Kingdom of Cambodia

National Religion King

Ministry of Agriculture, Forestry and Fisheries

Strategic Development Plan for Cambodian Agro-industries 2019-2030

Phnom Penh, February 2020

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Preface

Cambodia has changed and developed very significantly since she embarked upon her free market economy project in the 1990s. In her historical journey, agricultural sector plays a very fundamental role for her existence and in her economic development by providing the nation with food and nutrition, generating employment, gaining foreign exchange earnings, and supporting the development of industrial and service sectors.

Until 20 years ago, one of the most pressing developmental issues for Cambodia was food security; and thus the agricultural sector was deeply focused on food production, which means the production of rice, the staple food for Cambodians. Now, Cambodia has entered a new era with a broadening perspective and a long-term vision set forth by the Royal Government of Cambodia (RGC) that aims to uplift the country status to the upper-middle income class by 2030 based on sustainable, inclusive, and resilient economic development and growth taking full advantage of the industrial revolution 4.0 (IR4.0).

In order to contribute to the achievement of this vision, the agricultural sector will have to be diversified driven by dynamic, revolutionized and innovative value-addition activities and technologies. This calls for the promotion and acceleration of the development of agribusinesses, otherwise known as agro-industries. This **Strategic Development Plan for Cambodian Agro-Industries 2019-2030** is specifically a response to this call. This document is the product resulting from support and contribution from and a series of consultations with key concerned stakeholders, including RGC's institutions, private sector, development partners and NGOs, and farmer organizations. The **Strategic Development Plan for Cambodian Agro-Industries 2019-2030**, therefore, will be a solid basis for implementation that contributes to the achievement of the RGC's **Cambodia Industrial Development Policy 2015-2025**.

On behalf of the Ministry of Agriculture, Forestry and Fisheries, I strong believe that all relevant departments and agencies will actively participate in the implementation of activities that have been set out; and that international community will continue to provide both technical and financial assistances to support the implementation process of this strategy to ensure a successful achievement, effectively as planned and as expected.

Phnom Penh, {insert date}

Ministry of Agriculture, Forestry and Fisheries

H.E. Veng Sakhon
Minister

1. Introduction

1.1. Cambodian AI

Agro-industry has been part of Cambodian economy (Annex 1). By the end of the 1960's agro-industries comprised 76% of 3,728 industries in the country. Agro-industry development was, however, disrupted by the civil war during the 1970's and the 1980's. The sector slowly recovered afterward. By 2005, 45,894 agribusinesses were recorded, but 91% of them were small employing less than five employees and having a capital outlay of less than US$1,000.

In contemporary Cambodia, statistics on agro-industries is hard to find. The Economic Census of Cambodia (2011) recorded 505,134 establishments, including the ones involved in processing agricultural raw materials. Nevertheless, it is difficult to say how many of them were involved in agro-businesses. Based on provincial agro-industry profiles compiled by PDAFFs, Cambodia currently has at least 3,234 operational agribusinesses[1]. Very few of them are large ones; and an overwhelming majority is rice mills (78%).

The Royal Government of Cambodia (RGC), in 2015, adopted the very first Industrial Development Policy that promotes, *inter alia*, the development of Cambodian agro-industries. It sets forth specific policy measures and target for the development of the Cambodian agro-industrial sector. The target set for the agro-industry development is *"increased share of export of processed agricultural products (including new processed agricultural products) to 12% in total export volume by 2025* starting from 7.9% in 2013. Annual target is 8% in 2018, 10% in 2020 and 12% in 2025. More than one year of the IDP 2015 implementation, it was reported that the export of processed agricultural products comprised only 4.6% of total export in 2016. This falls short of the RGC's target.

1.2. Challenges

The RGC and her line institutions have worked very hard and done everything in their capacity with resources they have to improve Cambodia's competitiveness in order to make "doing business" easier and improve logistics in the country to attract investments and facilitate the development of industrial sector, including agro-industries following the endorsement of the **IDP 2015**. But in the meantime, other countries around the world and in the region including Cambodia's neighbors (specifically, Vietnam and Thailand) are also working tirelessly to do the same in order to improve competitiveness of their countries. Cambodia competitiveness environment remains behind them (Annex 1).

As a consequence, Cambodia continues to trail behind them in competitiveness; and thus in attracting foreign direct investments for industry development. This means Cambodian raw materials generated by its agricultural sector continue to flow straight to their agro-processing factories unless they do not have

[1] This statistic was reported by 13 provinces only. The non-reporting provinces include Phnom Penh, Kampong Cham, Kandal, Svay Rieng, Kampong Thom, Kampong Speu, Kampong Chhnang, Kratie, Stung Treng, Banteay Meanchey, Sihanoukville and Koh Kong.

any demand. The IDP's target, therefore, seems not realized even a lot of effort has been put into implementing it. Consequently, a new strategy might be required to drastically change as to how the business as usual culture needs to be reformed and make change as a culture in order to stay on the edge of competitiveness.

1.3. Opportunities

While challenges continue to be present, a golden opportunity for Cambodian agro-industrial sector development remains. Cambodian agriculture produces a great deal of agro-industrial raw materials such as paddy rice, cassava, cashew, rubber and mango are exported most often in raw forms. However, with exception of rubber estates, the agricultural production is mainly done by unorganized smallholder farming households with limited applications of improved practices and technologies. Supply chain management is highly disorganized.

IDP's measures (including, just to name a few, granting of tax holidays to investors, creation of special economic zones, low electricity rate for night operation, and building of new airport and deep sea port) are favorable for promoting agro-industry development. The realization of the IDP will help address the pressing BEE issues. As long as the RGC is committed to addressing, in a dramatic and revolutionary fashion, the bottlenecks to competitiveness environment, the agroindustry sector will be able to establish its foot, take its root and unleash its potential. The RGC's commitment points to this direction with recent decision to remove Camcontrol from border's checkpoints; Kamsab from sea shipping points; and requirement for certificate of origin; the promulgation of a sub-decree on tax incentives for SMEs; and the creation of an SME bank. The building of the express way connecting Phnom Penh to Sihanoukville will help cut further the logistic costs for export.

In order to take this advantage, and continue the momentum forward, a strategic plan is required. The strategic plan can guide the development process taking into account existing institutional framework. Also, the strategic plan has to make Cambodian agro-industry competitive and market-driven that will arrest and reverse the flow of agricultural raw materials (including, fresh or semi-processed products of cassava, cashew, rubber, mango, corn, paddy rice, beef cattle) that have so far been shipped to the neighboring countries. As long as the Cambodian agro-industrial sector is competitive the agricultural raw materials will not flow out of the country to its neighbors unless its demand is saturated.

2. Strategic Plan Formulation Principles and Process

2.1. Principle

The present strategic plan is aimed to support the mission of the RGC as well as MAFF. It is, therefore, fully aligned with the RGC's vision and long-term goals. Specifically, it is aligned with:

(i) the RGC/IDP's vision,
(ii) the agricultural development vision, and
(iii) the Cambodia's long-term vision.

The formulation of the strategic plan is based on (i) existing policies and strategies, to name a few, the Rectangular Strategy IV, the Industrial Development Plan, the Policy Paper on the Promotion of Paddy Rice Production and Milled Rice Export, the draft Agricultural Sector Master Plan, the Master Plan on the Promotion of Agricultural Investment in Cambodia; and (ii) evidences obtained from secondary sources, including the Economic Census of Cambodia, the Census of Agriculture, Agriculture and Agro-Processing Sector in Cambodia, etc., and generated from provincial agro-industry profiles compiled and studied by Agro-Industry Offices (AIO) of the Provincial Departments of Agriculture, Forestry and Fisheries (PDAFFs).

2.2. Process

The strategic plan was formulated with the use of participatory process whereby stakeholders – RGC's agencies, development partners, private sector, and representatives of farmers and cooperatives – were consulted and involved. Interactions with various stakeholders were made during the process of gathering information and data for preparing the provincial agro-industry profiles. At least two consultative stakeholder workshops, in addition to intra MAFF forums, were organized to collect their views and feedback. The strategic plan was also shared with and presented to members of the TWGAW.

The strategic plan is composed of: (i) strategic direction; (ii) sector strategies; (iii) strategic actions; (iv) financing framework; (v) implementation arrangement; (vi) risks and risk management; (vii) M&E framework; and (vii) conclusions.

This is the long-term strategic development plan for Cambodian agro-industries for the period 2019-2030. It is called in short, and hereinafter referred to as the **Strategic Plan**.

3. Strategic Direction

3.1. Vision

Cambodia will have a modern agro-industrial sector that shall be competitive, inclusive, resilient, and sustainable by 2030. This vision will be realized in three stages: (i) improvement and modernization stage from 2019 to 2022; (ii) diversification and transformation stage from 2023 to 2026; and (iii) reinvention and innovation stage from 2027 to 2030.

Moving from Stage 1 to Stage 2 the agro-industrial sector of Cambodia will take a continuous incremental change path. From Stage 2 to Stage 3, passing through a short transitional period between the two stages, it will take a discontinuous change.

3.2. Mission

The very mission of the **Strategic Plan** is to provide a framework that supports the development and advancement of Cambodia's agro-industrial sector. The mission will be led partly, coordinated and supported by the Ministry of Agriculture, Forestry and Fisheries (MAFF) with its Department of Agro-Industry (DAI) as its executing arm.

3.3. Goal

The important goal of the **Strategic Plan** is to increase share of export of processed agricultural products (including new processed agricultural products) to 15% in total export volume by 2030. Over the medium term, i.e. by 2025, the goal is to achieve such an increase in share to 12%[2].

The goal of the **Strategic Plan** is well aligned with the RGC's IDP 2015. Most importantly, the achievement of this goal will contribute to the RGC's long-term goal for Cambodia, which is to make Cambodia an upper middle-income economy by 2030 (and a high-income country by 2050).

4. Sector Strategies

4.1. Scope

Agro-industry has a very broad definition covering post-harvest activities in the agricultural sector to agricultural-produce-based intermediate input processing to food processing to agribusinesses (Appendix 1 of Annex 1**)**. This broad definition of agro-industry means that jurisdictions over and responsibilities for the development of the agro-industrial sector can be under many public institutions. This in fact complicates the promotion and development of the sector *per se* as coordination among the public institutions is required, not impossible, but time and resource consuming.

Mindful of the complicated nature of the coordination and the RGC's aim to promote and accelerate the agro-industry development and upgrade Cambodian economy over the medium and long terms, the **Strategic Plan** is aimed to cover agribusinesses as per the FAO's definition (Appendix 1 of Annex 1). Even with this limitation, strong and outward institutional leadership on the part of MAFF/DAI, if authorized, in the implementation and coordination will be a must.

Despite its limitation, the **Strategic Plan**'s realization hinges on the assumptions that Cambodia's competitiveness supporting the agro-industrial sector development is addressed by and dealt with through the implementation of the IDP 2015 and other relevant policies of the RGC and her line institutions (MEF, MRD, MoWRAM, MoC, MPTC, MPWT, MME, MIH, MoWA, CDC, to name a few).

Although the **Strategic Plan** is designed and intended as the long-term strategic plan, everything, including its objectives, and actions, are not cast in stone. The **Strategic Plan** has to be considered as a living strategy paper of the RGC, and especially MAFF. This suggests that the **Strategic Plan** needs to be regularly updated as time goes by and when lessons learned from its implementation through regular monitoring and implementation are available in order to keep it abreast with national agenda, and regional and global development and trend.

[2] This is the RGC/IDP's target.

4.2. Strategic Objectives

Strategic objectives of the **Strategic Plan** is well aligned with the RGC's and MAFF's medium and long-term goals and strategies. Nevertheless, given its focused nature, the **Strategic Plan**'s strategic objectives are:

1. To promote processing of market-demanded, safe and quality agricultural products; and
2. To create quality and inclusive rural employment in Cambodia.

4.3. Strategic Actions

The **Strategic Plan** is designed for the duration of 12 years from 2019 to 2030. Over this long-term period its implementation is divided into three stages. Each stage contains four years. The three stages are:

1. **Stage 1 (S1):** Agro-industry Improvement and Modernization Stage 2019-2022 (the AI Strengthening Phase);
2. **Stage 2 (S2):** Agro-industry Diversification and Transformation Stage 2023-2026 (the AI Transformation Phase); and
3. **Stage 3 (S3):** Agro-industry Reinvention and Innovation Stage 2027-2030 (the AI Cutting-edge Phase).

From **Stage 1** to **Stage 2** the agro-industrial sector of Cambodia will develop on a continuous incremental change pathway. As its foundation becomes consolidated, it will take a discontinuous change passing through a transitional period between **Stage 2** and **Stage 3** before it will proceed with a continuous incremental development again. During each phase there are programs, sub-programs, projects and strategic activities that will be executed.

However, as indicated earlier, since the **Strategic Plan** is not cast in stone the programs, sub-programs, projects and activities will be changed. This relates to all the stages as time goes. Nevertheless, the changes and adjustments are more obvious and will be needed for **Stage 2** and **Stage 3**. The changes have to be adopted in order that the Cambodian agro-industrial sector can adapt, reinvent itself and stay on the competitive edge.

4.3.1. Stage 1: AI Strengthening Phase

At this stage the **Strategic Plan** will promote economies of scale of agro-industries that have potential for commercialization, and provide quality employment in the countryside of Cambodia where agricultural production is based. The internal and external economies of scale will be realized during this stage by optimizing – enhancing, strengthening and modernizing – existing agribusinesses that produce products potential for (i) export,[3] and (ii) import substitution.

[3] Export is the dominant criterion as regards the RGC/IDP's target. The export strategy to meet the RGC/IDP's target should be focused on Cambodia's niche and potential products. These could include, to name a few, aromatic rice, organic-aromatic rice, and products processed from cassava, cashew, mango, vegetables, longan, yellow banana, soy bean, groundnut, poultry, and sea fruits.

Stage 1 will span between 2019 and 2022. It has three programs, which are divided into 7 sub-programs. Budget needed for **Stage 1** is estimated to be, at least, US$11.85 million.

S1-Program 1: Capacity and Institutional Development and Strengthening Program

S1-Program 1 is aimed *at (i) building and strengthening capacity of stakeholders in food safety and quality standards; and (ii) developing and strengthening legal/policy framework and existing institutions and services*. The program will require a budget of US$2.1 million for five projects under two sub-programs (Table 1).

Table 1: S1-Program 1's project budget (US$000)

ID	Description	2019	2020	2021	2022	Total
1	Capacity and Institutional Development and Strengthening Program	541.0	556.0	556.0	441.0	2,094.0
1.1	Capacity Building and Development Sub-program	60.0	260.0	210.0	210.0	740.0
1.1.1	Food quality and safety standards management capacity building and development project	30.0	180.0	130.0	130.0	470.0
1.1.2	Food safety and quality standards analysis and control skills development project	30.0	80.0	80.0	80.0	270.0
1.2	Institutional Development and Strengthening Sub-program	481.0	296.0	346.0	231.0	1,354.0
1.2.1	Legal and policy framework development and organizational strengthening project	39.0	64.0	119.0	69.0	291.0
1.2.2	DAI institutional strengthening project	122.0	142.0	127.0	122.0	513.0
1.2.3	Laboratory development project	320.0	90.0	100.0	40.0	550.0

S1-Program 2: Knowledge Management and Technology Transfer Program

Objectives of **S1-Program 2** are *to (i) build, share and transfer knowledge; and (ii) transfer relevant applicable AI technologies*. The program consists of two sub-programs with two project each. The budget needed to execute the program is estimated to be US$1.16 million (Table 2).

Table 2: S1-Program 2's project budget (US$000)

ID	Description	2019	2020	2021	2022	Total
2	Knowledge Management and Technology Transfer Program	123.0	416.0	359.0	259.0	1,157.0
2.1	Knowledge Management and Transfer Sub-program	83.0	206.0	149.0	149.0	587.0
2.1.1	Agroindustry database development and management project	53.0	171.0	124.0	124.0	472.0
2.1.2	Contract farming knowledge transfer project (Annex 2)	30.0	35.0	25.0	25.0	115.0
2.2	Applied Research and Technology Transfer Sub-program	40.0	210.0	210.0	110.0	570.0
2.2.1	AI applied research project	25.0	165.0	165.0	65.0	420.0
2.2.2	AI technology development and transfer project	15.0	45.0	45.0	45.0	150.0

S1-Program 3: Agro-product and Trade Development Program

S1-Program 3 comprises 7 projects in three sub-programs (Table 3). Total budget estimated for the program is US$9.45 million. The program is intended *to (i) ensure quality of agro-products that are currently produced; (ii) create new, competitive agro-products with market potential; (iii) establish agribusiness incubator to promote and grow promising agro-industry start-ups; and (iv) stimulate development of competitive agro-industries through agro-industry cluster development promotion*.

Table 3: Program 3's project budget (US$000)

ID	Description	2019	2020	2021	2022	Total
3	Agro-product and Trade Development Program	913.6	3,188.6	2,749.6	2,599.6	9,451.4
3.1	Agro-industry Product Development Sub-program	440.6	590.6	660.6	580.6	2,272.4
3.1.1	Product improvement and quality assurance project (Annex 3)	225.0	275.0	335.0	255.0	1,090.0
3.1.2	New product development project	215.6	315.6	325.6	325.6	1,182.4

ID	Description	2019	2020	2021	2022	Total
3.2	Agro-industry Cluster Development Sub-program (Annex 4)	415.0	2,390.0	1,806.0	1,756.0	5,367.0
3.2.1	North-western agro-industry cluster development project	182.5	210.0	128.0	128.0	648.5
3.2.2	Eastern agro-industry cluster development project	182.5	210.0	128.0	128.0	648.5
3.2.3	Agri-business incubator development project (Annex 5)	50.0	1,970.0	1,550.0	1,500.0	5,070.0
3.3	Agro-Industry Trade Development Sub-program	58.0	208.0	283.0	263.0	812.0
3.3.1	National market development project	25.0	70.0	120.0	100.0	315.0
3.3.2	International market development project	33.0	138.0	163.0	163.0	497.0

4.3.2. Stage 2: AI Transformation Phase

Toward the end of **Stage 1** most existing agro-industries should be well-organized and mature with efforts and activities undertaken under all the three programs. Although, at the end of **Stage 1**, certain agro-industry firms may not be effective and efficient or may not achieve internal economies of scale due to various good reasons (for example, size, poor management and lacking business strategy, attachment to outdated AI technologies), the agro-industry sector overall should be able to attain external economies of size.

Moving to **Stage 2**, the ineffective and inefficient agro-industry firms may continue their operations and strive to achieve their [internal] economies of size, while the agro-industry sector *per se* will consolidate and maximize its [external] economies of scale; diversify further its products and markets; and transform its technological foundation. During **Stage 2**, the sector will be prepared for transitioning to an **AI** phase in which sector management processes, technologies, and products become more advanced and innovative. More employment will be added, but such employment will be for better skilled and knowledgeable workforce. It is assumed that the education and vocational sectors were able to prepare Cambodian workforce for such a development.

Stage 2 will take place from 2023 to 2026. Total budget required for this stage is estimated at about US$12.2 million. **Stage 2**, like **Stage 1**, has three programs. All together it has 7 sub-programs.

S2-Program 1: Capacity and Institutional Strengthening Program

S2-Program 1 with its two sub-programs has five projects (Table 4). Total budget needed for **S2-Program 1** is estimated at US$2.38 million. **S2-Program 1** is aimed *to strengthen and consolidate capacity, skills, and institutions* already built, and developed for the sector during **Stage 1**.

Table 4: S2-Program 1's project budget (US$000)

ID	Description	2023	2024	2025	2026	Total
1	Capacity and Institutional Strengthening Program	766.0	511.0	556.0	551.0	2,384.0
1.1	Capacity Consolidation Sub-program	210.0	210.0	210.0	210.0	840.0
1.1.1	GMP, GHP and HACCP skills and food quality and safety standards strengthening project	130.0	130.0	130.0	130.0	520.0
1.1.2	Strengthening skills in food safety and quality standards, and food quality analysis and control project	80.0	80.0	80.0	80.0	320.0
1.2	Institutional Strengthening Sub-program	556.0	301.0	346.0	341.0	1,544.0
1.2.1	Legal and policy framework and institutional consolidation project	29.0	29.0	29.0	29.0	96.0
1.2.2	DAI functional strengthening project	127.0	122.0	127.0	122.0	498.0
1.2.3	Laboratory operation strengthening project	400.0	150.0	200.0	200.0	950.0

S2-Program 2: Technology Development and Knowledge Management Program

S2-Program 2's objectives include *(i) strengthening sector knowledge and intelligence, and assuring quality of such knowledge and intelligence; and (ii) developing new technologies for the sector, and promoting their commercialization*. **S2-Program 2** contains two sub-programs with four projects, all together. The program requires a budget of at least US$1.04 million (Table 5).

Table 5: S2-Program 2's project budget (US$000)

ID	Description	2023	2024	2025	2026	Total
2	Technology Development and Knowledge Management Program	259.0	254.0	264.0	264.0	1,041.0
2.1	Knowledge Management Strengthening Sub-program	149.0	154.0	149.0	149.0	601.0
2.1.1	Agroindustry database management strengthening project	124.0	124.0	124.0	124.0	496.0
2.1.2	Contract farming knowledge transfer project	25.0	30.0	25.0	25.0	105.0
2.2	Technology Development and Transfer Sub-program	110.0	100.0	115.0	115.0	440.0
2.2.1	Agro-industry technology commercialization project	65.0	65.0	65.0	65.0	260.0
2.2.2	Agro-industry technology development and transfer project	45.0	35.0	50.0	50.0	180.0

S2-Program 3: Agro-product Development and Trade Expansion Program

Aims of **S2-Program 3** are to *(i) strengthen and consolidate the results and achievements of the preceding program in the previous stage; and (ii) diversify (products and markets) and expand coverage (in terms of target agro-industry regions and markets)*. The program has three sub-programs. All together, the program has 8 projects. It is budgeted at approximately US$ 8.74 million (Table 6).

Table 6: S2-Program 3's project budget (US$000)

ID	Description	2023	2024	2025	2026	Total
3	Agro-industry Product Development and Trade Expansion Program	2,862.1	2,289.0	2,157.0	2,077.0	9,385.1
3.1	Agro-industry Product Development Sub-program	640.6	495.0	535.0	475.0	2,145.6
3.1.1	Product quality assurance project	315.0	275.0	315.0	255.0	1,160.0
3.1.2	New product development project	325.6	220.0	220.0	220.0	985.6
3.2	Agro-industry Cluster Consolidation and Scaling-Up Sub-program	1,938.5	1,516.0	1,334.0	1,334.0	6,142.5
3.2.1	North-western agro-industry cluster consolidation project	128.0	128.0	108.0	108.0	472.0
3.2.2	Eastern agro-industry cluster consolidation project	128.0	128.0	108.0	108.0	472.0
3.2.3	Agri-business incubator consolidation project	1,500.0	1,050.0	1,000.0	1,000.0	4,550.0
3.2.3	Southern agro-industry cluster development project	182.5	210.0	128.0	128.0	648.5
3.3	Agro-Industry Trade Consolidation and Expansion Sub-program	283.0	278.0	278.0	258.0	1,097.0
3.3.1	National market consolidation and expansion project	120.0	120.0	120.0	100.0	460.0
3.3.2	International market consolidation and expansion project	163.0	158.0	158.0	158.0	637.0

4.3.3. Stage 3: AI Cutting-edge Phase

At the completion of **Stage 2**, the AI sector has reached an advanced stage and are readied to move into a more highly sophisticated stage. At this more highly sophisticated stage, i.e., **Stage 3**, the AI sector will be capable of exploiting digital, artificial intelligence and block-chain technologies in a significant way, and marginal costs of individual industry and of the sector as a whole will gradually tend toward zero.

At this stage, therefore, the sector will be more skill-, knowledge- and technology-based. The individual industry and the sector will become highly efficient and smart and generate much more value per resource used than the preceding stages. The AI sector at this stage will continue to create additional employment; however, such employment will demand higher technological knowledge and skills – the skills for creativity and innovation.

In order to support this phase, therefore, the RGC will *(i) put in place a program that will develop English and digital literacy for new / future generations in order to support the sector; and (ii) strengthen and expand social protection program to support the un-adaptive and aging workforce that will not be able to catch up with accelerated technological advancement.*

Stage 3 will span from 2027 to 2030 and will require a budget of US$12.42 million. Like **Stage 1** and **Stage 2**, **Stage 3** comprises three programs. It comprises 7 sub-programs.

S3-Program 1: Capacity and Institutional Innovation Program

S3-Program 1 is aimed to *(i) instill creative and innovative skills and build talents in the AI sector; and (ii) promote and develop innovative institutions*. The program comprises two sub-programs. It consists of five projects and is budgeted at over US$ 2.24 million (Table 7).

Table 7: S3-Program 1's project budget (US$000)

ID	Description	2027	2028	2029	2030	Total
1	Capacity and Institutional Innovation Program	791.0	486.0	491.0	476.0	2,244.0
1.1	Creative and Innovative Skills and Talent Development Sub-program	325.0	225.0	225.0	225.0	1,000.0
1.1.1	GMP, GHP, HACCP and food quality and safety standards innovative skills and talent development project	205.0	130.0	130.0	130.0	595.0
1.1.2	Innovative skills and talent development in food quality analysis and control project	120.0.	95.0	95.0	95.0	405.0
1.2	Institutional Reinvention and Innovation Sub-program	466.0	261.0	266.0	251.0	1,244.0
1.2.1	Innovative legal and policy framework development project	84.0	84.0	84.0	84.0	336.0
1.2.2	DAI reinvention project	167.0	162.0	157.0	152.0	638.0
1.2.3	Laboratory service decentralization and privatization project	215.0	15.0	25.0	15.0	270.0

S3-Program 2: Technology Innovation and Knowledge Management Program

Objectives of **S3-Program 2** are to *(i) facilitate and promote the application of latest management processes, and techniques and technologies that relate to the AI sector; and (ii) facilitate the development and use of digital, artificial and block-chain technologies that support the AI sector advancement*. **S3-Program 2** consists of two sub-programs with four projects. Its budget is estimated at US$1.31 million (Table 8).

Table 8: S3-Program 2's project budget (US$000)

ID	Description	2027	2028	2029	2030	Total
2	Innovative Technology and Knowledge Management Program	369.0	313.0	313.0	313.0	1,308.0
2.1	Basic Research and Technology Transfer Sub-program	204.0	148.0	148.0	148.0	648.0
2.1.1	Agroindustry database management strengthening project	124.0	124.0	124.0	124.0	496.0
2.1.2	Digital contract farming platform development and application project	80.0	24.0	24.0	24.0	152.0
2.2	Applied Research and Technology Transfer Sub-program	165.0	165.0	165.0	165.0	660.0
2.2.1	Agro-industry technology commercialization project	80.0	80.0	80.0	80.0	320.0
2.2.2	AI innovative process and technology development and transfer project	85.0	85.0	85.0	85.0	340.0

S3-Program 3: Agro-industry Product and Trade Innovation Program

S3-Program 3 comprises three sub-programs with 8 projects. The program will need about US$8.87 million (Table 9), which is aimed to *(i) create more varieties of innovative, high quality processed agricultural products; and (ii) with continued expansion of both national and international market coverage, ensure efficient and effective delivery of supplies of processed agricultural products*.

Table 9: S3-Program 3's project budget (US$000)

ID	Description	2027	2028	2029	2030	Total
3	Agro-industry Product and Trade Innovation Program	2,392.0	2,142.0	2,182.0	2,152.0	8,868.0
3.1	Innovative Agro-industry Product Development Sub-program	580.0	540.0	580.0	520.0	2,220.0
3.1.1	AI product quality assurance project	315.0	275.0	315.0	255.0	1,160.0
3.1.2	Innovative AI product development project	265.0	265.0	265.0	265.0	1,060.0
3.2	Agro-industry Cluster Reinvention Sub-program	1,434.0	1,324.0	1,324.0	1,374.0	5,456.0
3.2.1	North-western agro-industry cluster reinvention project	108.0	108.0	108.0	108.0	432.0
3.2.2	Eastern agro-industry cluster reinvention project	108.0	108.0	108.0	108.0	432.0
3.2.3	Agri-business incubator reinvention	1,110.0	1,000.0	1,000.0	1,050.0	4,160.0
3.2.4	Southern agro-industry cluster reinvention project	108.0	108.0	108.0	108.0	432.0
3.3	Agro-Industry Trade Innovation Sub-program	378.0	278.0	278.0	258.0	1,192.0
3.3.1	National market innovation and reinvention project	120.0	120.0	120.0	100.0	460.0
3.3.2	International market innovation and reinvention	258.0	158.0	158.0	158.0	732.0

Summing up, the **Strategic Plan**, divided into three phases, will cost the RGC US$37.93 million over twelve year period from 2019 to 2030 (Table 10). This amount of budget will be invested in 50 projects. All of the projects are indicative and might be changed during the course of the **Strategic Plan**'s implementation.

Table 10: Strategic Plan's projects 2019-2030

Strategic Development Plan for Cambodian Agro-Industries 2019-2030					
Motto: Creating Markets for Cambodia's Competitively Processed Agricultural Products					
TOTAL (STRATEGIC PLAN)	$ 37,932,504.00				
Stage / Program / Sub-program / Project	**Budget, US$**	**Stage / Program / Sub-program / Project**	**Budget, US$**	**Stage / Program / Sub-program / Project**	**Budget, US$**
Stage 1: Agro-industry Improvement and Modernisation (AI Strengthening Phase) [2019-2022]	**12,702,400.0**	**Stage 2: Agro-industry Diversification and Transformation (AI Transition Phase [to AI4.0]) [2023-2026]**	**12,810,104.0**	**Stage 3: Agro-Industry Reinvention and Innovation (AI4.0 Phase) [2027-2030]**	**12,420,000.0**
1. Capacity and Institutional Development and Strengthening Program	**2,094,000.0**	**1. Capacity and Institutional Strengthening Program**	**2,384,004.0**	**1. Capacity and Institutional Innovation Program**	**2,244,000.0**
1.1. Sub-program: Capacity Building and Development	**740,000.0**	**1.1. Sub-program: Capacity Consolidation**	**840,000.0**	**1.1. Sub-program: Creative and Innovative Skills and Talent Development**	**1,000,000.0**
1.1.1 Project: Capacity building in GMP, GHP and food quality and safety standards	470,000.0	1.1.1 Project: GMP and GHP skills and food quality and safety standards strengthening	520,000.0	1.1.1 Project: GMP, GHP and food quality and safety standards innovative skills and talent development	595,000.0
1.1.2. Project: Building skills in food safety and quality standards, and food quality analysis and control	270,000.0	1.1.2. Project: Strengthening skills in food safety and quality standards, and food quality analysis and control	320,000.0	1.1.2. Project: Innovative skills and talent development in food quality analysis and control	405,000.0
1.2. Sub-program: Institutional Development and Strengthening	**1,354,000.0**	**1.2. Sub-program: Institutional Strengthening**	**1,544,004.0**	**1.2. Sub-program: Institutional Reinvention and Innovation**	**1,244,000.0**
1.2.1 Project: Legal and policy framework development and organizational strengthening	291,000.0	1.2.1 Project: Legal and policy framework and institutional consolidation	96,000.0	1.2.1. Project: Innovative legal and policy framework development	336,000.0
1.2.2. Project: DAI institutional strengthening	513,000.0	1.2.2. Project: DAI functional strengthening	498,000.0	1.2.2. Project: DAI reinvention	638,000.0
1.2.3. Project: Laboratory development	550,000.0	1.2.3. Project: Laboratory operation strengthening	950,004.0	1.2.3. Project: Laboratory service decentralization and privatization	270,000.0
2. Knowledge Management and Technology Transfer Program	**1,157,000.0**	**2. Technology Development and Knowledge Management Program**	**1,041,000.0**	**2. Innovative Technology and Knowledge Management Program**	**1,308,000.0**
2.1. Sub-program: Knowledge Management and Transfer	**587,000.0**	**2.1. Sub-program: Knowledge Management Strengthening**	**601,000.0**	**2.1. Sub-program: Basic Research and Technology Transfer**	**648,000.0**
2.1.1 Project: Agroindustry database development and management	472,000.0	2.1.1 Project: Agroindustry database management strengthening	496,000.0	2.1.1 Project: Agroindustry database management strengthening	496,000.0
2.1.2. Project: Contract farming knowledge transfer	115,000.0	2.1.2. Project: Contract farming knowledge transfer	105,000.0	2.1.2. Project: Digital contract farming platform development and application	152,000.0
2.2. Sub-program: Applied Research and Technology Transfer	**570,000.0**	**2.2. Sub-program: Technology Development and Transfer Transfer**	**440,000.0**	**2.2. Sub-program: Applied Research and Technology Transfer**	**660,000.0**
2.2.1 Project: AI applied researches (incl. demonstrations)	420,000.0	2.2.1 Project: Agro-industry technology commercialization	260,000.0	2.2.1 Project: Agro-industry technology commercialization	320,000.0
2.2.2. Project: AI technology development and transfer	150,000.0	2.2.2. Project: AI technology development and transfer	180,000.0	2.2.2. Project: AI innovative process and technology development and transfer	340,000.0
3. Agro-industry Product and Trade Development Program	**9,451,400.0**	**3. Agro-industry Product Development and Trade Expansion Program**	**9,385,100.0**	**3. Agro-industry Product and Trade Innovation Program**	**8,868,000.0**
3.1. Sub-program: Agro-industry Product Development	**2,272,400.0**	**3.1. Sub-program: Agro-industry Product Development**	**2,145,600.0**	**3.1. Sub-program: Innovative Agro-industry Product Development**	**2,220,000.0**
3.1.1 Project: Product improvement and quality assurance	1,090,000.0	3.1.1 Projec: Product quality assurance	1,160,000.0	3.1.1. Projec: AI product quality assurance	1,160,000.0
3.1.2. Project: New product development	1,182,400.0	3.1.2. Project: New product development	985,600.0	3.1.2. Project: Innovative AI product development	1,060,000.0
3.2. Sub-program: Agro-industry (AI) Cluster Development	**6,367,000.0**	**3.2. Sub-program: Agro-industry Cluster Strengthening and Scaling-Up**	**6,142,500.0**	**3.2. Sub-program: Agro-industry Cluster Reinvention**	**5,456,000.0**
3.2.1 Project: North-western agro-industry cluster development	648,500.0	3.2.1 Project: North-western agro-industry cluster consolidation	472,000.0	3.2.1 Project: North-western agro-industry cluster reinvention	432,000.0
3.2.2. Project: Eastern agro-industry cluster development	648,500.0	3.2.2. Project: Eastern agro-industry cluster consolidation	472,000.0	3.2.2. Project: Eastern agro-industry cluster reinvention	432,000.0
3.2.3. Project: Agri-business incubator development	5,070,000.0	3.2.3. Project: Agri-business incubator consolidation	4,550,000.0	3.2.3. Project: Agri-business incubator reinvention	4,160,000.0
		3.2.4. Project: Southern agro-industry cluster development	648,500.0	3.2.4. Project: Southern agro-industry cluster reinvention	432,000.0
3.3. Sub-program: Agro-Industry Trade Development	**812,000.0**	**3.3. Sub-program: Agro-Industry Trade Consolidation and Expansion**	**1,097,000.0**	**3.3. Sub-program: Agro-Industry Trade Innovation**	**1,192,000.0**
3.3.1 Project: National market development	315,000.0	3.3.1 Project: National market consolidation and expansion	460,000.0	3.3.1. Project: National market innovation and reinvention	460,000.0
3.3.2. Project: International market development	497,000.0	3.3.2. Project: International market consolidation and expansion	637,000.0	3.3.2. Project: International market innovation and reinvention	732,000.0

5. Financing Framework

Adequate resources are critical to realizing any plans. During each phase of the **Strategic Plan** resources, especially fund, will have to be made available in a timely manner. The financial resource is urgently needed for the first phase which begins now.

During the first phase, sources of financial resource for the implementation of the **Strategic Plan** cannot be specifically identified. Financial resource will only come from the traditional budget of MAFF/DAI which is sourced from the RGC. This budget is, however, very small (Table 11) and is possibly earmarked for DAI's traditional programs; and thus a huge funding gap is expected.

MAFF/DAI's program budget from the RGC grew, on average, 17% per annum. In 2019, the RGC has allocated US$0.47 million only for MAFF/DAI's program budget. This suggests that the financial resource gap for the **Strategic Plan** in 2019 is at least US$1.1 million (or 68.36% of the estimated budget), if that allocation could be assigned to the **Strategic Plan**'s programs. Assuming that the RGC's budget allocation of the MAFF/DAI's program continued unchanged this huge shortfall will continue until 2027 before it will narrow down for the final three years of the **Strategic Plan**, i.e., from 2028 to 2030.

Table 11: Financing situation for phase 1 of Strategic Plan

Stage / Program	Year 1	Year 2	Year 3	Year 4	Total(undiscounted)
Stage 1: Agro-industry Improvement and Modernisation (AI Strengthening Phase) [2019-2022]	*1,577,600.0*	*4,160,600.0*	*3,664,600.0*	*3,299,600.0*	*12,702,400.0*
1. Capacity and Institutional Development and Strengthening Program	541,000.0	556,000.0	556,000.0	441,000.0	2,094,000.0
2. Knowledge Management and Technology Transfer Program	123,000.0	416,000.0	359,000.0	259,000.0	1,157,000.0
3. Agro-industry Product and Trade Development Program	913,600.0	3,188,600.0	2,749,600.0	2,599,600.0	9,451,400.0
Stage 2: Agro-industry Diversification and Transformation (AI Transition Phase) [2023-2026]	*3,887,100.0*	*3,054,000.0*	*2,977,002.0*	*2,892,002.0*	*12,810,104.0*
1. Capacity and Institutional Strengthening Program	766,000.0	511,000.0	556,002.0	551,002.0	2,384,004.0
2. Technology Development and Knowledge Management Program	259,000.0	254,000.0	264,000.0	264,000.0	1,041,000.0
3. Agro-industry Product Development and Trade Expansion Program	2,862,100.0	2,289,000.0	2,157,000.0	2,077,000.0	9,385,100.0
Stage 3: Agro-industry Reinvention and Innovation (Cutting-edge Phase) [2027-2030]	*3,552,000.0*	*2,941,000.0*	*2,986,000.0*	*2,941,000.0*	*12,420,000.0*
1. Capacity and Institutional Innovation Program	791,000.0	486,000.0	491,000.0	476,000.0	2,244,000.0
2. Innovative Technology and Knowledge Management Program	369,000.0	313,000.0	313,000.0	313,000.0	1,308,000.0
3. Agro-industry Product and Trade Innovation Program	2,392,000.0	2,142,000.0	2,182,000.0	2,152,000.0	8,868,000.0
Strategic Plan (Total)	**9,016,700.0**	**10,155,600.0**	**9,627,602.0**	**9,132,602.0**	**37,932,504.0**
Budget for Strategic Plan vs. Projected, Available Budget of DAI from the RGC					
Year	**2019**	**2020**	**2021**	**2022**	**Total(undiscounted)**
Strategic Plan's program budget (estimated)	1,577,600.0	4,160,600.0	3,664,600.0	3,299,600.0	12,702,400.0
DAI's program budget (projected, exc. 2019)	468,500.0	550,450.7	646,736.3	759,864.4	2,425,551.4
Budgetary gap	**(1,109,100.0)**	**(3,610,149.3)**	**(3,017,863.7)**	**(2,539,735.6)**	**(10,276,848.6)**
Year	**2023**	**2024**	**2025**	**2026**	**Total(undiscounted)**
Strategic Plan's program budget (estimated)	3,887,100.0	3,054,000.0	2,977,002.0	2,892,002.0	12,810,104.0
DAI's program budget (projected)	892,780.9	1,048,947.4	1,232,430.8	1,448,009.4	4,622,168.5
Budgetary gap	**(2,994,319.1)**	**(2,005,052.6)**	**(1,744,571.2)**	**(1,443,992.6)**	**(8,187,935.5)**
Year	**2027**	**2028**	**2029**	**2030**	**Total(undiscounted)**
Strategic Plan's program budget (estimated)	3,552,000.0	2,941,000.0	2,986,000.0	2,941,000.0	12,420,000.0
DAI's program budget (projected)	1,701,297.3	1,998,890.6	2,348,539.4	2,759,349.3	8,808,076.6
Budgetary gap	**(1,850,702.7)**	**(942,109.4)**	**(637,460.6)**	**(181,650.7)**	**(3,611,923.4)**
Total shortfall	**(5,954,121.8)**	**(6,557,311.3)**	**(5,399,895.5)**	**(4,165,379.0)**	**(22,076,707.5)**

In phase 1, the financial resource required is at least US$12.70 million. The financial resource needed for the second phase and third phase is, respectively, US$12.81 million and US$12.42 million. As can be clearly seen in Table 11 the financial resource gap is US$10.28 million, US$8.19 million, and US$3.61 million, respectively, for the first phase, second phase and third phase. Therefore, financial resource mobilization is urgently needed especially for the phase 1 since it is almost half way through 2019, the first year of the **Strategic Plan**. While the implementation of the first phase takes place, financial resource mobilization should occur for the second phase and then for the third phase.

Mobilization of the financial resource for the **Strategic Plan** can be done by (i) increasing the RGC's budget allocation to the AI sector; (ii) raising financial assistance from development partners (including, NGOs); and (iii) attracting investments from private sector (domestic and foreign investors).

At present, the budget allocation to the sector by the RGC is very small as revealed in Table 11 above. Given the country's economic progress and revenue size, the RGC shall be able to increase budget for the sector. However, the size of the increase cannot be forecasted since the RGC has other priorities and pressing needs, especially in social development and environmental management (in order to cope with climate change).

Until now, DP assistance to the sector has been very limited. The RGC, specifically, MAFF/DAI should closely work and coordinate with DPs (including, NGOs) to mobilize their financial support. The RGC, MAFF/DAI and concerned government agencies (especially, CRDB/CDC, MIH, MOC) should encourage DPs to consider and integrate sector's interventions in their development assistance to and strategies for Cambodia.

Regardless of the public sector's effort and budgetary allocation, the sector can only develop and grow with active and dynamic participation, engagement and investments of private sector. Favorable and conducive business enabling environment (BEE) is, therefore, critical to attracting private sector's interest, participation, involvement and investments. The RGC's commitment to continued enhancement of the BEE, as clearly revealed in the IDP 2015 and recent actions, will help to draw the private sector engagement and investments.

Nonetheless, additional actions are required in order to entice the private sector's investments for the sector. These actions[4] should include, but not limited to:

1. Producing and widely disseminating AI sector-specific investment opportunity analyses and guidebooks;
2. Developing and operating a user-friendly website and mobile Apps that promote AI sector-specific investments;
3. Running advertisement spots on both well-known national and world renown business media that showcase AI sector-specific investment opportunities;
4. Establishing regular communication with DPs and foreign embassies to Cambodia to promote AI sector-specific investments;
5. Working and coordinating with commercial attaches of Cambodian embassies overseas to promote AI sector-specific investments; and
6. Organizing regular AI sector-specific investment forum at regional, national and international levels in which sector investment opportunities will be showcased and promoted.

[4] These actions are mostly under the responsibilities and leadership of CDC. However, they are incorporated in the projects proposed in the Strategic Plan.

6. Implementation Arrangement

AI is a crosscutting sector, which interests and involves a large variety of actors and agencies. As for the Cambodian public agencies, their roles, responsibilities and jurisdictions are specifically defined in the RGC's legal letters. According to such legal instruments, MAFF's jurisdiction is over food businesses engaged in primary processing (Annex 6); MIH's is over those involved in secondary processing; MOC's is over those involved in food trading/marketing; and MOT's is over those running tourist canteens and restaurants.

Therefore, the development of the AI sector has to take a comprehensive value chain approach. None of the actors and agencies can perform their roles, functions and duties in isolation and in separate geographies of their own interest in order to develop the AI sector. In principle, the AI development has to be (i) based on a concerted and coordinated effort of all concerned agencies; and (ii) geographically focused on and concentrated with specific and potential value chains (for example, cassava value chain, cashew value chain, mango value chain, indigenous chicken value chain or banana value chain).

In order to implement the **Strategic Plan** MAFF's DAI shall be tasked to (i) implement areas under its direct responsibilities in accordance to relevant legal provisions for its raison d'être;[5] (ii) coordinate among and support line agencies of MAFF for the implementation of areas under their respective responsibilities; and (iii) negotiate and hold dialogue with other line ministries to encourage the implementation of areas under their respective responsibilities (Annex 7).

7. Risks and Risk Management

The success of the **Strategic Plan** and the ability of the RGC to achieve its vision is and will be threatened by three macro risks, including: (i) the challenge with institutional coordination and overlapping jurisdiction among concerned government agencies in implementing the **Strategic Plan**; (ii) climate change; (iii) global economic recession; and (iv) international politics. Possible problems, level of impacts, and likelihoods of occurrence of and possible remedies to these risks are provided below (Table 12).

[5] Annex 6 presents relevant legal instruments that define roles and responsibilities of DAI. Other instruments that describe DAI's roles and responsibilities include, but not limited to, MAFF's Prakas No. 358 (2002), No. 334 (2007), No. 346 (2009), and No. 204 (2018) and MAFF's Directive No. 196 (2017).

Table 12: Risks and risk response

Risk name	Problem	Impact	Likelihood	Remedy
Institutional coordination challenge	Many agencies are responsible for and have jurisdiction over specific activities of relevance to AI development. These agencies tend to take silo and individualistic approach focusing mainly on their roles, functions and responsibilities. These is nothing wrong about this. However, this poses a great challenge for the development of a sector like AI that is cross-cutting, which requires committed, effective and efficient collaboration of all concerned stakeholders.	When public agencies take piecemeal and individualistic approach the **Strategic Plan** will be partly implemented; and thus its results will be insignificant. The Cambodian agro-industry sector will remain underdeveloped, and Cambodia will continue to lose value addition to agricultural commodities in significant terms; and thus her export of raw agricultural materials will prevail.	Medium	The agency, i.e., DAI, tasked to coordinate and support the implementation of the **Strategic Plan** has to be fully equipped with needed instruments, tools and capacity. DAI has to have a strong leadership and use comprehensive VC approach to implementing and coordinating the implementation of the **Strategic Plan**.
Climate change	Climate change is real and will have adverse impact on national economy at large and specifically on the agricultural sector. Climate change would possibly change demand pattern and affect investment priorities of the public and private sectors.	Negative effect of the climate change on agricultural sector would mean reduced production of raw agricultural materials needed for the AI sector.	High	Public-Private Partnership in investments in climate smart agriculture should be promoted, encouraged, and facilitated. When the climate change takes effect import of agricultural raw materials

Risk name	Problem	Impact	Likelihood	Remedy
		The change in demand and investment pattern would have implications for the AI sector.		should be allowed for the agroindustry investors/operators.
Global economic recession	Global economic recession will affect consumers' disposable incomes. Moreover, during time of economic crisis capital flight from the country could occur.	Global (i.e., domestic and international) demand for and consumer's spending on certain AI products could be affected during time of economic crisis as consumers will prioritize their expenditures in favour of their basics / basic needs. As the capital is moved out of the economy, investment in the sector will be affected. Generally, the global economic downturn will adversely affect investments in the sector, and thus its progress and development.	Medium	Incentive measures should be introduced and implemented by the RGC during the economic crisis. Some of these measures are instituted in the IDP 2015. Also, public spending / investments, if affordable, should be increased. This should the quick-impact response measures aimed for long-term benefits (e.g., spending on infrastructure development, investments in skill development, small grant funding for technological innovations).
International politics	Major international markets for Cambodian products have been the EU and the USA.	Reliance on a limited number of markets is very risky. Furthermore, international politics (incl. protectionism; trade	Medium	Export markets should be diversified. Huge potential is still untapped from China,

Risk name	Problem	Impact	Likelihood	Remedy
		war; and human rights, labour/union rights and democracy agendas of these markets) could slow down or disrupt Cambodian export, incl. export of agro-industrial / agricultural processed products. (Export of milled rice to the EU market is a recent example.)		ASEAN, India, Middle East, and Africa markets.

8. M&E Framework

8.1. Purposes

The **Strategic Plan** is aimed "to increase share of export of processed agricultural products to 15% in total export volume by 2030. It comprises three strategic objectives and three programs. The achievements of these objectives and programs will contribute to the wider and overarching developmental goal of the RGC and the country as a whole. In order to verify such achievements M&E of the **Strategic Plan** is required.

The **Strategic Plan**'s M&E will serve at least three purposes, which include (i) monitoring and evaluating its progress and achievements; (ii) monitoring and updating risks and challenges with which it is faced; and; (iii) documenting lessons learned and identifying opportunities that can be used to improve its performance, and to develop better future strategic plan. The results and findings of the M&E will be very important for decision making as well.

The M&E can serve its purposes only if its system is capable of providing and generating regularly accurate, and reliable information/data in a timely fashion that is accessible to all concerned stakeholders, and, most of all, easily interpreted and understood. The M&E system for projects, and programs under the **Strategic Plan** has to be harmonized and aligned with one another. Nonetheless, the M&E of the projects have to be based on the programs to which they are supposed to contribute. In turn, the M&E of the programs have to be built around the M&E system of the **Strategic Plan** *per se* unless other overarching sectoral plan takes precedence.

8.2. M&E Hierarchy and Responsible Institutions

A good M&E framework should be able to: (i) highlight types of information/data needed in M&E and hierarchy of the M&E; (ii) identify and assign responsible institutions for relevant levels; and (iii) provide relevant instructions about systems and methodologies for information/data acquisition, management, and analysis as well as distribution of M&E results and findings. Both internal and external M&E for the **Strategic Plan** shall be required.

Based on the structure of the **Strategic Plan**, the M&E will comprise mainly four levels, namely, strategic action, strategic objective, goal and vision levels (Table 13). The M&E at various levels need to be able to report on results and findings within individual levels of the results chain. The progress toward achieving the upper and higher levels – strategic objectives, goal and vision – can be only tracked and reported on annual basis, while that of the lower level – the strategic actions – can be done on quarterly, semi-annual and annual basis.

Table 13: Results chain of the Strategic Plan

Strategic Development Plan for Cambodian Agro-Industries 2019-2030					
		Motto: Creating Markets for Cambodia's Competitively Processed Agricultural Products			
Vision: Cambodia will have a modern agro-industrial sector that shall be competitive, inclusive, resilient, and sustainable by 2030.					
	Level	Narrative	Indicators	Data/Reporting	Risks
	IMPACT	Vision			
^^^^^		Cambodia will have a modern agro-industrial sector that shall be competitive, inclusive, resilient, and sustainable by 2030 and beyond.	GDP per capita Employment in AI sector disaggregated by gender	. National Account . Economic census	International politics
	OUTCOME	Goal			
^^^^^^^^^^^		To increase share of export of processed agricultural products (including new processed agricultural products) to 12% in total export volume by 2025 (IDP2015) and to 15% by 2030. (This goal will contribute to realizing the RGC's long-term goal aiming at uplifting Cambodia to an upper middle-income economy by 2030 and a high-income economy by 2050.)	Share of export of processed agricultural products in Cambodia's export (disaggregated by products	. National Account . M&E Reports of Strategic Plan	Global economic recession
	OUTPUT	Strategic Objectives			
^^^^^		To promote processing of market-demanded, safe and quality agricultural products.	GVA of non-rice sector disaggregated by sub-sector AI's GVA (incl. processed rice) disaggregated by sub-sector	MAFF/DPS NIS National account	Climate change
^^^		To create quality and inclusive rural employment in Cambodia.	Wage in AI sector, disaggregated by gender	National account Labor force survey	Lack of basic English and digital literacy skills

ACTIONS	Strategic Actions			
	Stage 1: Agro-industry Improvement and Modernisation (AI Strengthening Phase) [2019-2022]			
	1. Capacity and Institutional Development and Strengthening Program	. No. of stakeholders with enhanced capacity . No. of responsive instruments developed and implemented . Improved food quality and safety assurance capacity	. M&E Reports of Strategic Plan . M&E Reports of Projects of Strategic Plan	. Adequate financial resource . Adequate technical assistance
	2. Knowledge Management and Technology Transfer Program	. Operational ICT-based KM and MIS . Improved AI management processes . Increased use of AI's modern and innovative technologies		
	3. Agro-industry Product and Trade Development Program	. No. / variety of products developed, produced and sold domestically and exported . No. / variety of export markets		

	Stage 2: Agro-industry Diversification and Transformation (AI Transition Phase [to AI4.0]) [2023-2026]			
	1. Capacity and Institutional Strengthening Program	. No. of stakeholders with enhanced capacity . No. of responsive instruments developed and implemented . Improved food quality and safety assurance capacity	. M&E Reports of Strategic Plan . M&E Reports of Projects of Strategic Plan	. Adequate financial resource . Adequate technical assistance
	2. Technology Development and Knowledge Management Program	. Operational ICT-based KM and MIS . Improved AI management processes . Increased use of AI's modern and innovative technologies		
	3. Agro-industry Product Development and Trade Expansion Program	. No. / variety of products developed, produced and sold domestically and exported . No. / variety of export markets		

Stage 3: Agro-Industry Reinvention and Innovation (AI4.0 Phase) [2027-2030]				
	1. Capacity and Institutional Innovation Program	. No. of stakeholders with enhanced capacity . No. of responsive instruments developed and implemented . Improved food quality and safety assurance capacity	. M&E Reports of Strategic Plan . M&E Reports of Projects of Strategic Plan	. Adequate financial resource . Adequate technical assistance
	2. Innovative Technology and Knowledge Management Program	. Operational ICT-based KM and MIS . Improved AI management processes . Increased use of AI's modern and innovative technologies		
	3. Agro-industry Product and Trade Innovation Program	. No. / variety of products developed, produced and sold domestically and exported . No. / variety of export markets		

The M&E for the projects shall be performed and coordinated by agencies responsible for implementing the projects, whereas the M&E for the programs shall be the responsibilities of the agencies or units in charge of implementing the programs. These units/agencies in charge of the programs shall be tasked to compile all project M&E information/data, results and findings for the programs that contribute to the realization of the **Strategic Plan**. And, the M&E of the **Strategic Plan** and the compilation of all information/data, results and findings of the M&E programs shall be the responsibilities of the agency that is in charge of implementing, leading or coordinating the implementation of the **Strategic Plan**; in this case, it should be DAI.

In order to ensure this, standard template and format for M&E information/data collection, and reporting that will be used for projects, programs and the **Strategic Plan** shall be developed and made available. The standard template should contain introductory section; provide information/data on and analysis of efficiency, effectiveness, impact, sustainability, lessons learned, innovation and scaling-up plan; and comprise a conclusion section. The M&E should be able to report on status of indicators of the projects, programs and the **Strategic Plan**.

8.3. M&E Information Collection, Management, Analysis and Reporting System

Data collection methods in M&E have to be consistent among projects, programs and the **Strategic Plan** that will allow for meaningful comparison across projects and programs and for appropriate compilation for the **Strategic Plan** as a whole. The information/data collected and generated by the M&E will be both quantitative, and qualitative.

In order to ensure that quantitative and qualitative information/data is/are captured in the M&E exercises following information/data gathering approaches should be utilized: (i) statistical survey; (ii) longitudinal/time-series study; and (iii) qualitative approach (specifically, focus group discussion and case study). The combined use of these approaches will allow not only for gathering quantitative and qualitative information/data, but also for triangulation and complementarity.

Information/data gathering for project M&E shall be conducted by agencies implementing the projects, and for programs by agencies in charge of implementing the programs covering these projects. The M&E of the **Strategic Plan** shall be assigned to DAI supported by line agencies of MAFF and of the RGC. In order to be able to perform this assignment, over the medium and long terms, DAI will be equipped with and modernize the M&E system focusing on the employment of ICT; building capacity of staff and concerned stakeholders; and networking and connecting with private sector in information/data collection, provision and sharing, and system operation and maintenance. Regular collection of feedback and public opinions on the sector and the **Strategic Plan** shall be made part of the M&E exercises at all levels and done using public opinion boxes.

Important indicators that the M&E will deal with for the projects and programs will be those of individual projects and programs. To the extent possible, such indicators have to relate to and be aligned with the **Strategic Plan**'s (Table 13).

Although the M&E information/data collection will be done by individual agencies responsible for implementing projects and programs at various levels - national and sub-national - overall M&E information/data management, including storage, shall be centralized. A specialized central server or App will have to be created and operated for this purpose. This means that all agencies responsible for the M&E at all levels will be connected to the central server or App, which can be a national agro-industry database management system server / App connected to national agricultural statistical database system, if any. The central server should be able to give real-time information/data that can be reviewed, verified and extracted for preliminary analysis and reporting purpose.

Software to be used for the M&E should be the same by all agencies at all levels. The software could be, for example, MS SQL Server, MS Access or MS Excel. Maybe, MS Excel could be a good option since it is user-friendly and generally used by and most familiar for general staff and most computer users.

For analysis and reporting basic statistical techniques – descriptive and inferential statistics – can be used to handle quantitative information/data. Advanced statistical analysis and reporting can also be done, depending on intended audiences and the needs of the analysis and purpose of usage of the analytical results.

The information/data and reports of the M&E shall be shared regularly and widely. Access to such information/data and reports shall be open to the public. Reports on findings and results of the M&E shall be published at least twice a year, and dissemination of the findings and results shall be done on bi-annual basis. The practice should promote transparency and participatory M&E exercises in which all stakeholders – development partners, private sector and the public – are involved. The dissemination of the M&E reports can be done via public forums; development partners-private sector-government platforms; websites; radio and TV channels; print media; mobile Apps; etc.

The findings and results of the M&E can be produced in various formats for public consumption; and depending on types of audiences and use purposes, such formats as newsletters, leaflets, info-graphics; policy briefs; detailed in-depth reports; etc. should be produced and disseminated. The M&E database management system should be crafted and operated in a way that it is user friendly and can allow the users to produce simple, basic reports on their own, if needed.

9. Conclusions

The **Strategic Plan** is a long-term plan for Cambodia's AI sector development that will span 12 years from 2019 to 2030, and will thus require firm commitment and determination on the part of the RGC / MAFF to undertaking it and active engagement and participation of development community (incl. NGOs), private sector as well as farmer communities.

The **Strategic Plan** is aligned well with (i) the RGC's developmental vision and goal for the industrial sector and for Cambodia as a whole; and (ii) MAFF's vision and developmental goal for the agricultural sector. Its formulation was based on a participatory process with inputs from key concerned stakeholders within the government sector, donor community, farmer community and private sector and based on facts from both primary and secondary sources.

Over the 12 year period the **Strategic Plan** is divided into three phases. Phase 1 (2019-2022) will improve and modernize the Cambodian AI sector. In Phase 2 (2023-2026), the Cambodian AI sector will be diversified and transformed. Toward the end of Phase 2, the Cambodian AI sector will be transitioned to and readied for a more advanced stage, Phase 3 (2027-2030). At this final phase of the **Strategic Plan**, the Cambodian AI sector will be more skill-based and knowledge-based taking the advantage of the Industrial Revolution 4.0. It will keep reinventing and innovating itself in order to stay on the edge of competitiveness.

Financial resource required to undertake the **Strategic Plan** is estimated to be US$38.1 million. This amount of budget will be for 50 projects. At this stage, besides the RGC's limited budget allocation to DAI's traditional programs, no other sources of funding are identified, and thus there will be a very huge financial shortfall for the **Strategic Plan**'s implementation. The execution of these projects will not occur without adequate financial resource, and will therefore have undesirable effect on the achievement of the **Strategic Plan**'s impacts.

The **Strategic Plan** clearly reflects the need for active and dynamic participation, engagement and investments of private sector. It has stressed the importance of BEE as the foundation that can attract private sector's interest, participation, involvement and investments and recognizes the RGC's relentless commitment to continued enhancement of the BEE. Nonetheless, it has suggested following actions:

- Producing and widely disseminating AI sector-specific investment opportunity analyses and guidebooks;
- Developing and operating a user-friendly website and mobile Apps that promote AI sector-specific investments;
- Running advertisement spots on both well-known national and world renown business media that showcase AI sector-specific investment opportunities;
- Establishing regular communication with DPs and foreign embassies to Cambodia to promote AI sector-specific investments;
- Working and coordinating with commercial attaches of Cambodian embassies overseas to promote AI sector-specific investments; and
- Organizing regular AI sector-specific investment forum at regional, national and international levels in which sector investment opportunities will be showcased and promoted.

Acronyms

AI	Agro-Industry
AIO	Agro-Industry Office
BEE	Business Enabling Environment
CDC	Council for Development of Cambodia
CRDB	Cambodian Rehabilitation and Development Board
DAI	Department of Agro-Industry
DP	Development Partner
IDP	Industrial Development Policy
MAFF	Ministry of Agriculture, Forestry and Fisheries
MIH	Ministry of Handicrafts
MME	Ministry of Mine and Energy
MOC	Ministry of Commerce
MOH	Ministry of Health
MOT	Ministry of Tourism
MoWA	Ministry of Women's Affairs
MoWRAM	Ministry of Water Resources and Meteorology
MPTC	Ministry of Post and Tele-Communication
MPWT	Ministry of Public Works and Transport
MRD	Ministry of Rural Development
NGO	Non-Governmental Organization
PDAFF	Provincial Department of Agriculture, Forestry and Fisheries
RGC	Royal Government of Cambodia
S1	Stage 1
S2	Stage 2
S3	Stage 3
TWGAW	Technical Working Group on Agriculture

ANNEXES

Annex 1: Cambodia's Agro-Industry Profile

1. A Historical Context

Agro-industry (AI) has been part of Cambodian economy for a long time. By the end of the 1960's agro-industries comprised 76% of 3,728 recorded industries in Cambodia. Agro-industry development, like all other industries, recessed during the 1970's and the 1980's when the country was in civil war. During this period, Cambodia housed, by some records, 2,686[6] agro-industries, including rice milling, food processing, rubber-based processing, forest-based industries, etc. By 2005 the record showed that Cambodia was home to 45,894 agribusinesses/agro-industries, but 91% of them were small employing less than five employees and having a capital outlay of less than US$1,000.

Although agro-industry has always been part of Cambodian economy, it remains incapable of unleashing its promise and potential. Its ability to drive national economic development and growth remains untapped. Their scales are generally micro and small, and they are not well-equipped with modern technologies.

In the old days Cambodian agro-industry generally took the form of cottage industries. Prior to the war in the 1970's and the 1980's the sector saw some noticeable development. Unfortunately, however, such development was hijacked by the cold and civil wars that spanned for about two decades (between the 1970's and 1990's).

Existence of agro-industry is everywhere in modern day Cambodia. Nonetheless, majority of them are micro and small, while the meaning of agro-industry is misunderstood among the general public as well as decision makers. Most often when it comes to agro-industries Cambodians tend to think of only food processing. In a broader sense, agro-industries encompass a wide range of activities dealing with agricultural produce after harvest (Appendix 1).

2. The Return of AI

Decades of war affected AI in Cambodia not only in terms of its infrastructure and technologies, but also its survival. Until the late 1990's Cambodian development and public policy was bogged down with basic social development and basic needs. In such a policy food security was one of the priorities, and that means producing enough rice, and possibly fish as Cambodian main diet is rice and fish. With such a preoccupation, no thinking about AI ever emerged in much of public policy making process.

While Cambodia tried to address her basic development needs between the 1980's and the early part of 2000's agro-industries remained nearly unheard of except for small scale rice processing and rubber crepe making. The situation began to change when the RGC adopted, in July 2010, the Policy on Paddy Rice Production and Milled Rice Export. The policy was aimed to add value to the rice production surplus for

[6] This statistic excludes agri-traders such as rice traders, vegetable traders, rice exporters, etc.

export and diversify the economy. The measures instituted in the policy were considered having a spillover effect on and making way for the development of the agro-industrial sector at large.

Following the adoption of the policy the rice processing sector saw a significant development. According to Francesco and Srey (2016) the capacity of rice milling in the country increased from 96 tons per hour in mid-2009 to 829 tons per hour in 2015. Likewise, the capacity for rice polishing rose by more than 7 folds from 72 tons per hour in mid-2009 to 520 tons per hour in 2014. The milling and polishing capacities were projected to expand in the following years. These mills are mainly small and medium in size, which have been set up to serve generally rice export business. This suggests that the agro-industry sector is dominated by rice milling business.

In 2015 the RGC adopted the very first Industrial Development Policy (IDP) that is aimed to also promote the development of Cambodian agro-industries. It sets forth specific policy measures and target for the development of the Cambodian agro-industrial sector (Appendix 2). The target set for the agro-industry development is "increased share of export of processed agricultural products (including new processed agricultural products) to 12% in total export volume by 2025" starting from 7.9% in 2013. Annual target is fixed at 8% in 2018, 10% in 2020 and 12% in 2025. More than one year of the IDP implementation, it was reported that the export of processed agricultural products comprised only 4.6% of total export in 2016. This felt short of the RGC's target.

3. AI Current Status

3.1. AI Statistics

Statistics on agro-industries in contemporary Cambodia is hard to find. The Economic Census of Cambodia 2011 reported that there were 505,134 establishments in the country, which included establishments involved in processing agricultural raw materials such as agricultural, animal, forestry and fishery products.

Of these establishments 80% were micro in size with 1-2 persons engaged each. The establishments engaging 5-9 persons each were composed on 7.8%; and those with 10-99 persons engaged constituted only 2.6%. Generally speaking, therefore, an overwhelming majority (about 88%) of the Cambodian establishments were micro and small. This available statistic can hardly tell how many of these establishments were involved in agro-industries/agro-businesses.

Based on provincial agro-industry profiles compiled by PDAFFs to support the strategic plan formulation exercise, Cambodia currently has at least 3,234 agribusinesses[7] that are in operation. An overwhelming majority of them (78%) are rice mills. Very few of these agro-businesses, especially feed mills like CP and GreenFeed, are large. Overall, nearly all of them are classified as micro/family, small and medium

[7] This statistic was reported by 13 provinces only. The non-reporting provinces include Phnom Penh, Kampong Cham, Kandal, Svay Rieng, Kampong Thom, Kampong Speu, Kampong Chhnang, Kratie, Stung Treng, Banteay Meanchey, Sihanoukville and Koh Kong.

enterprises. Appendix 3 and Appendix 4 provide two examples of provincial agro-industry profiles, respectively, for Pailin and Tboung Khmum.

3.2. AI Roles in Cambodian Economy

The underdevelopment of the AI sector sees Cambodia losing opportunities for maximizing the economy's share of the industrial sector as her agricultural commodities are exported raw or, at best, in semi-processed forms (such as crepe rubber, cassava dried chips). Take example of paddy rice, cassava, and cashew. While Cambodia produced approximately 10.5 million tons of paddies in 2018, she exported less than 0.5 million tons of milled rice, which means Cambodia exported approximately 3.8 million tons of paddies in 2018, netting domestic demand for rice. In the case of cassava, the country exported some US$728 million of raw cassava tubers and dried cassava chips combined[8]. As for cashew, nearly all of 23,671.5 tons of cashew kernels produced in 2017/2018 were exported since the country has almost no processing factories.[9]

Although Cambodia's AI sector has not yet delivered on its full potential, it has been able to contribute to the nation's economic development. It helps to carry Cambodian flag to the world trading stage (specifically, the fragrant rice industry); add values to agricultural commodities and create more varieties of food products for domestic market; create jobs; and earn foreign exchange. During 2010-2017, export value of agricultural processed products, *albeit* variable, exhibited an upward trend (Table 14). Its share in the GDP increased from 1.4% in 2010 to 3.6% in 2017.

The export value of agricultural processed products increased from US$164.9 million in 2010 to US$805.6 million in 2017, despite noticeable drop in 2015 and 2016. Its share in the total export value was only 7.2% in 2017, which is slightly below the target set in the IDP. Its annual growth is estimated at 25% during 2010-2017. In order that the IDP's target is reached it had to grow on average 35% per annum during this period. By 2025, the IDP's target is set at 12% this means that the export value of agricultural processed products has to grow at least 18% per annum during the period from 2017 to 2025.

[8] Cassava Policy 2019-2023.

[9] In 2010, IFC estimated that processing of cashew nuts could add value of US$30-40 million per year when production of in-shell cashew nuts was calculated at 60,000 tons. Currently, there are approximately three operational micro to small cashew processing plants in the country. One small plant is located in Tboung Khmum exporting processed cashew nuts to the Middle Eastern countries. One micro plant in Kampong Thom and another micro-processor in Kampong Cham, both process the nuts for local markets. A cashew cooperative in Kampong Thom is trying to recover its processing capacity; and a new cashew processing plant is being set up in Preah Vihear, which is aimed to export processed nuts to Japan.

Table 14: Cambodia's multi-year export (million US$)

Cambodia's export 2010–2017 (million US$)									
No.	Item	2010	2011	2012	2013	2014	2015	2016	2017
1	Timber and plywood (from rubber)	30.78	45.81	27.66	64.55	123.29	25.41	5.22	10.24
2	Veneer	0.52	0.34	0.27	0.63	0.06	0.83	0.24	0.15
3	Plywood	0.25	1.06	1.67	2.41	8.60	1.47	0.10	0.21
4	Other articles from wood	2.65	1.58	1.55	5.96	0.08	20.24	40.21	100.23
5	Rice	34.52	106.56	135.99	262.27	248.50	315.30	300.77	329.59
6	Rubber	89.33	197.63	164.43	175.17	154.93	165.39	165.29	254.15
7	Sugar	-	-	-	-	-	-	-	37.92
8	Fishery products	2.70	3.12	1.69	1.18	0.79	0.51	0.71	0.59
9	Other agricultural products	4.10	5.95	13.58	42.36	89.12	21.27	20.45	72.54
	Non-AI exports	3,465.29	4,567.44	5,226.96	6,428.48	7,480.58	8,707.32	9,524.43	10,334.81
	Total export value	**3,630.15**	**4,929.49**	**5,573.81**	**6,983.01**	**8,105.96**	**9,257.74**	**10,057.41**	**11,140.44**
	Total agro-industry export value	*164.86*	*362.05*	*346.85*	*554.53*	*625.37*	*550.42*	*532.99*	*805.62*
	Share of agro-industry export in total export	*4.5%*	*7.3%*	*6.2%*	*7.9%*	*7.7%*	*5.9%*	*5.3%*	*7.2%*
	GDP	**11,634**	**12,965**	**14,054**	**15,237**	**16,734**	**18,078**	**20,159**	**22,189**
	Percentage of agro-industry export of GDP	*1.4%*	*2.8%*	*2.5%*	*3.6%*	*3.7%*	*3.0%*	*2.6%*	*3.6%*

Data source: NIS/MOP 2019

Although, the AI sector, overall, is not advanced, certain agro-industries such as rice milling and tobacco processing are well developed, structured and organized. While the tobacco manufacturing industry is nearly monopolized by BATC, the rice milling industry is highly competitive. After rice and tobacco, rubber sector is also well organized. Unfortunately, however, the rubber sector has not been able to move away from primary production and processing aspects. Although Cambodia has close to 0.5 million hectares of rubber plantations, she has no rubber manufacturing industry that produces consumer goods (such as washers, seals, children toys, condoms, rubber bands, tires, shoe soles, gloves, boots, medical materials/tools). Cambodia produces primarily semi-processed products such as rubber sheets or crêpe rubber.

3.3. Challenges for AI Development

Cambodian agriculture produces large quantity of paddy rice, cassava, cashew, rubber, just to name a few, which are important raw materials. However, large proportions of these raw materials are exported without or with limited value additions due to lack of investors in agribusiness sector.

Following the endorsement of the IDP efforts have been made and resources have been channeled to implement relevant actions in order to attract investments and facilitate the development of the industrial sector, including agro-industries. The RGC and her line institutions have worked very hard and done everything in their capacity with resources they have in order to improve country's logistics and to make doing business easier. Despite promising progress, and the RGC's commitment and effort, Cambodia remains struggling against major agricultural exporters in the region and in the world, notably Vietnam and Thailand.

The fact is while Cambodia is working to enhance her competitiveness, countries in the region and around the world, including Cambodia's immediate neighbors – Vietnam and Thailand – also work very hard to improve theirs. Therefore, if Cambodia wants to compete on the regional and global markets, she has to be, at least, as competitive as they are or even more competitive than they are. Unless she can punch above her weight – do much, much more – Cambodia will continue to trail behind both Thailand and Vietnam for a very long time in the foreseeable future.

Two indexes – ease of doing business and logistics – studied by the World Bank to measure competitiveness of the countries in the world reveal that Cambodia remains far behind both Vietnam and Thailand. In terms of ease of doing business (Table 15), Cambodia is only better than Lao PDR. In logistics sphere, Cambodia is only better than Lao PDR and Myanmar (Table 16). This could be very challenging for Cambodia to attract critical investments in industrial/agro-industrial sector that is capital and technological intensive and requires long-term commitment from investors. As such, like it or not, Cambodian raw materials generated by its agricultural sector will continue to flow straight to agro-processing factories in these neighbors unless their demand is saturated.

Table 15: Ease of doing business (distance to frontier)

Country	2014 Score (Rank)	2015 Score (Rank)	2016 Score (Rank)	2019 Score (Rank)
Malaysia	… (6)	78.83 (18)	79.13 (18)	80.60 (15)
Thailand	… (18)	75.27 (26)	71.42 (49)	78.45 (27)
Vietnam	… (99)	64.42 (78)	62.10 (90)	68.36 (69)
Indonesia	… (120)	59.15 (114)	58.12 (109)	67.96 (73)
Regional average	… (88)	63.19 (92)	61.47 (96)	63.41 (…)
Philippines	… (108)	62.08 (95)	60.07 (103)	57.68 (124)
Cambodia	… (137)	55.33 (135)	52.22 (127)	54.8 (138)
Lao PDR	… (159)	51.54 (148)	53.77 (134)	51.26 (154)

Source: World Bank's Ease of Doing Business Reports 2019

The flow of raw materials from agricultural sector across the borders represents the loss of opportunities and value addition for the Cambodian economy. This is no wonder why the target in IDP seems not realized for agro-industrial sector even a lot of effort has been put into implementing it. However, since Cambodia's degree of competitiveness started from a very weak baseline, her competitiveness will continue to follow her competitors. The trend will not reverse for a very long time unless the effort is dramatic and revolutionary.

Table 16: Overall LPI scores and ranks

Year	2012		2014		2016		2018	
Country	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Singapore	4.13	1	4.00	5	4.14	5	4.00	7
Malaysia	3.49	29	3.59	25	3.43	32	3.22	41
Thailand	3.18	38	3.43	35	3.26	45	3.41	32
Philippines	3.02	52	3.00	57	2.86	71	2.90	60
Vietnam	3.00	53	3.16	48	2.98	64	3.27	39
Indonesia	2.94	59	3.08	53	2.98	63	3.15	46
Cambodia	2.56	101	2.74	83	2.80	73	2.58	98
Lao PDR	2.50	109	2.39	131	2.07	152	2.70	82
Myanmar	2.37	129	2.25	145	2.46	113	2.30	137

Source: World Bank's LPI datasheets 2019

3.4. Opportunities for AI Development

While challenges continue to be present, a golden opportunity for agro-industrial sector development in Cambodia remains. Cambodian important raw materials produced by the agricultural sector are in huge surpluses and remain unexploited. These raw materials include, but not limited to, paddy rice, cassava, cashew, rubber and mango are exported most often in raw forms. Meanwhile, their production can be increased and expanded in a sustainable fashion. However, with exception of rubber plantations/estates, their production is mainly dominated or done by unorganized smallholder farming households with limited applications of improved practices and technologies. Supply chain management is highly disorganized with low level of value addition activities and processes.

IDP's measures, the implementation of which is in progress, will help address some of the afore-mentioned constraints, especially with regard to value additions. Although the RGC has not yet been able to implement all of the IDP's measures, certain fruits are observed. Business enabling environment (BEE) has been improved and costs for doing businesses have been reduced. Recent actions by the RGC to remove (i) Camcontrol from the border's checkpoints, (ii) Kamsab from sea shipping points, and (iii) requirement for certificate of origin will help to further reduce the trading cost, specifically for exports. The issuance of a sub-decree on tax incentives for SMEs late last year will also encourage the development of and investments in agro-industries and SMEs. Furthermore, the SME bank, which is in the process of the making, will possibly contribute to this development.

As long as this trend continues and the RGC is committed to addressing in a dramatic, and revolutionary fashion the bottlenecks to competitiveness environment, agro-industry will be able to establish its foot, take its root and be propelled forward. In order to ensure this, a focused strategic plan is required in order to guide the AI sector development process taking into account existing institutional frameworks and ***make change as a culture*** in order to enable the Cambodian AI to stay on the edge of competitiveness. ***The strategic plan has to make Cambodian agro-industry competitive and market-driven that will reverse the flow of agricultural raw materials from going to the Cambodia's neighboring countries.***

In the process of developing the Strategic Plan for Cambodian Agro-Industrial Sector Development lessons can be learned from the rice milling sector development (Appendix 5). The most important lessons are that the Policy on Paddy Rice Production and Milled Rice Export 2010 (i) was formulated without sufficient consultations with the private sector and farmers; (ii) did not provide a clear vision encompassing sustainability of the sector and targets for values of exports, value added, and farm income; and (iii) did not establish an independent and regular monitoring and evaluation system (Francesco and Srey 2016).

4. Conclusions

Historically, agro-industry (AI) has been part of Cambodian economy. Records showed that they were numerous and very active during the pre-war period in the 1960's. By 2005, 45,894 agro-industries were recorded of which 91% were small. Currently, over 3,000 agribusinesses are reported from 13 provinces of Cambodia; an overwhelming majority of them are micro, small and medium. The sector is dominated by rice milling. Despite its presence in the economy, the AI sector has not yet been able to unleash its full potential. In 2017, for instance, its export shared only 3.6% in the GDP.

The Policy on Paddy Rice Production and Milled Rice Export issued by the RGC in 2010 has paved the way for the development not only the rice industry *per se*, but also the agro-industry in general. The subsequent endorsement of the IDP by the RGC in 2015 has provided a stronger foundation for the AI sector development. However, it remains faced with lots of challenges relating to Cambodia's competitiveness. Despite promising progress, and the RGC's commitment and effort, Cambodia remains struggling against major agricultural exporters in the region and in the world, notably Vietnam and Thailand as regards logistics and ease of doing business.

While challenges continue to be present, potential opportunity for Cambodian agro-industrial sector development should not be underestimated. The progress in the implementation of the IDP's measures, *albeit* slow, yields some positive impacts for the sector; and recent actions by the RGC regarding Camcontrol, Kamsab and certificate of origin will help to further reduce transaction costs for exports. The issuance of a sub-decree on tax incentives for SMEs and the establishment of the SME bank should encourage the development of and investments in agro-industries and agro-based SMEs. However, in order to provide a focused support to the AI sector development, a specialized strategic plan should be required and ***such a plan should make Cambodian agro-industry competitive and market-driven that will reverse the flow of agricultural raw materials from going to the Cambodia's neighboring countries.***

Appendix 1: Definition of Agro-Industry

Interest in studies and analyses of agro-industry began in the 1980's when it became important for developing countries. Therefore, literature on it is in abundance. In the literature, researchers, experts and authors in the field use different terms to represent what they mean by agro-industry.

James (1981) defined an agro-industry as an enterprise that processes agricultural raw materials, including ground and tree crops as well as livestock. He further noted that the degree of processing can vary tremendously, ranging from the cleaning and grading of apples to the milling of rice, to the cooking, mixing, and chemical alteration that creates a textured vegetable food. Hsu (1997) concurred with this definition. In short, they both agreed that agro-industry is an industry that uses or processes agricultural products as raw materials in its production process.

According to John and Rudi (2008), agro-industry focuses on post-harvest activities that are involved in the transformation, preservation and preparation of agricultural production for intermediary or final consumption with an emphasis on food. For Carlos et al. from FAO (2009) agro-industrial sector is the subset of the manufacturing sector that processes raw materials and intermediate products derived from agriculture, fisheries and forestry taken to include manufacturers of food, beverages and tobacco, textiles and clothing, wood products and furniture, paper, paper products and printing, and rubber and rubber products.

FAO-UNIDO Expert Group on Agro-industry Measurement (2015) acknowledges that there are multiple terms used in literature for agro-industry, which include agribusiness; agro-industry; agro food system; food industry; farm-gate-to-market; processed agriculture; agro-processing; food processing; agro food value chain; FTB (food, beverages and tobacco); FaF (food and fibers); agro-food complex.

The group pointed out that for the calculations on GTAP (Global Trade Analysis Project) figures for 2004, 2007 and 2011 for East Asian countries, processed agriculture (agribusiness) covers eight sub-sectors plus one, including: (i) meat (cattle, sheep, goats, horse); (ii) meat products; (iii) vegetable oils and fats; (iv) dairy products; (v) processed rice; (vi) sugar; (vii) food products; and (viii) beverages and tobacco products; as well as (ix) the category "other animal products". In the past, textiles, wearing apparel, leather products and wood products were included in the GTAP database as "processed agriculture" for the calculations.

In Cambodia, BLDLink (2017) considers, as agro-processing industries, food processing and innovations, beverage production (drinks from fruit juice to alcohol) and tobacco; rice milling and value-added on rice; cassava processing (starch, noodles, alcohol, and chips); sugar and sugar cane processing; maize processing (maize flour and maize-based products); cashew nut processing and packaging; soybean processing; fruit, vegetable and meat products; dried pork and beef / meat processing; sweets and snacks; insects; honey; rubber products (accessories for cars, toys, household products, pharmaceuticals, condoms, etc.); paper and wood products (napkins, toilet papers, boxes, tissues, large scale frames, furniture, etc.); textiles and production of leather; and milk and dairy products (yoghurts, milk-based products, etc.).

The definition of the agro-industry is, therefore, very broad and cuts across functions, responsibilities and jurisdictions of many ministries and public agencies in Cambodia. No one single public agency is tasked and equipped to single-handedly cover the sector. Its development, consequently, requires concerted and coordinated effort among all concerned line agencies, from farm to table or from rural villages of Cambodia to overseas supermarkets.

Appendix 2: IDP's Measures for AI Development

The IDP was set out to promote, *inter alia*, agro-industries in the very first phase of the industrial development. The fourth scope of the IDP implementation consists of the promotion for the agro-industrial cluster development. The RGC introduced five specific policy measures out of 129 to promote the development of the agro-industry sector, which is ranked as the third priority sector. These five measures include:

1. Exploring possibilities of establishing agro-processing zones through public-private partnership for export;
2. Providing incentives to companies to locate their businesses in the agro-processing zones;
3. Establishing agro-industry development and promotion fund for export-led agro-products;
4. Developing a coordination mechanism to address logistic issues, eliminate informal fees, and improve trade facilitation that supports export of processed agricultural products; and
5. Conducting a study to identify potential products that can be processed for export and prepare a comprehensive value chain based action plan that enables the RGC to provide concrete supports.

The five measures above have direct implications for the agro-industrial sector. Nonetheless, the remaining 124 policy measures that relate to investment promotion; expansion and modernization of SMEs; improvement of regulatory environment; and coordination of supporting policies also have strong implications for promoting and facilitating the agro-industrial sector development.

All line institutions of the RGC have been committed to implementing all the stated policy measures supporting the industry development in general, and the five specific measures promoting, in particular, the development of the agro-industrial sector. However, implementation of certain activities under the five specific measures for agro-industry development seems scattered. Moreover, it seems that coordination among concerned agencies remains limited.

For example, Ministry of Industry and Handicrafts has facilitated and supported an SME cluster in Kandal province to process fresh fruits for export. In Kampong Chhnang it has facilitated and supported an SME cluster to process freshwater fishery products for export. Meanwhile, Ministry of Commerce has worked with UNIDO to improve a location in Kampot and turn it into a common market where members of Cambodian marine fishery association can display and sell their marine fishery products.

Such piecemeal approaches do not help the agro-industrial sector to unleash its potential. The approaches cannot allow it to achieve both internal and external economies of scale. Like it or not, therefore, the policy's target for the agro-industry is hardly achieved.

Appendix 3: Pailin Agro-Industry Profile

NB: Information contains herein is derived from interviews of people met during field visits in Pailin municipality.

1.0. Introduction

1.1 Geography

Pailin is located 372 km from Phnom Penh, the capital city of Cambodia. It is situated on the plateau region of the country covering a land area of 1,062.0 sq. km. Mountainous area comprises at least 42% of the land area.

Pailin has its border with Thailand to the west, and Battambang province's Kamrieng district to the north and Rotanak Mondul to the east and south. It is about 83.5 km from Battambang province. It has a bustling casino town bordering with Thailand.

Pailin is about 266 km from Laem Chabang Seaport and about 264 km from Sriracha Harbour Deep Seaport in Thailand. The province is, therefore, closer to these seaports than to Phnom Penh. It is located nearly 566 km to Sihanoukville, the country's main seaport, and more than 300 km to Koh Kong, one of the country's coastal provinces.

1.2. Climate

Pailin, like all other provinces and municipalities of Cambodia, is influenced by tropical climate condition with two major seasons, rainy season (May-October) and dry season (November-April). Average quantity of rainfall is variable; it varies from year to year.

Average annual rainfall ranges from 790 mm to 1,900 mm during 2008-2015. Based on the record, 2014 saw the lowest average amount of rainfall, which was only 790 mm; this was a very dry year for farmers.

In recent years rainfall has been erratic and irregular. It is not homogeneous across the province. Certain places receive too much rain while others see no rain at all. This is possibly due to climate change. The condition has negative effect on agricultural production. For example, in 2008 four communes/sangkats out of 8 had no rain.

1.3. Population and Occupation

Pailin is inhibited by 66,289 people in 14,536 households. Its population density is 62.4 persons/sq. km. Women are composed of 52% of the total population. Its population growth rate saw a decline of 1.38% during 2008-2011. Like most Cambodian provinces, majority of households in Pailin rely on agriculture dominated by the cultivation of industrial and subsidiary crops and plantations such as cassava, feed maize, longan, mango, rubber and pulses.

2.0. Agricultural Production

2.1. Potential Commodities for Agro-Industries

Major agricultural commodities produced or harvested are, in order of importance, cassava, feed maize, longan and possibly mango. Paddy rice is also produced, but mainly for local consumption. Total cultivated area for rice in 2017 amounted to 6,060.0 ha 99.9% of which belonged to wet season paddy rice production.

Cassava, feed maize and longan as well as mango are important agricultural products that the province has exported to Thailand and China through Thailand. Most of these commodities are exported as raw products or as semi-processed products, for example, cassava dry chops, sorted fresh longan fruits, sorted fresh mango fruits. Feed maize is exported in raw form.

Area cultivated to cassava, feed maize, longan and mango in 2017 was, respectively, 24,142 ha, 30,427 ha, 3,248 ha, and 3,519 ha. It is reported that cassava's "dry starch content (DSC)" is believed to be 20-25% and impurities in feed maize's grain is 20% or less. Longan produce has 70-80% of Grades 1-4 that is good and demanded internationally; the remaining 20-30% is in Grade 5 or has no grade, which is suitable for processing into other forms of foods or drinks, for example, marmalade, dry longan, longan wine, longan juice, etc.

2.2. Competitiveness

Average rice yield is 2.7 tons/ha (wet season) and 3.0 tons/ha (dry season). Average yield of cassava is 25 tons/ha and feed maize's is 5.8 tons/ha. Rice varieties grown, albeit for local consumption, are mostly aromatic types. Quality of cassava, feed maize, longan and mango produce seems very good.

No production cost data are available.

2.3. Share of Smallholders

Agricultural producers in Pailin consist of both small and large holder farmers if defined by size of agricultural landholding. Nearly 65% of them, however, can be considered smallholders farmers with average agricultural landholding size less than 4.0 ha/household. Majority of the agricultural producers are involved in plantation or industrial crops such as cassava, maize, longan, mango, rubber, and so on. Very few have paddy lands and grow paddy rice; all of paddy fields concentrate in Sala Krao district.

2.4. Constraints

Cassava and maze farmers are discouraged as buyers (i.e., silos, and drying pad operators/owners) control prices at harvest time. Buyers who can pay extra to harvest-cum-transport service providers can get services of the latter easily; and these buyers control farm-gate prices.

Oftentimes, farmers are unable to hire the services of the harvest-cum-transport service providers. If they could they would sell their produce to buyers who cannot afford to pay extra to harvest-cum-transport service providers; these buyers give relatively better prices.

Weight measures and fuel costs are problematic. Buyers, if they could, cheat farmers on weight measures. Prices of fuel needed for land preparation, production, and transportation are high which affect farmers' incomes. For cassava, there are issues with stem and leaf diseases, and insects.

Mono-cropping of cassava for more than a decade in most parts of Pailin causes soil fertility depletion. Climate change makes weather drier and hotter. The shortage of rainfall coupled with the lack of irrigation infrastructure has adverse impacts of agricultural production.

Competition among buyers is limited, while market is lacking. There are nearly no processors to make agricultural produce or raw materials into final and semi-finished products. Market linkage mechanism - CF facility and CF arbitration service - is non-existent. Market information is not available for decision making by farmers and buyers. Credit remains expensive. Input costs are also high as all of inputs used by farmers are imported.

Although farmers and buyers/industries would like to have formal CF arrangements they fear the lack of mechanism that can help them to deal with contract dispute should it arise. Conventional judicial court system is not suitable for CF, while trust in it is limited.

Besides high fuel cost for farm mechanization, labour cost is also high for production - cultivation, maintenance and care - and harvesting as farm labour has become scarcer. High wage is good for labour, but hurts producers. Substitution is required in the form of, for example, affordable and cost-effective mechanisation and/or automation. But this needs long-term effort and planning.

3.0. Existing and Potential Agro-Industries

3.1. Existing Agro-Industries

At present, 207 agribusinesses, agro-enterprises and food processing entities, including rice milling, are found in Pailin. However, only 194 are reported active. Nearly all of them are micro and small enterprises. Many are family, cottage industries. Only a small number of them are involved in making final agro-products such as rice wine, longan wine, milled rice or animal feeds. Below is a summary listing of agribusinesses in Pailin.

No.	Agribusiness	No. of enterprises
01	Silo	40
02	Rice wine making	35
03	Rice milling	30
04	Agro-input shops (for fertilizers, seeds, feeds, etc.)	28
05	Collection points	27
06	Pickle making	10
07	Feed making	09
08	Soy sauce making	02
09	Banana chip making	02
10	Dried radish/daikon making	02
11	Rubber crepe sheet making	01
12	Bitter gourd tea making	01
13	Non-defined enterprises	07
	TOTAL	194

Agro-industrial sector of Pailin is currently dominated by businesses engaged in silos, drying, buying and selling of cassava and maize (20.6%) followed by rice wine making (18.0%) and rice milling (15.5%). Very few are processing agro-produce into new varieties of final agro-products (for example, cassava-based cosmetic products, flour, noodles, cassava-based bags or bottles, longan marmalade, dry longan, mango juice, bran cooking oil, rice cakes, rice crackers, cassava-based wine, etc.).

3.2. Potential Agro-Industries

Two agro-commodities are potential for agro-industry development in Pailin. These include cassava and longan. Feed maize is a potential candidate too. Currently, produce of these crops are mainly exported in raw or, at best, semi-processed forms.

Now, a Chinese company is building a sorting, grading and packing facility that will handle longan produce for export to China. Only fresh good grade longan will be absorbed by the company. This means low grade longan will remain for local markets if demand is there or wasted.

A Cambodian who is a member of Pailin's longan association working with the association members to export fresh longan to China through Thailand. He buys only Grades 1-4 (this constitutes 70-80% of all members' harvest, the rest is non-graded/low grade fruits); non-graded longan produce will be dumped or left for local consumption, if any. Probably, the Chinese company and the association cannot absorb all the produce. Additional exporters of fresh fruits might be needed, but investors in processing graded and non-graded longan produce into other product types (such longan wine, longan juice, longan marmalade, dry longan) are also needed.

A Korean company was looking into a possibility to set up a cassava-based wine making factory. The company recognised that Pailin's cassava produce is of fine quality with 20-25% DSC (Dry Starch Content). (For CP, 80% of Pailin cassava is of good quality for its feed making factory. It recognises that Pailin's cassava is better than

that coming from neighbouring provinces.) However, the Korean firm might not invest in the cassava wine making factory. One major inhibiting factor is reportedly transport costs.

4.0. Demand for and Supply of Agro-Industrial Products

4.1. Demand

More than 90% of processed agro-products demanded and sold in Pailin are from Thailand. Very limited range and amount of locally processed agro-products (such as milled rice, rice wine, banana chips) or inputs (e.g., feeds, liquid fertilizers) are on sales.

4.2. Supply

Supply and consumption of locally or domestically processed agricultural products in Pailin is negligible; it is very small in range and limited in amount. Nearly 100% of processed food items, for example, are imported from Thailand.

5.0. Enabling Environment

5.1. Human Resources

Availability of managerial skills in human resources for agroindustry development is limited or non-existent. Only unskilled labour is available.

5.2. Property Rights

At least 60% of families or households in Pailin hold titles to their land. No land conflicts or very few cases of land conflicts have occurred or been reported. No public land is available for concession. Nonetheless, it is reported that there are about 200 ha of highly degraded/deforested land that offer potential for "agroindustry cluster". (Pailin has not been considered a special economic zone.)

Although public land is not available for economic concession, investors, processors or businesses can always purchase land, if needed, for their investments and apply for titles. These land titles, for local households, are useful as collateral for accessing loans from banks or MFIs.

5.3. Infrastructure

Majority of roads (70-80%) in Pailin are in good condition. Most of the roads in Pailin city are paved; only a few are laterite roads. In the future many of these roads will be built of concrete. National and district-to-district roads are all paved. Some commune-to-commune roads are also paved. All roads are well maintained. According to farmers, nearly all farm roads are in good condition.

About 60% of households in Pailin are covered with tap water system. The rest depends on wells and rain water harvest and storage. For many business facilities, for example CP's, outside township sections, water is extracted from well/s.

Farming is mainly rain-fed. Limited irrigation systems are available mainly for paddy production. Some plantation and field crops such as longan, mango, cassava or maize may have depended on groundwater as well, to a very limited extent. Two water schemes are being planned. They are multipurpose projects that will make water available for domestic consumption and for irrigation and will also generate some electricity. In the city and residential areas there is sanitary service, but it is very irregular.

Electricity for Pailin is sourced from Thailand and national grid through Battambang. At least 60%-70% of the households in the province have connection to the grid; and electricity's tariff rate is 800-1,000 Riels per kilowatt hour. Supply is not stable especially when there is heavy rain and storm blackout occurs.

5.4. Sub-National Policies

National policies and institutional frameworks are followed and always take precedence. No sub-national level policies and institutional frameworks are decreed or enforced.

5.5. Research and Development

No researches have been conducted. Extension services are mainly offered by PDAFF in aquaculture, CF, banana chip processing, and food safety and quality management. No extension works for cassava and maize are implemented. PDAFF carries out some monitoring activities of rice mills to ensure quality and safety of milled rice.

Researches in agricultural production and agroindustry activities are required.

5.6. Financing for Agro-Industries

Major banks and MFIs such as ACLEDA, PRASAC, AMRET are present in Pailin. Businesses and farmers can borrow from them. However, collateral is required if large amount of loans is needed. Since borrowers lack collateral they can only borrow small amount of loans, which are not suitable for long-term and significant investments.

5.7. Ease of Doing Business

To start and do a business in Pailin is not very difficult or challenging. Most often businesses, especially big ones, could get their business start-up projects with approvals of either the provincial administration or line ministries in Phnom Penh; and local line agencies provide support accordingly.

Registration of businesses or enterprises is now decentralised. Registration is not very difficult and done at the provincial level.

5.8. Agro-Industrial Technologies and Business Development Services and Linkages

Availability of technologies for agro-industries is limited or almost next to nothing. No business development services supporting agroindustry development are available.

Business linkage - connection between producers and buyers and/or processors, and local and regional markets as well as overseas markets is very limited. No contract farming exists. Farmers and buyers, for example, are aware of the contract farming arrangements and practices. PDAFF has disseminated information on and promoted CF. Product fairs and fora to promote this have been organized and facilitated by PDAFF. Unfortunately, however, none of them is interested, but informal arrangements.

6.0. Conclusions and Recommendations

6.1. Priority Agro-Industries

There are two potential agro-commodities for piloting and developing agro-industries in Pailin. These include cassava and longan.

At the present time, only CP, one of the largest animal feed making company in Asia, buys cassava chips and maize grains for manufacturing of poultry and pig feeds. However, it cannot absorb all of the produce that is locally produced. Therefore, excess raw produce is being exported to Thailand and/or China via the former.

Potential pilots could include agro-industries that process cassava into flour; noodles; ethanol; wine; cosmetic products; biodegradable wrapping materials, bags and bottles; etc. (Excess maize can also be processed into ethanol.)

As for longan, main export destination is China; and that export is done via Thailand. The export concerns only fresh fruits that are being sorted and packed in Thailand. Now a Chinese firm will do some of these. But more of these activities should be retained within the province for value added. Surplus produce will occur in the coming years, and low grade fruits require processing to satisfy markets and for value added. Potential pilots could involve agro-industries that

Both cassava and longan and possibly maize could enable Pailin to become an agroindustry (AI) cluster taking into consideration the many factors below:

(a) Pailin's proximity to deep seaports in Thailand conducive to export beyond Thai's markets (assuming that the RGC can make arrangements with the TRG);
(b) Pailin's proximity to Thailand allows it to easily import related technologies, techniques and skills from Thailand and possibly imitate/learn from Thai agroindustry's success;
(c) A variety of and vibrant local agro-enterprises (e.g., silos, drying pads, and warehouses for raw or semi-processed cassava and maize dot the landscape of the province):
(d) AI cluster in Pailin can be an AI catchment area for Battambang and Banteay Meanchey that are producing similar produce (e.g., cassava, maize, longan and mango); and
(e) Infrastructure is good shape or even better than the two neighbouring provinces.

The AI cluster will allow Pailin's agro-industrial sector to achieve external economies. It can be a potential model for other region too.

Farmers and buyers are reluctant to do formal CF because they do not see any benefit. In addition, if there are disputes or breaches regarding contract execution there is no acceptable or trusted enforcement mechanism. They do not want to deal through court if there is a conflict. Going through court takes a lot of time that is not suitable for agricultural produce which is perishable and costly when it comes to shelf life and storage.

6.2. Key Binding Constraints

Important constraints for the development of agro-industries in Pailin are the lack of access to relevant technologies (including technical tools, equipment and machines) and skilled human resources. Quality of and trust in locally processed agricultural products are other issues. Consumers are not sure of food safety of the locally processed foods or drinks, for example. Labelling, branding and trusted certification do not exist.

Credit is expensive and only physical collateral is accepted. Transport cost remains high; this could be a challenge for processors and exporters as it affects competitiveness of final products delivered to consumers.

6.3. Investment Budget and Private Sector Roles

There is a strong and urgent need for researches in agricultural production and agroindustry activities, especially those relating to cassava and maize. However, estimate is not available.

Important roles of private sector is in marketing; provision of repair services for farm and factory machines; and distribution of inputs on credit and/or at cheaper prices.

Appendix 4: Tboung Khmum Agro-Industry Profile

NB: Information contains herein is derived from interviews of people by PDAFF and met by the consultant during field visits in Tboung Khmum province.

1. Introduction

1.1 Geography

Tboung Khmum province is located to the east of Cambodia bordering with Kratie to the north, Kampong Cham to the west and south-west, Prey Veng to the east and south east, and Vietnam to the east. It is situated 153 km from Phnom Penh, the capital city of Cambodia. It has a total land area of 250.51 sq. km. Much of the province is on upland area covered with red soil, one of the most fertile soil types of Cambodia for agricultural production. Its western part that borders with Kampong Cham that is flooded during the rainy season lies along the Mekong that brings silt to the area every year. Certain parts are flat plain. The geography of the province is generally favourable for industrial crops - both annuals and perennials. At least two thirds of the province is covered with industrial crops such as rubber, cashew, mango, banana, cassava, maize, sugar cane, pulses, just to name a few. Only one third is devoted to paddy rice production.

1.2. Climate

Like all other provinces and municipalities of Cambodia Tboung Khmum province is characterized by tropical climate that creates two distinct seasons - wet season (May-October) and dry season (November-April). Rainfall is variable from year to year from district to district. Nonetheless, average total rainfall is 1,569.2 mm per year.

In recent years, rainfall has been erratic. It is very hot and dry. This may be due to climate change impact. The changing climate does have undesired effect on agriculture, and thus livelihoods of farmers and agricultural production.

1.3. Population and Occupation

Tboung Khmum has a total population of 843,310. Total number of households is 189,803. The population density is 160.6 persons/sq. km. Female population comprises 51% of total population. The population grew at 1.16% during 2017-2018. Like most provinces of Cambodia, the population of Tboung Khmum rely on agriculture for their livelihoods. Their farming mainly depends largely on industrial and subsidiary crops and plantations (rubber, pepper, cassava, cashew, mango, banana, feed maize, pulses and vegetables).

2. Agricultural Production

2.1. Potential Commodities for Agro-Industries

Important products, in order of rank, that are potential for supporting agro-industry development include cassava, cashew, rubber, pepper, rice and pulses. Since there is limited or no processing and value addition activities in the province, raw produce of these crops are exported in raw form to Vietnam. Only small quantity of these commodities are exported as semi-process products such as crêpe rubber, dried cassava chips. Cassava's DC ranges from 20% to 25%, which is of good quality.

Cultivated land area, in 2018, for cassava, cashew, rubber, rice and pepper is, respectively, 53,960 ha, 7,637 ha, 79,696 ha, 62,875 ha, and 2,645 ha.

2.2. Competitiveness

No farm budget analyses have been done for potential agricultural enterprises. Therefore, it is difficult to identify their cost competitiveness. Only information on yields is available. Average yield of wet season rice is 3.5 tons/ha and that of dry season rice is 4.0 tons/ha. Most rice production is aromatic varieties whether farmers grow it for home consumption or for sale, and of premium quality.

For rubber the average yield is 1.5 tons/ha, while that of pepper, cassava, cashew and maize is, respectively, 5.3 tons/ha, 25 tons/ha,1,5 tons/ha and 5.0 tons/ha. These products are of good quality that are easily exportable even raw materials.

2.3. Share of Smallholders

Based on size of their landholdings farmers in Tboung Khmum can be classified in both small and large scale groups. More than half (65%) of them possess, on average, less than 4.0 ha/household. They cultivate their farm land to annual as well as industrial crops such as rubber, pepper, cassava, cashew, etc. Smallholder farmers in certain localities grow also vegetables.

2.4. Constraints

Markets and prices of agricultural commodities are very volatile and unstable. Prices for rubber, pepper and cashew have declined significantly over recent years. Only prices of cassava seem to be better. Unfortunately, however, cassava yield has been badly affected by diseases that affect productivity. Fuel prices and scale measures of buyers are major issues for farmers. Fuel is needed in land preparation, pumping, harvesting, and transportation. High price of fuel affect cost of production and post-harvest handling.

High price of fuel really affect farm mechanization, while farm labour becomes scarce and thus more expensive. Increased farm wages are good for farm workers; but production costs are affected.

Mono-cropping, especially, of cassava without proper soil fertility management for years has depleted soil quality. Changing climate has made the weather hotter and drier. Dry spell becomes prolonged. Lack of rain combined with lack of irrigation infrastructure has had negative consequence on agriculture sector of the province.

Credit needed for production remains expensive. Prices of inputs are high as nearly all inputs are imported. Costly credit and inputs blow up the production cost.

Competition in acquiring agricultural commodities is quite limited. Very few manufacturers of agricultural commodities exist. Mechanism to link farms to markets does not exist. Contract farming is not practiced and arbitration service for agricultural trade is not available. Agricultural market information is not adequate. No market intelligence is available.

Buyers/manufacturers and farmers might want to be engaged in CF. However, they are reluctant because they are concerned about the absence of an acceptable and trustworthy mechanism to address contractual conflict. Dealing with CF conflict through traditional court system is not relevant and appropriate, while the trust in the system remains questionable.

3. Existing and Potential Agro-Industries

3.1. Existing Agro-Industries

Nowadays, numerous agribusinesses are presence in Tboung Khmum. Nearly all of them, however, are micro and small; most of them are run as family businesses. A few of them are engaged themselves in processing.

These include, for example, cashew nut processing, mango processing, cassava starch processing, peanut processing, rice milling and feed making.

3.2. Potential Agro-Industries

Two agricultural commodities can be considered potential for developing agro-industry in the province. These include rubber and cassava. Pepper and cashew are also potential. At the present time, these commodities are exported raw or as semi-processed products.

There are a few enterprises that manufacture final products such as cashew nut processing and mango processing in Memot district, cassava starch making in Krong Suong, groundnut processing and animal feed production in Tboung Khmum district. Most of these enterprises export their products to international markets.

Rubber has the largest production acreage in Tboung Khmum. Rubber estates belonging to companies and the Rubber Research Institute cover 31,811.5 ha. Additionally, rubber plantations that belong to smallholder farmers comprise 47,884.5 ha. Currently, there are 21 rubber crêpe producing plants. Crêpe rubber sheets are exported to Vietnam, Thailand, Malaysia, Singapore, etc.

Cassava is also potential for agro-industry development in the province. It is the third crop after rubber and rice. It has a planted area of 53,960 ha. Cassava yield of fresh roots ranges from 18.0 to 25.0 tons per hectare. Farmers either sell their fresh cassava to silos or take them across the border to Vietnam by themselves. As for silos, they export both fresh roots and dried chips to Vietnam.

Two others commodities are potential as well. These are pepper and cashew. Pepper covers a planted area of 2,645 ha. Its produce is exported raw to Vietnam, no value addition. With the decline in prices pepper in recent years, many farmers have their pepper fields unattended. As for cashew, planted area has gained traction in the past few years. If the trend continues cashew will take over other crops, including cassava and rubber.

4. Demand for and Supply of Agro-Industrial Products

4.1. Demand

All types of agro-industrial products and agro-inputs (e.g., fertilizers, herbicides) are on sales. However, nearly all of processed agricultural products demanded and sold in the province are from Vietnam and Thailand as well as other provinces in Cambodia. Actually, there is no locally processed agro-products (except milled rice and those processed by traditional practices).

4.2. Supply

Extremely limited agro-products that are supplied in local markets are processed and made in the province. All of processed agricultural products, except animal feeds, are imported from neighbouring countries (specifically Vietnam and Thailand) and other provinces of Cambodia.

5. Enabling Environment

5.1. Human Resources

Human resources, especially in general management, leadership and agro-industrial management and technologies, are nearly non-existence. Only unskilled labour is available, to a limited extent. Many have migrated for jobs in the city centres or overseas.

5.2. Property Rights

Most farming households have access to land. However, only about 50% of them have land titles to prove their ownership. Despite this fact, land dispute is not a problem, there are very few cases. Households with land titles use them as collateral to access loans with MFIs.

Public state land remains available in Tboung Khmum. Such land be converted and offered as economic land concessions (ELCs) to investors by the RGC. Investors can apply for ELCs and invest in agribusinesses.

5.3. Infrastructure

Most of road infrastructure (70-80%) in Tboung Khmum is in good condition. More than half is paved with asphalt. However, some that connect rural area are still in dirt or laterite. In the near future these roads will be rebuilt in concrete. Nearly all roads connecting districts are paved; and most roads linking communes are too. Farm roads are also good. All roads are regularly maintained.

Tap water is accessible by about half of the province's population. The remainder use water from wells or rain harvest. Water supply and sanitation project for rural areas is planned. In township centre hygiene service is available, but on irregular basis.

Irrigation infrastructure remains limited, and is generally for rice production. Other farming activities are totally rainfed. Certain farmers use groundwater for their crops such as pepper, vegetables, cashew, cassava, mango and rubber.

Electricity for Tboung Khmum is supplied from hydropower in Stung Treng and from Vietnam. At least 70-80% of households are connected to electricity grid. However, supply is not yet stable; especially, blackout occurs during heavy rain and storm. Electricity tariff is 484-720 Riel/kWh.

Special Economic Zone was recently established in Dar commune of Memot district. However, its development is slow and will take time. No investors have yet expressed any interest.

5.4. Sub-National Policies

No policies or institutional instruments are issued at sub-national level. Only national policies and instruments are followed and enforced.

5.5. Research and Development

No researches related to AI have been done. Extension service has been mainly provided by PDAFF; and it is focused, generally, on animal raising, CF, and food safety and quality control. No extension service deals with non-rice crops, except vegetables. Researches and extension service in non-rice crops are needed in order to support the development of agro-industries.

5.6. Financing for Agro-Industries

Large banks, and MFIs are present in the province. These include, for example, ACLEDA, PRASAC and AMRIT. Agribusiness investors and farmers are able to borrow from these institutions for their businesses. They can access these institutions only with collateral if there required loans are large. Without collateral they can get only small loans. Interest rate, in addition, is still high.

5.7. Ease of Doing Business

Starting a business in Tboung Khmum is not difficult. Investors will receive full support from sub-national administrations, authorities, and departments as well as concerned ministries at national level. Potential investors are welcomed.

5.8. Agro-Industrial Technologies and Business Development Services and Linkages

Technologies available for agro-industrial processes and development are almost non-existent in Tboung Khmum.

No business development services that can support the development of agribusinesses exist.

Business linkage - connection between producers and buyers and/or processors, and local and regional markets as well as overseas markets remains limited. No contract farming exists. Farmers and buyers, for example, are aware of the contract farming arrangements and practices. PDAFF has disseminated information on and promoted CF. Product fairs and fora to promote this have been organized and facilitated by PDAFF. Unfortunately, however, none of them is interested. This could be due to the fact that they still do not trust each other and they do not appreciate PDAFF's facilitation.

Farmers and buyers are reluctant to enter into any CF arrangements because they do not feel the benefit. Furthermore, there is no acceptable and trustworthy mechanism for them to address dispute or contractual breach. In case of conflict or breach of contracts, they do not want to go through traditional court system. The use of conventional court system is time consuming, which is not applicable to agricultural trade as most of agricultural products are perishable and their storages are very costly.

6. Conclusions and Recommendations

6.1. Priority Agro-Industries

Five agricultural commodities have potential for promoting agro-industry development in Tboung Khmum. These include cassava, cashew, rubber, rice and pepper. Currently, there are numerous agro-industries. However, the majority of them are small and medium. Below is a summary listing of these agribusinesses.

No.	Agribusiness	Number of enterprises
1	Crêpe rubber processing	60
2	Rice milling	12
3	Cashew nut processing	01
4	Mango processing	01
5	Peanut processing	01
6	Cassava starch processing	02
7	Feed mill	01
	Total	78

These agro-industries are not able to absorb fully the agricultural outputs of the province. As a consequence, surplus of raw agricultural materials are being exported to Vietnam.

Potential agro-industries that may be considered for piloting could be cassava-based industries such as cassava starch processing, noodle making, ethanol production, wine, cosmetic products, biodegradable wrappers and containers, etc.

For rubber, main markets are Vietnam, Thailand, Singapore and Malaysia. Rubber export from Tboung Khmum comprises the largest share in Cambodia's total rubber export.

6.2. Key Binding Constraints

Key constraints are lack of technologies and skilled human resources that can support the development of agro-industry sector. Quality of and local consumers' trust in locally produced agro-industrial products are limited. Consumers are not convinced of safety of food and beverage products that are produced locally. Proper labelling and certification remain lacking.

Another important constraint is capital. Loan is expensive and requires collateral. Transport cost remains high with rampant informal fees on the road, which is very challenging for processors and exporters as it affects their competitiveness and final sale prices.

6.3. Investment Budget and Private Sector Roles

There is an urgent need for researches in potential agricultural production that supports agro-industrial development in the province. The important researches relate to cassava, cashew, pepper, and maize value chains. However, no estimated budget can be made at this stage.

Private sector in the province is very active in providing various services, including marketing, repair of farm machines and manufacturing plant, agro-input distribution. If enabling environment is good private sector can be encouraged to invest in other agribusinesses that can add value to local agricultural commodities and create local employments.

Appendix 5: Lessons Learned from the Rice Milling Sector[10]

The Royal Government of Cambodia (RGC) adopted a Policy on the Promotion of Paddy Rice Production and Milled Rice Export in 2010. The policy (i) was formulated without sufficient consultations with the private sector and farmers; (ii) did not provide a clear vision encompassing sustainability of the sector and targets for values of exports, value added, and farm income (even though rice is produced by millions of smallholders across the country); and (iii) did not establish an independent and regular monitoring and evaluation system.

Nevertheless, the implementation of the policy witnessed improvement in Cambodian logistics between 2009 and 2015. Export procedures were streamlined and the costs of logistics reduced. Transport infrastructure including railways between Poipet and Phnom Penh and Phnom Penh and Sihanoukville, and the port of Sihanoukville were upgraded. New sanitary and phyto-sanitary regulations and SPS capacity have been improved. However, Cambodia still lags behind its neighboring countries in the logistic aspects and SPS compliance.

As a matter of fact, the policy has paved the way for the development of the rice milling sector and benefitted agro-industry at large. The target of 1.0 million tons of milled rice export by 2015 was not achieved; but the policy actually facilitated (i) the dramatic increase in private sector investment in rice milling, and polishing; (ii) the rise of milled rice export; and (iii) the emergence of the Cambodian Rice Federation (CRF) as a major rice sector player.

Despite the increased investments and presence the rice milling companies (i) have not been able to establish a solid supply chain management system; and (ii) have challenges in accessing finance (although there is no indication that banks are biased against the rice millers). Even the RGC was committed and the rice millers and exporters seem to work together, to a large extent, under the same apex body – the CRF – Cambodian rice was traded without a value added brand until 2018, while Cambodian fragrant rice received the world's best rice award several times.

Investment – by both public and private sectors – in research and extension remained low throughout the policy's period. This possibly resulted in stagnant productivity in rice farming, and in turn affects the availability and thus the adoption of innovative technologies required to boost productivity. Productivity at the farm level and rice farmers' income have remained low in spite of the higher use of inputs such as fertilizers and farm equipment; increased investments in irrigation; enhanced access of farmers to credit; increased investments in rural roads and electricity infrastructure; and the enactment of new regulations for cooperatives and contract farming.

[10] These lessons learned are adapted from the review of the Policy on Paddy Rice Production and Milled Rice Export 2010 conducted by Francesco and Srey in 2016.

Annex 2: Contract Farming

(Source: The World Bank, April 2016)

Contract farming is a transaction-based approach to coordination in agro-food value chains. Though contract farming is centuries old and its track record is mixed, there is rising interest in its potential to address traditional as well as emerging challenges related to food production and marketing. These include increasing demand for quality, sustainability, traceability, and certification, and growing competition for agricultural land and labor (based on Will/GIZ 2013).

On the most basic level, contract farming offers a potential means to reduce the transaction costs involved in sourcing agricultural products, and conversely, getting these to market. Though there is no single contract farming model, it generally involves a formal agreement—often between a multiplicity of producers and at least one buyer such as a processor or trader—to buy/sell agricultural products on terms established in advance. In addition, it is common for contract farming agreements to address market failures surrounding the provision of agricultural inputs, technology, and services such as finance, extension, training, transportation, and logistics—by involving buyers or third parties in delivering these to farmers.

Contract farming has also become a growth strategy for a number of processing and trading firms facing tightening land, labor, or other resource constraints, as well as increasing pressure to meet more rigorous or restrictive environmental, labor, social, land-use, food safety, quality, and traceability standards. In some contexts, smallholders can become a source of competitive advantage by providing access to ever scarcer land and labor resources, and local farming knowledge (Will/GIZ 2013). And comprehensive, forward-looking arrangements with such producers can help lower the costs and increase the feasibility of meeting higher standards. Buyer involvement ranges from providing or dictating the use of certain inputs (e.g., specific varieties), to controlling or investing in most aspects of production from land preparation to harvesting (e.g., land, machines, staff, management). The latter is often true when large volumes of a commodity need to be of a uniform quality for processing (e.g., sugar cane, cotton, coffee, tea, dairy, poultry, and so forth); and when buyers source from their own estates as well as contracted farmers (e.g., outgrower schemes involving perennials, Will/GIZ 2013).

When it goes well, contract farming can offer buyers greater consistency in terms of quality and volumes, a better alignment of supplies and customer requirements, and lower operating risks and costs. For smallholders, central benefits of successful contract farming include enhanced access to markets along with higher and more stable incomes. Under some arrangements, producers negotiate an equity stake (i.e., become joint owners) of productive assets such as land and processing facilities.

While contract farming is primarily private-sector led, government support for such arrangements is not uncommon on the grounds that these can contribute to meeting broader policy objectives such as inclusive growth, food security, or the protection of natural resources. Besides improving the enabling environment (e.g., the rule of law, the quality of infrastructure, health, and education, political stability, financial markets, and so forth), government can encourage contract farming by facilitating interactions

and brokering transactions among potential counterparts, establishing a legal framework for farming contracts, putting economic incentives in place, building technical and institutional capacity, and educating counterparts about potential benefits and risks. India, Vietnam, Morocco, Thailand and other countries have developed policies aimed at promoting it (Will/GIZ 2013). Box 1 offers an example of a public-sector led approach to contract farming that has taken root in China. That said, the public sector needs to tread carefully. A number of contract farming arrangements have owed their failure to facilitators in the public or non-profit sector getting ahead of value chain actors and pushing for arrangements that were not in line with existing capacities, ambitions, risk-preference, or levels of trust; or that put development objectives ahead of business viability.

Box 1: The Dragonhead Enterprise: An East Asian Take on Contract Farming

A public sector-led variant of contract farming, China's dragonhead enterprise model has become a core part of the government's strategy to promote vertical coordination in agricultural value chains and help farmers to access higher value markets by connecting them to leading agro-enterprises. It accomplishes this by offering subsidies, such as fiscal incentives, to lead firms that formally qualify to receive the dragon head label. For this, firms must meet certain requirements, including that they source at least 70 percent of the material they use in processing or distribution from external, small-scale farms. Farmers, for their part, must join cooperatives to deliver their products to these firms. Meanwhile, the government actively supports farmer cooperatives, which it sees as improving small-scale producers' ability to meet food safety and quality requirements. It does so not only financially, by offering credit, fiscal advantages and direct support, but also by organizing mobilization meetings, providing land and office space, and giving out awards (Verhofstadt et al. 2014). The dragonhead enterprise model resembles the agricultural cluster model (see related thematic sheet) in that it promotes formal contracts and informal relationships to connect actors in the value chain. Unlike the cluster model, however, the dragon head model centers around one or few, rather than a multiplicity, of firms to organize collective action. In that sense, it is more akin to contract farming. The central place of the value chain construct in these approaches—which actively seeks to link and promote cooperation and competition among value chain actors—is relatively new in China. Until recently, different parts of the value chain fell under the purview of different government bodies and were treated as separate. Now, the ministry of agriculture has been empowered to support value chains as a whole, as the government has downgraded or abolished the role of other ministries (Galvez-Nogales/FAO 2010).

Annex 3: Food Safety Governance (Food Safety and Quality Assurance)

(Source: The World Bank, April 2016)

High profile outbreaks and increases in the recorded incidence of food-borne illness have led many governments to tighten food safety regulations and oversight. At the same time, industry has increasingly taken food safety into its own hands and developed private food safety control mechanisms (whether voluntarily or as directed by regulation or cooperative agreements). In several countries and regions including Canada, New Zealand, and the EU, the public sector has fostered close cooperation between government and industry, an approach broadly known as co-regulation.

While a purely market-driven control system may not yield socially efficient outcomes, Martinez et al. (2007) note the benefits of co-regulation by highlighting how the alternative—an approach based solely on coercion — "can breed minimalist approaches to compliance resulting in sub-optimal improvements to public health alongside significant expenditure of resources on enforcement and monitoring." Greater coordination of public and private sector efforts can be beneficial (in terms of efficacy or efficiency) when it comes to setting food safety standards, but also when it comes to implementation, monitoring, and enforcement.

Co-regulation typically involves cooperation between the public and private sectors to create new rules, whether these take the form of mandatory, binding, or purely voluntary food safety standards or agreements. In several countries, the public sector has come to rely increasingly on standardized risk and cost-benefit assessment methodologies to objectively evaluate specific risks before taking regulatory action. In this context, co-regulation has represented an attempt to remedy the fact that oftentimes, these assessments have involved industry too little or too late.

In some instances, the government has encouraged industry to develop and implement its own codes of good conduct. In Canada, for example, the impetus to develop on-farm HACCP[11] programs came from a number of commodity organizations (especially for pork, chicken, and eggs); these started developing voluntary codes of safe practices. Recognizing these efforts, the government stepped in in the capacity of facilitator and coordinator, eventually leading to the formal recognition of individual commodity programs by the Canadian Food Inspection Agency. By contrast, the development of national, voluntary organic standard by the U.S. Department of Agriculture (USDA) in the early 2000s illustrates how the absence of co-regulation can result in the duplication of effort and slow progress. In this case, although 50 organic certifiers operated prior to the national standards being put in place (by USDA), the national standard did not attempt to build on these and the labeling program took ten years to develop (Martinez et al. 2007).

[11] According to the U.S. Food and Drug Administration, HACCP is: "a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product." http:// www.fda.gov/Food/GuidanceRegulation/HACCP/

Annex 4: Agro-based Clusters

(Source: The World Bank, April 2016)

Agro-based clusters[12] foster interactions among all actors in a value chain, including public institutions, to help innovation and competitiveness. Public sector promotion of agro-based clusters has emerged as one response to the productivity and market pressures on agro-industry that are being shaped by globalization, standardization, high-value production, massive growth in demand, retail and packaging innovations, and a ramp up in efficiency (Galvez-Nogales/FAO 2010). They have been particularly helpful to export agriculture by improving productivity, value-addition, and access to high-value markets. They have also benefited small producers by allowing them to participate in economies of scale and share costs related to training, quality management, market information, and capital-intensive assets. Another benefit of clusters, in some cases, has been their contribution to creating a regional or brand identity, often with links to other clusters such as tourism (Galvez-Nogales/FAO 2010).

The public sector can support clusters in multiple ways that include investing in human capital through education and training, promoting cooperation among firms, strengthening applied research institutions, and adopting industry-friendly policies. Box 2 provides examples of this through examples of agro-based clusters in Latin America.

[12] Agro-based clusters are a concentration of producers, agro-industries, traders and other private and public actors engaged in the same industry inter-connecting and building value networks, either formally or informally, when addressing common challenges and pursuing the same opportunities (FAO 2010).

Box 2: Public Sector Support for Clusters: Examples from Latin America

Clusters do not usually emerge spontaneously, but take shape through the efforts of agents such as government, large local firms, foreign direct investors, and universities, often working in concert. In most cases, clusters are shaped by public-private collaboration. The flower cluster in Ecuador and apple cluster in Santa Catarina, Brazil, for example, were the product of public collaboration with lead firms. In some cases, the private sector has played a driving role and government has only become involved at a later stage as in the case of the Rio Grande do Norte melon cluster in Brazil (Galvez-Nogales/FAO 2010). Chile's salmon cluster offers an example of a cluster in which government has played a significant, supporting role. That cluster is known for having turned Chile, previously a minor player in the salmon industry, into the world's second largest producer. In this case, government helped by building trust and facilitating joint action among different industry players. It also funded and collaborated in research and program design efforts to overcome a wide variety of challenges related to upgrading (e.g., fish health and genetics, supplier management and certification, vaccine registration, coastal zoning, fisher registration, regulatory enforcement, and clean production). As in Chile's multiple fruit clusters, an integrated territorial program that sits within a key industry association helped to align regional government efforts with business needs. In some cases, as in the Chilean and Argentine wine clusters, government support has been decisive. In both cases, the government played a pivotal role in liberalizing grape and wine production and exports, as well as in enabling collective marketing and export promotion efforts. The public sector in Chile also supported technology absorption, especially by small producers, while in Argentina, the government promoted public-private partnerships and participatory governance which engaged industry in mutual monitoring. However, examples of government, alone, creating clusters from scratch are extremely rare; the Brazilian Petrolina-Juazeiro mango and grape clusters are exceptional in this respect. This is because clusters build upon the co-location of their actors, and the formal and informal linkages between them— elements that develop organically, over time, even if they are later encouraged.

Annex 5: Agribusiness Incubation

(Source: The World Bank, April 2016)

Agribusiness incubation has emerged over the past 15–20 years as a means to stimulate commercial agriculture and transform comparative advantages in commodity markets into competitive advantages in differentiated product markets (Goletti/World Bank 2011). A defining characteristic of agribusiness incubators is that they directly engage with startups to help them grow, usually offering them a range of advisory and business development services geared to improving firms' competitiveness and access to markets. Box 3 describes and provides examples of various types and roles of agribusiness incubators.

Government involvement in agribusiness incubation varies significantly, and incubators enjoy different degrees of financial and political autonomy. Many are non-profits and start out with public sector and other external sources of funding from which they wean themselves to varying degrees. Incubators are generally able to cover some if not all of their operating costs by charging firms for access to their services and facilities, i.e., by charging consulting, business development, marketing, franchising, rental, and other fees. Over time, certain incubators invest in the firms they incubate as well as their intellectual property, allowing them to share in their profits and royalties.

Box 3: Types and Examples of Agribusiness Incubators

Some incubators are dedicated to accelerating technology commercialization or technology transfer. The former typically have strong ties with agricultural research institutions; oftentimes they are arms or spinoffs of such institutions. Examples include the ICRISAT-affiliated Agribusiness Incubator (ABI) in India—now the country's largest agribusiness incubator—IAA-IPB, affiliated with the Bogor Agriculture University in Indonesia, and Brazil's CENTEV/Technology Based Business Incubator, affiliated with the Federal University of Vicosa. Though their ties to research are to some degree these incubators' strength as they provide privileged access to, and understanding of, the latest research, these carry certain risks. Examples of incubators that focus on technology transfer—at the grassroots and high-tech levels respectively—are Villgro in India, and the Malaysian Life Sciences Capital Fund. Villgro accelerates the uptake of indigenous technology with activities involving knowledge creation and sharing, competitions and awards, brokerage between innovators and entrepreneurs, and retail, mostly at the village-level. These activities aim to build rural confidence and networks. MLSCF, a public-private venture fund, is focused on importing technologies that can be adapted to the national oil palm industry. Incubators transfer technology across national and corporate borders in various ways, including through intellectual property markets, manufacturing contracts, and joint ventures. Some incubators go beyond technology commercialization and provided a broader set of support services. Timbali Industrial Incubator in South Africa, and Fundacion Jalisco in Mexico—focused on high-end floriculture and packed fresh berries respectively—are examples of incubators that specialize in developing value chains as well as providing market access to small-scale farmers. Both have developed farm-level business models that large numbers of small-scale producers can adopt, along with a suite of supportive farm-level and supply chain services (e.g., the identification of new inputs, cropping methods and handling technologies, marketing, packing, order fulfillment, logistics, cash management). They allow what are generally low-asset, low-capacity, risk-averse producers to access distant and high value niche markets that they would not be able to access on their own, or even through existing farmers' organizations. Timbali specifically recruits and nurtures black, female agro-entrepreneurs to launch franchises. Both organizations have cultivated internal competencies and relationships to undertake or outsource market research and the testing of products before their launch.

Annex 6: MAFF's Responsibilities in Agribusinesses

MAFF roles in and responsibilities for agribusinesses are defined in several legal instruments of the RGC. Below are extracts of legal provisions that define functions, roles and responsibilities of MAFF, in particular, of DAI as regards fields relating to agroindustry/agribusiness activities.

Article 4 of the Sub-decree No. 17 on the Organization and Functioning of the Ministry of Agriculture, Forestry and Fisheries (2000) defines, in broad terms, the roles of the Department of Agro-Industry. The article establishes that the DAI's roles are:

- To design policies, plans, programs, projects and measures for development of agro-industries;
- To be involved in resolving problems associated with the development of agro-industrial and food enterprises;
- To be involved in making concepts that encourage and promote the agro-industrial and agri-food enterprises;
- To be involved in the encouragement and promotion of investments in exports of agricultural and food products;
- To disseminate technological and agro-economic information to farmers and industrial and commercial partners in cooperation with specialized public institutions and farmer organizations; and
- To perform other duties as may be assigned by the higher management.

This clearly suggests that the DAI is created to mainly provide technical and policy advice and support processes (such as policy, program, project, and concept formulation, and information dissemination), which support the development of the AI sector.

Overall, MAFF roles and responsibilities relating to agribusinesses are very basic. The ministry covers only farm to primary processing activities in the agri-food system. Article 11 – Article 13 of the Inter-ministerial Prakas 868 (2010) specifically determine MAFF roles and responsibilities in primary production and primary processing activities. According to the Prakas, the primary processing activities are referred to very basic processes such as grinding; cleaning; husking; peeling; cutting and slicing; threshing and winnowing; slaughtering; gutting, skinning, drying, deboning and filleting; and preservation that do not change much original nature of agricultural produce. Furthermore, the Prakas defines that primary processing excludes processing activities that are carried out in small, medium and large handicraft and factory facilities or units.

Albeit such limitation, the roles and responsibilities of the MAFF, and especially DAI, in supporting and facilitating agribusinesses/agro-industries should not be constrained. The MAFF/DAI should be proactive when it comes to agribusinesses/agro-industries otherwise its plans and achievements in increasing agricultural productivity, expanding agricultural production and agricultural diversification will not be strategically advantageous for the economy and the nation when coordination among institutions hardly takes place. For this reason, *the RGC may revisit existing relevant legal instruments and frameworks that confine the MAFF/DAI roles in and responsibilities for agribusiness/agro-industry development*.