machine and parts was USD 2,104 million, with an annual growth of 3%.

Agricultural and forestry machinery contributes 65% of the growth, followed by pumps, compressors, taps and valves that contribute 16% and with an annual growth rate of 8%.

Table 3.5.5: Domestic Sale Value of Agricultural Machinery and Parts

Demand for Ag. Machinery (ISIC 4)	Mil. USD	1996	2006	2011	% Growth/Yr (2006-2011)	% Share of Consumption 2011
2211	Rubber tyres and tubes; retreading and rebuilding of rubber tyres	38	61	115	13%	5%
2593	Cutlery, hand tools and general hardware	1	0	8	n.a	0%
2813	Other pumps, compressors, taps and valves	213	230	336	8%	16%
2816	Lifting and handling equipment	132	146	158	2%	8%
2821	Agricultural and forestry machinery	418	464	1,374	24%	65%
2825	Machinery for food, beverage and tobacco processing	13	885	114	-34%	5%
Total	Agriculture Machinery	816	1,785	2,104	3%	100%

Source: Calculated from data of National Statistics Office of Thailand and UN Comtrade / Ministry of Commerce (2017)

Domestic Production of Agriculture Machinery and Parts

In 2011, Thailand's domestic production value of agriculture machinery and parts was USD1,362 million, with an annual growth rate of 3%. Agricultural and forestry machinery contributed to 80% growing 45% annually, followed by rubber tires and tubes; retreading and rebuilding of rubber tires contribute to 10% with a growth of 17%.

Table 3.5.6: Domestic Production of Agricultural Machinery and Parts

Manufacturing of Ag. Machinery (ISIC 4)	Mil. USD	1996	2006	2011	% Growth/Yr (2006-2011)	% Share of Production 2011
2211	Rubber tires and tubes; retreading and rebuilding of rubber tires	42	60	133	17%	10%
2593	Cutlery, hand tools and general hardware	1	3	13	32%	1%
2813	Other pumps, compressors, taps and valves	12	54	32	-10%	2%
2816	Lifting and handling equipment	31	37	10	-23%	1%
2821	Agricultural and forestry machinery	137	171	1,087	45%	80%
2825	Machinery for food, beverage and tobacco processing	6	864	86	-37%	6%
Total	Agriculture Machinery	229	1,190	1,362	3%	100%

Source: Calculated from the data of National Statistics Office of Thailand and UN Comtrade/Ministry of Commerce

3.5.3 Investment Environment and Policy

3.5.3.1 Investment Policy

Both the Thailand 20-Year Strategic Plan 2017-2036 and the Thailand 4.0 for Smart Farmers, Smart Enterprises and Smart Offices have provisions of agricultural investment strategies and supporting policies. For examples, the government has pushed the investment in rural internet and rural mobile phone projects that in 2016-2017 harvest season to allow the farmers

to utilize e-market to sell their products. In fact, it is the first time that Thailand developed long-term 20 Years Strategic Planning. The policies for Smart Agricultural Investment and their implementation and enforcement are therefore clear, accessible, transparent and predictable. The policies for Smart Agricultural Investment contribute to the aims of the 20 Years Strategic Plan to bring Thailand into innovation-driven country relying on local-made technologies and environmental-friendly production.

To implement these policies, the public hearings are required for every government project, where the local stakeholders in the areas can voice their opinions. In the national level, the National Farmers Council, the Federation of Thai Industry, the Thai Chamber of Commerce and the Thai Banks Association and other related agencies can provide public consultation services.

Moreover, the government aims to use public-people participation (PPP) to solicit consensus of all key stakeholders. According to the State's Investment Act B.E. 2556 (2013) and the announcement of the Committee on PPP in 2016, for projects with investment less than one billion Baht (about 30 million USD); the general practice would be (1) the private sector can participate in the planning of the 5-years strategic plan on private investment in state's projects. (2) the government agencies prepare the project feasibility report that requires the private sector participation and propose to the ministry and related agencies for approval, if approved, the ministry proposes to the Committee on PPP, (3) if agreed, the committee submits to the cabinet, (4) the ministry prepares the invitation for private sector to bid in the projects. At this stage, the private sector can participate in voicing their opinions on the drafted term of reference, (5) the ministry selects the most suitable private sector to participate in the projects, (6) the ministry sets up monitoring committee and/or consultant companies to conduct regular evaluation of the project performance. Therefore, the public consultation mechanisms have been established to improve regulatory quality in the investment environment of every project, including in agricultural sector.

In securing land tenure for agricultural purposes, the Thai farmers can benefit greatly from more favorable leasing conditions provided in the Agriculture Land Lease Act B.E.2559 (2016). However, foreigners are not allowed to secure land for agricultural purposes. In addition, foreigners are restricted from doing business or invest in the agricultural sector in Thailand. As stated in the Foreign Business Act B.E. 2542 (1999), foreigners are not allowed to work or invest in the following businesses: Farming or gardening, animal husbandry, forestry and processing of wood from natural forests, fishery within the waters in the exclusive economic zone of Thailand, herbal extraction, rice milling and flour production from rice and farm crops, fishery from aquaculture, forestry from forestation.

In terms of water rights, the two authority that administers that the allocation of the water for irrigation are the Electricity Generation Authority of Thailand (EGAT) and the Irrigation Department. The allocation of water is centrally planned by the government based mainly on data provided by these two authorities. At the local level, water is allocated to farmers by the irrigation officers in consultation with the relevant communities.

If there is any dispute concerning the farming or other issues in the agricultural sector, the Court of Justice is the main mechanism for dispute settlement. This includes a compensation for land and property expropriation: the government has to provide a timely, adequate, and effective compensation. People who are not satisfy with the compensation can always submit the case to the Court of Justice or the Administrative Court depending on the nature of the case. However, in the land tenure issue, the Agriculture Land Lease Act B.E.2559 (2016) provides the dispute settlement power to the committee comprising of local officers together with village and community leaders in order to save costs and time of the farmers.

3.5.3.2 Investment Promotion and Facilitation

The main agency that is in charge of investment promotion and facilitation is the Board of Investment of Thailand (BOI). It presently promotes the agricultural and processed food in the following categories:

- Breeding livestock or aquatic animals
- Livestock husbandry or aquatic culture (except shrimp)
- Slaughter / butcher plant
- Quality control, packaging and storage of vegetables, fruits or flowers
- Manufacture of modified starches or starch from plants with special properties
- Production of oil or fat from plants or animals (except soy bean oil)
- Production of extracts from natural raw materials (except medicine, soap, shampoo, toothpaste and cosmetics)
- Primary rubber processing
- Production of food, beverages or food additives or food ingredient using modern technologies (excluding alcoholic beverages)

- Cold storage or refrigerated transport
- Commercial center for agricultural products

The measures applied to promote and facilitate investment in agriculture include various forms of financial support by the state-owned banks, tax exemption and tax reduction. For example, the BOI policies provide tax exemption for 8-15 years depending on the type of investment including other incentives, and the smallholders may benefit from the tax reduction up to the double of the expenses in research and development.

Besides the promotion and facilitation of investment, the government often intervenes in the markets of main agricultural products for the benefits of farmers, in particular rice, maize and tapioca, and agricultural inputs of fertilizer and diesel oil; therefore, these markets in agricultural sector are not really competitive.

To facilitate the implementation of investment policy, the government has established dialogue mechanism with the National Farmers Council, the Federation of Thai Industry, the Thai Chamber of Commerce, and the Thai Banks Association. These organizations could arrange formal and regular investor-state dialogue. The BOI, whose committee consists of the Prime Minister as the chairperson and some other cabinet ministers as the committee's members, can also fulfill any policy advocacy role.

3.5.4 Trading Environment & Policy

3.5.4.1 Trade Policy

In Thailand, there are no administrative, fiscal or regulatory barriers to restrict the movement of agricultural commodities across the country. For the cross-border agricultural trade, the Department of International Trade Promotion (DITP) of the Ministry of Commerce, is the main promoter of agricultural products export. In performing its role, DITP focuses on value-added commodities production, brand creation, innovation, and environmental-friendly production in line with the global trade trends. The agency conducts core activities as: 1) organize Thai trade fair, at home and around the world, providing opportunities to the manufacturers and exporters to promote their products and services; 2) participate in overseas trade fair (over a hundred international trade fairs a year); 3) attend trade exhibitions and shows in emerging or dynamic countries to introduce Thai products and services; 4) B2B e-marketplace through "thaitrade.com", to enable entrepreneurs, especially SMEs, to promote their products and services to potential buyers around the world at a lower cost. Private sector is also a vital force in promoting agricultural trade. Some Thai companies are the world-class agricultural traders, such as the CP group and Thai Rice Exporters Association's members. The combined efforts of the department and private sector are deemed successful, especially with jasmine rice, varieties of Thai fruits and processed food.

Thailand favors free trade policies aiming mainly to expand export. Thailand has entered into bilateral and multilateral free trade agreements with many other countries and favorably enjoyed the increasing market size and access. In terms of the regional agreements, the ASEAN trade agreements with China, India, Japan, Korea, Australia and New Zealand have opened vast export markets for Thai rice, fruits and other agriculture products. Thailand also successfully entered into bilateral trade agreements with China, Japan, Australia, New Zealand, Peru and early-harvest agreement with India. At present about 12-15 more negotiations are underway including Regional Comprehensive Economic Partnership (RCEP) and with Europe Union. Thai traders may choose any channel in these agreements to export and import products.

On the import side, very few of the agriculture products are excluded or have special treatment in these free trade agreements, mostly to protect the benefits of domestic producers. These products are shown in sensitive lists of the agreements, namely coffee beans, copra, potatoes and cut flowers. Nevertheless, all the trade barriers of these products must be brought down to 0-5% range. On the export side, presently very few agri-food products are restricted to export. Sugar is allowed to export only if the domestic demand is satisfied; but by the end of 2017, sugar will be allowed to export freely. The Thai government attempts to abolish all the tariff and non-tariff barriers that may hinder access to agricultural inputs and services. Free trade agreements with many countries facilitate the free import of these agricultural inputs and services.

3.5.4.2 Risk Management

The insurance in the agricultural sector is rare in Thailand, due to the risk-nature of agricultural practice. However, in recent years, there are private and governmental organizations cooperating to provide insurance in the agricultural sector to help the affected farmers from natural disasters. These organizations include the Thailand Insurance Association as the insurer, BAAC for public relation and management, and the Department of Agricultural Extension as registration office for farmers for this insurance scheme.

The government has established measures to support the development of futures markets for agricultural commodity by forming the Agricultural Futures Exchange of Thailand (AFET) that is responsible for Thai agricultural futures exchange and manage the reference price with global market prices as benchmarks. AFET was established under the Agricultural Futures Trading Act, B.E. 2542 (1999) to serve as the center for futures exchange, make regulations and manage the risks of the futures markets by providing market prices and data, as well as other relevant information of the commodity prices. The operation of AFET is directed by the Office of the Agricultural Futures Trading Commission (AFTC), which promotes and develops as well as oversees the agricultural futures markets. The main tasks of the agency are to approve permits for the futures trading business, such as brokers and contract agents, and to address various complaints about the business, as well as to provide data on agricultural commodities traded in the futures market.

The Department of Agricultural Extension also provides collective risk management strategies by registering the farmers for insurance, helping the insured farmers to make the claims for their actual damages; preparing information systems related to insurance and paying claims, and giving early warning of disasters at the county level to assist disaster victims.

As part of risk management instrument, the government is promoting the Zoning System of land use to encourage diversification, as well as more productive practices, market and income sources. The steps of zoning system are: 1) develop an information system of agriculture on geographic map to create diversified zones suitable for crops and livestock, where infrastructure such as irrigation, transportation/logistics processing plants and markets can be invested; 2) develop a database of technical knowledge for the commodities produced in each zone, including the production and marketing costs, the cultivation calendar, the incentives and risks of production and pricing, the supply and demand balance; and 3) develop the database of the human resource of farming in each zone, where the smart farmers can be trained and the suitable smart officers can be assigned to the zones together with proper machines and equipment. Therefore, the Zoning System of land use policy can lower the risks in agricultural production and enhance the effectiveness of Smart Farming policy.

3.5.5 Infrastructure & Financial Development

In the past, the infrastructure policies were not aligned with agricultural investment objectives. However, with the existing 20-Year Strategic Planning, the infrastructure investment priorities of agriculture can be identified and purposively implemented. The responsibilities for infrastructure project design, provision and maintenance are shared on the basis of investment budgets. Mostly the central government is responsible for a higher share of investment costs, whereas the local level authorities are responsible for a lower share. To enhance transparency, there are numerous regulations for the clear guidelines and transparent procedures of the disbursement of public money for agriculture-related infrastructure. Their effectiveness was improved by the stricter coercion of laws. In addition, the government presently attempts to apply more Public-Private Participation (PPP) for large investment projects.

Since under-supply of irrigation and lack of flood control infrastructure and measures is the biggest problem in Thailand, the government has clear strategies for irrigation infrastructure development. The responsibilities for the development, operations and maintenance of such infrastructure are shouldered mostly by the government, whereas there are little requirements for the water users and farmers. To attract private investment in irrigation projects and other agriculture-related infrastructure, it is clearly stated in the strategic plan that PPP is encouraged to attract private sector's funding in irrigation and water management to stimulate economic growth.

Since the agricultural products are the most important commodity of Thailand, the government has developed the logistics systems mainly through road transportation. Only recently, the government starts to invest in railways and waterways for transportation; but the facilities for interlinkage, for example, from trucks to railways, and for appropriate storage are yet to be invested by the private sector. Along with the logistics development, the Department of Alternative Energy Development and Efficiency of the Ministry of Energy is responsible for the strategy to ensure access to reliable and affordable energy supply in rural areas.

In Thailand, the state-owned financial organizations like the Bank for Agriculture and Agricultural Co-operatives (BAAC) are mainly responsible for financial support to both large and small agricultural investors. According to the laws, the collateral of loans can be in the form of property collateral or personnel collateral. Most of formal financial institutions require land as the property collateral for agricultural loans, which prevents the access of credit for agricultural investors. Only the BAAC allows the group of small farmers to form the personnel collateral.

The competition of the formal financial sector in rural areas is very low, the BAAC is the only important institution providing agricultural loans. The financial product offered to small agricultural investors is usually short-term loans for cultivation, whereas the long-term loans can be offered to large investors for other purposes. The access to credit varies by region or investor size. The informal financial sector, including community savings, middlemen and retailers plays vital roles in providing consumer-credit to farmers. The microfinance and leasing still have little progress because of the lack of formal collateral by the farmers. The government takes measures before facilitating the access to credit for agricultural investments, using various methods, such as by suspending loan repayment, reducing interest rates and providing rice mortgage scheme.

3.5.6 Conclusion

Thailand is in transition from agricultural economy to industry and service economy due to following reasons: soil degradation, under-supply of irrigation and lack of flood control, expansion of urbanization, dependency on imported technology and mechanization, the inability of farmers to cope with technology advancement, the aging society that reduces the workforce in agriculture, and the establishment of ASEAN Economic Community in 2015. The 20-Year Strategic Plan 2017-2036 aims to bring the farmers out of poverty trap by turning them into modern and innovation-driven agricultural entrepreneurs or Smart Farmers with good management knowledges and capability to lower production costs and add value to agricultural products through innovation and mechanization. The ultimate goal is to position Thailand as a centre of agriculture and food. The supporting policies include short, medium, and long terms supporting policies that were developed to be executed the 20-Year Strategic Plan 2017-2036. short term policies (1 year) focus on measures to reduce farmers' debt by lowering interest rates. Medium term policies (1-3 years) target mainly on the development of entrepreneurs. Long term policies (3-5 years) deal more with land reform and water system development.

The government policies have mainly emphasized on the establishment of learning and training centres to nurture Smart Farmers, promoting big plot farming to create Smart Enterprises, and to enhance efficiency of public offices to be Smart Offices. As for water rights allocation, the government plans the water rights based mainly on data provided by the Electricity Generation Authority of Thailand (EGAT) and the Irrigation Department. The government also promotes and supports investments in agriculture with tax reductions and exemptions. Only a Thai citizen can secure land tenure. However, foreigners can lease the land for other purposes except for agriculture. The ASEAN Economic Community (AEC) has greatly facilitated the cross-border agricultural trade by reducing regulatory and administrative border procedures. The government attempts to abolish all the tariff and non-tariff barriers that may hinder access to agricultural inputs and services. Free trade agreements have been signed with many countries facilitating the free import of these agricultural inputs and services.

The state-owned Bank for Agriculture and Agricultural Co-operatives (BAAC), is the main responsible for providing financial support to both large and small agricultural investors. Many private and governmental organizations cooperate to provide help for farmers affected by natural disasters. The Thailand Insurance Association is the insurer; the BAAC is the public relations and management centre; and the Department of Agricultural Extension as the farmers' registration office for this insurance scheme. The government also promotes Zoning System of land use to encourage diversification in production and income sources and risk management instrument.

During 2011-2015, Thailand exports were of USD 661 million agriculture machinery annually, with 13% annual growth, and imported USD 1,544 million per year, with an annual decline of 0.6%. In the same period, Thailand exported USD 245 million agriculture machinery parts on average per year, with 14.7% annual growth, and imported USD556 million per year, with 14.1% annual growth. In 2011, Thailand's domestic sales of agriculture machinery and parts was USD 2,104 million, with 3% annual growth. In the same year, Thailand's domestic productions of agriculture machinery parts was USD 1,362 million, with 3% annual growth.

Chapter 4: Summary of Findings, Conclusions and Recommendations

Agricultural mechanisation, considered to be one of the greatest achievements of the 20th Century was only made possible because of technology; technologies that created more value in the practices of agricultural production through more efficient use of labour and speedy operations (Reid, 2011). Agricultural mechanization in agriculture will no doubt be one of the primary drivers of achieving the global total factor productivity towards ensuring food security in the years to come.

In the circumstances of demographic pressure, accelerated urbanization, climate change, constraints of land and water resources, sustainable agricultural mechanization should be pursued by moving from pure technology to a broader context meeting technological, economic, social, environmental and cultural requirements, and offers innovative and economically viable opportunities for growers, consumers, policymakers and many others in the entire food system.

Sustainable agricultural mechanization can ease hard labour, relieve labour shortages, improve productivity, and increase timeliness of agricultural operations, improve the efficiency of use of resources, enhance market access, and help mitigating climate related hazards. Sustainable agricultural mechanization will assist member States in the Asia-Pacific region for achievement of SDGs, particularly SDG 2 (End hunger, achieve food security and improved nutrition, and promote sustainable agriculture).

Trade and Investment are powerful engines for growth and sustainable development. The expansion of trade across the Asia-Pacific in recent years has been a key driver of economic dynamism and rising prosperity[29]. But not all individuals and communities have benefited from the growth, and too many barriers to inclusion remain.

In general, an enabling trade and investment policy environment will:

- Strengthen the role of the private sector and enhance local assembly/manufacturing capacity;
- Increase a country's capacity to access and adopt innovative technologies;
- Increase the availability of affordable financing measures for small farmers to adopt mechanization;
- Increase the capacity to access scientific & technological research and processing techniques for setting up manufacturing appropriate farm machinery;
- Enhance the transfer of technology and know-how to less industrialised countries; and
- Increase the availability of affordable & sustainable agricultural mechanisation across the region via intra trade through zero taxes and tariffs.

A study of this nature therefore, will provide rich insights as to how trade and investment policies have contributed successfully to or even stifled the development of agricultural mechanization, which can be used as a launching pad by the respective member states.

29 ESCAP - Trade and Investment in Innovation, available at: < website at http://www.unescap.org/our-work/trade-investment-innovation>.

4.1 Summary of Findings: Comparative Narration

Of the five countries included in this study, China, India and Thailand have strong and well developed manufacturing bases in agriculture machinery whilst Nepal and Sri Lanka are net importers of agriculture machinery. Across all countries in this study revealed, conducive environment to accelerate agricultural mechanization is crucial, albeit using different approaches.

China, in line with its political ideologies, maintains a strict national policy and regulatory environment, through which agricultural mechanization is promoted. Very well-articulated and documented policies coupled with structured regulations ensure that the policies are implemented and that the desired results could be achieved. In the policy and regulatory framework for agriculture in China, there is direct and specific reference to raise the use of mechanization in agriculture as well as to speed up the process altogether. Thailand also, follows a similar pattern though different, through their 20-year national strategic plan, within which the overall agriculture strategy is executed. Under the Thailand 4.0 policy directives, the country aims to switch from traditional farming to smart farming (modern and innovative driven agricultural entrepreneurs), where new technology, mechanization and management will take precedence. Nepal has undertaken an Agriculture Development Strategy for 20 years to support its vision of being self-reliant, sustainable, competitive and inclusive agriculture sector. The new federal system proposed and ready to be implemented by the Nepal government coupled with the Prime Minister's Agriculture Modernization Project appears to be making a concerted effort in facilitating modernization of agriculture, where sustainable mechanization will play a pivotal role. Both, in the cases of India and Sri Lanka, we do not observe a rigidly structured process as above, yet the respective Governments have laid out their own national policies, which does not hinder the mechanization processes. In India, agricultural mechanization initiatives at the national level are guided by the National Strategy on Agriculture as laid out in Plan XII. India's political ideology of building a strong domestic industry has led to the creation of globally competitive manufacturing bases, including agriculture machinery. Having recognized the need to improve productivity and production, the government of India has promoted the use of mechanization in agriculture more aggressively through specific state agencies. In Sri Lanka, on the other hand, the growth in mechanization of agriculture was initially led by the private sector; while the government supports the private sector's initiatives by reducing barriers to trade. However, in the last decade or so, we have seen concerted efforts by the government to promote sustainable mechanization of agriculture by broad basing the application of machinery across the value chain. The DoA of the Ministry of Agriculture, under the country's 10-year strategy is driving the acceleration of mechanization in agriculture. All five countries have clearly identified the need to face the global challenge of emerging threat of food shortages in the future and thus placed food security as a national priority. This is evident from the observation of the policies designed by the respective countries in this study.

The trading environment of all five countries has also been conducive through reduced tariffs and removal of trade barriers. In China, India and Thailand, where domestic manufacturing takes priority, trade policies promote the free flow of agriculture machinery across national boundaries. This urges for the growth of mechanization in the respective countries as well as in the region. China through ASEAN +1 has created a free flow of agriculture machinery across national boundaries of ASEAN members. Consequently, trade between land locked neighbouring countries is now on the rise. Today, China with its large and competitive manufacturing base, has a surplus in its export values over imports, in agricultural machinery. Thailand is a member of the ASEAN and through this regional cooperation, follows a liberal trade policy, where there are no restrictions to import of machinery. However, by creating large manufacturing bases in the domestic market, China, Thailand and India has minimized the need for imported machinery, except when the relevant technology is not available. The bilateral trade arrangements with neighbouring countries as well as the SAFTA regional cooperation between SAARC member countries which include Sri Lanka, India and Nepal, facilitate the free flow of agriculture machinery across national markets and removes additional tax burdens. India in particular has signed several regional trade agreements, including ASEAN-India and SAARC, which facilitate free trade flow between member states. Sri Lanka was the first country in the region to embrace an open economic policy, way back in 1977. Since then, imports have been liberalized, and there are hardly any barriers to mention of, except in specific instances where it is economically important to the country (eg. Tea). Due to low level of industrialization, Sri Lanka is dependent on imports for its drive in sustainable agricultural mechanization, and has removed duties and taxes to encourage introduction of machinery to the sector. Most of the farm machinery attracted zero duty and is a boon to the farmers, while this situation in fact happened in Nepal too.

The most significant negative factor revealed in the study is the high levy levies and duties on the import of parts and components, which eventually pushes the cost of maintenance of farm

machinery in the hands of the famer. On the positive side, all of the markets under this study reveals that, almost all the agriculture machineries are subject to either zero or marginal level duties and therefore do not act as barriers to trade.

In all five country markets, the development of agricultural mechanization is driven mainly by private sector, albeit ably supported by national policy and strategy. In the case of China and India, substantial support comes from the government by way of development funding; for example, by means of research and development support and export incentives. China, in particular, has made substantial moves by encouraging and supporting their domestic manufacturers to advance their production capabilities to become global players. Through a series of subsidies, fiscal support, tax incentives and financial aid, China has encouraged manufacturers to scale up capacity not only in production but also in technology. The results reflect, with China going global and creating a trade surplus in the agriculture machinery category. India has also emerged as a major global player in farm machinery, with several of its leading manufacturers going global. In the case of Thailand, the major portion of its manufacture is for domestic use, but has begun increasing their exports since of late. For the case of Sri Lanka, the government under its national food security strategy is driving the acceleration of mechanization in agriculture across all sectors. This has been facilitated by a low tariff structure to encourage the import of machinery, and in some instances, zero duty was even introduced. Thailand is enforcing the concept of 'smart farming' whereby agriculture modernization is being encouraged via the use of innovation and mechanization in particular. The national strategy has been systematically phased out into short, medium and long terms initiatives. Government policy has been directed at establishing learning / training centers to nurture "Smart Farmers". In Nepal, the AMPP is one of the primary drivers promoting agricultural mechanization through which they aim to transform subsistence agriculture to commercial farming. Several government-led initiatives have commenced, albeit from dissemination of product/technical information, improving access to finance, capacity building of service providers and amending the necessary regulatory framework to revise the tax structure to support mechanization.

A common theme emerging that we observe is the initiation of Public-Private Partnership (PPP) programmes in all five countries. The respective governments are collaborating with private sector organizations, to transform traditional, subsistence farming to modern agro-businesses. This we observe as a giant step in the right direction, which will not only boost productivity and production but also improve the livelihood of the farmer community. Within this strategic initiative, sustainable mechanization of agriculture stands out as a key component.

The investment climate has been conducive to agriculture in general, including to agricultural mechanization. China follows a "Going Global" and "Bringing-in" in their agriculture investment policy. Investments are encouraged with the objective of transferring technology, know-how to improve the production base and standards of machinery. Generous tax incentives are offered to prospective investors. The China Development Bank has played a leading role by providing investment support to local manufacturers to enhance their production capacities, invest in high-tech technologies and investments in research and development. The China EXIM bank has supported organizations with a range of credit facilities supporting their movement into global markets. The Chinese government has also simplified the application process and speeded up approval process for foreign investment. At the same time, restrictions on foreign investment have been minimized and are encouraging new technology to be brought into the country. Investment in new technologies and manufacturing of fuel-efficient machineries, low noise and low emission diesel engines are encouraged. Thailand investment strategy too is linked to the country's 20-year strategic plan and directed to support their transformation to smart farming. With the aim of building capacity within Thailand, investment strategies are designed in a manner that encourages PPP. Restrictions on agriculture investment are narrowed down to farming, animal husbandry, forestry and timber, rice milling and flour production and the like. The main thrust of the investment policy in Thailand is to promote investment that helps enhance national competitiveness by encouraging R&D, innovation, value creation in the agriculture sector. There is no specific mention of incentives designed to promote foreign investment in agriculture machinery. India also has a transparent process in encouraging investments in to the country. The Reserve Bank of India has also stepped in from time to time to supporting manufacturers to establish their presence in global markets through special credit financing packages. Notably, both, in India and China, one could observe several joint venture partnerships between local manufacturers and leading global players, mostly from USA, Japan & Europe. Thailand too has attracted a few large-scale international machinery manufacturers, to supplement its local industry. Kubota Corporation of Japan, is one of the main investors in Thailand. The size of the market appears to be the point of attraction for such investments. This is reflected by the fact that Sri Lanka and Nepal, though has no restrictions, do not have any international collaboration for manufacture of machinery. There are

few restrictions for foreign investment; the only notable constraint, which is common across all countries, was the acquisition of agriculture land.

One distinctive policy that stands out, both, in China and India, is its decision to provide subsidies to agriculture machinery users. China has a special policy that directs the issuance of subsidies to encourage farmers to adopt mechanization. The total investment made during the last decade to subsidize mechanization adoption has been a staggering US$17.65 billion. India too has a similar practice of providing subsidies to farmers who adopt mechanization. The subsidy scheme is offered through the state governments (provincial level) and the rates applied vary from state to state. The subsidy scheme has been a boon to, both, manufacturers as well as farmers. This practice is not seen in Nepal, Sri Lanka and Thailand. Farmers need to fund their investment in total, and therefore the costs become a deterrent at times on the decision to purchase farm machinery.

The overall infrastructure development appears to be in different stages in each of the economies. China being the more dominant economy and with its substantial capacity to invest, is focusing on agriculture and water conservancy, transportation, electric power facilities, scientific research and agricultural technology promotion. In India, emphasis is on irrigation, and the development of rural infrastructure such as road networks and energy supply. In Sri Lanka, several major projects have been initiated to provide irrigable land particularly in the dry zone. Using its extensive river network, projects have been implemented to divert water through constructing dams to areas that are generally prone to receive limited rainwater. This will facilitate year-round cropping for farmers. In the case of Thailand too irrigation infrastructure development is its priority. Nepal also follows a similar strategy, with priority being given to irrigation development and management. The common objectives of all national governments are to try and facilitate availability of water for cultivation around the year.

The financial sector appears to be well structured and established in all the countries in our study except for Nepal. China, India and Thailand all have in common a dedicated agriculture development bank and a national development bank, which is lacking in Sri Lanka and Nepal. The China Development Bank, the national development finance arm of the government of China is a major boon to manufacturers. Availability of low-cost funds for scaling up production and technological capabilities plus the enhancement of the overall infrastructure, have contributed to the rapid growth of the Chinese agricultural machinery industry. This is true in the Indian context too with the National Bank For Agriculture & Rural Development (NABARD) playing a leading role in this area. Both, India and China today are beginning to compete on a global scale in the sphere of agriculture machinery. The availability of a dedicated agricultural development bank network in China, India and Thailand also facilitate the growth of the industry with availability of low cost funding. In Sri Lanka, it is the licensed commercial banks that facilitate the financing of agriculture projects, which is costly and has an impact on the investment. The financial infrastructure is well developed in Sri Lanka and has facilitated farmers to access financing options with ease to procure their machinery requirements, but comes at a cost. The financial sector in Nepal is yet at an early stage of development and is one of the hindrances to propagating mechanization. The access to formal financial services in the rural areas are limited and this has paved the way for the informal sector to step in, which comes at a cost.

All in all, all five countries under study reflect a common desire to increase food production at national level. The challenges are common too. Increasing urbanization, migration of labour from agriculture to other industries, climate changes, depletion of water resources, are driving the nations to increase productivity through modernization of agriculture. China, drives its initiatives, primarily through a strict national policy supplemented by a regulatory framework; India drives it through its national sub-mission strategy for agriculture; Sri Lanka through its national policy for food security; Thailand through its 20-year strategic plan and Nepal through its 20-year Agriculture Development Strategy and The Prime Minister's Agriculture Modernization Project in specific. Varying in capacity and in offerings, all regimes are striving to maintain a conducive environment for trade and investment in agriculture and mechanization in particular.

4.2 Recommendations

Addressing the issue of food security through sustainable mechanization of agriculture needs to be progressively accelerated by creating an enabling environment. Our study reveals that such a process has begun within the countries under review. Arising from the findings of this study, it is recommended that ReCAMA membership should create an agenda for a wider discussion towards further developing an enabling environment, both in trade and investment, as well as in other peripheral areas such as financing and infrastructure, which will boost the growth of mechanization in the region. A coordinated approach, with each individual country developing its own strategy taking into account different levels

of economic development, national capacities, yet aligned to the common sustainable development goal of ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture. For this purpose the importance and the complimentary roles that the Governments, private sector, facilitators and other stakeholders have to play in unison cannot be understated.

Accordingly, the following broad agenda items are recommended:

- Design platforms to facilitate and enhance access to learning, training and exchange of information for a broad group of stakeholders (including smallholder farmers and other vulnerable communities) on trade and investment of agricultural machinery, both at national and regional levels;

- Undertake advocacy for (i) national policies conducive to sound trade and investment of agricultural machinery in the region including lowering import and export duties and taxes and minimizing other trade barriers; (ii) adopting a participatory approach for formulation of trade and investment policies in relation to agricultural machinery involving all related stakeholders including farmers, manufacturers, traders, channel partners, and other facilitators;

- Promote the harmonization and mutual recognition of regional standards for testing of agricultural machinery, for example, through the 'Asian and Pacific Network for Testing of Agricultural Machinery' (ANTAM) initiative of CSAM;

- Identify measures for, and facilitate, trade and investment in appropriate agricultural machinery suitable for the agro-ecological and socio-economic conditions in the target countries; and

- Support efforts for developing a database on sustainable agricultural mechanization and strengthening related capacities at the national and regional levels that can harmonize the collection, compilation and publication of relevant statistics comparable across countries. This can support the expansion of trade and investment decisions by government and private sector stakeholders.

At present, there are two primary groups that operate under the purview of CSAM; they are the Asian-Pacific Network for Testing of Agricultural Machinery (ANTAM) and the Regional Council of Agricultural Machinery Associations In Asia and the Pacific (ReCAMA) which target the public sector and the private sector, respectively. If we are to promote the use of sustainable agricultural mechanization in our member countries in a more holistic manner, we will need to consider the engagement of few other key stakeholders, especially from the perspectives of Government (for policy initiatives), financial institutions and that too preferably development financing (for low cost funding options), farmer associations (to create awareness of the technology available and its benefits) and research institutions (to develop appropriate and timely sustainable mechanization solutions), to mention the least. We will need to enhance our networking activities, both at international and national levels to promote the exchange of information on all of the key issues that challenge our progress.

Although this study was broadly confined to comparing the trade and investment policies relating to mechanization of agriculture in five selected countries, we need to accept the fact that sustainable mechanization is only one aspect of sustainable agriculture development. Thus the findings of this study and the recommendations made must be seen from this larger perspective. Whilst we will work at an institutional level through CSAM to drive this agenda forward, it is envisaged that the individual member states through their respective associations will take steps to implement one or more of these learnings and recommendations in their own country.

4.3 Conclusion

An enabling business environment is a pre-requisite for the development and expansion of mechanization in agriculture. Creating the right type of environment requires taking into consideration a holistic view and engaging all stakeholders responsible for driving sustainable agriculture mechanization. An enabling environment can be brought about by putting in place a mix of policies that will directly and indirectly affect the growth in sustainable agricultural mechanization. Effective trade policies, with zero or minimal cross border tariffs are important to make available appropriate mechanization of technology to member countries. Both, India and China, the two larger economies in the region offer subsidies to farmers to acquire agricultural machinery. However, this luxury is far from affordable to other ReCAMA member States, considering the small and fragile economies they have. Hence, adverse conditions created by exchange rate mechanisms, weak currency etc can be off-set by a regime of low tariff structures.

The other area of Government influence has to be focused on providing low-cost financing for farmers to invest in machinery.

If subsidised funding is necessary, it has to be designed properly and hence the impact on market mechanism can be minimized. Government can intervene more to provide low cost financing, and structured repayment schemes, so that investment in mechanization becomes feasible and cost-effective in the hands of the farmer.

The question of ownership rights of land does have a major impact on investment in mechanization. Land is widely used as collateral for the provision of credit. Security of tenure or ownership gives farmers the confidence to invest and make long term commitments such as investment in mechanisation. Emphasis should be given to creating conditions whereby it is possible for any person, company, or group of individuals to create and develop a farm business on land where they have sole title, which in turn provides them with a sense of security.

Investment policies must be aligned, both directly and indirectly. Opening up investment for large scale farming, will automatically influence the need for mechanization. When large scale farms come up, the tendency is for smaller farms around it to follow suit, albeit on a lower scale. Yet the cascading effects of mechanization are there, and some of these small farms eventually perform as out-growers to such large farms. Hence, investment policies for investing in large farms along without out-grower networks will definitely boost mechanization. Investment policies designed to attract private enterprises to engage in R&D to design and manufacture machinery with appropriate technology will impact the industry directly. Investment policies must be directed towards building institutional capacity, both in R&D and manufacturing. This coupled with effective cross-border trade policies, will create the necessary scale with expanding market sizes.

Overall, the reforms in agriculture policy have to be introduced to drive productivity growth. There are several success stories reported (Wickrramasinghe, Syed and Siregar, 2012) that supports the need for sound and effective agricultural policies that have created enabling environments. One such success story happened in the Republic of Korea, which changed from landlord-tenant to a self-owning farming system and through that creating a farmland entrepreneur category. Thereafter they had directed public funds to improve rural infrastructure facilities, such as irrigation schemes, R&D capacity, introduction of mechanization, development of technology and various financial schemes, which led to the improvement in agriculture productivity. Yet another case is the transformation of agriculture in Brazil. From a food importing country, Brazil transformed itself into one of the largest food producers and exporters in the world and ranks amongst the five main food producers in the world.[30] The Brazilian agriculture transformation had been executed on a policy founded on science and research. Under the guidance of the Ministry of Agriculture, they had set up research and outreach programmes, which contributed to agriculture transformation through a variety of input developments.

In conclusion, the need for public and private investment in the right direction is critically important to boost productivity in agriculture. Sustainable mechanization is one such important sub element in this process. On a note of positivism, we observe that all five countries in this study, namely China, India, Nepal, Sri Lanka, and Thailand, are all focusing on enhancing food security and focusing on modernization of agricultural practices, at a national level. Thus, there exists an opportunity for member countries of ReCAMA to compare each other's progress and share lessons learnt with an objective to accelerate the process and overcoming specific challenges.

30 FAO Statistics, available at: <http://faostat.fao.org>.

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