

Lao People's Democratic Republic
Ministry of Agriculture and Forestry
Dept. of Agricultural Extension and Cooperatives

PROJECT FOR
STRENGTHENING FOOD VALUE CHAIN
IN LAO PDR

FINAL REPORT
VOLUME-II

MASTER PLAN
FOR
STRENGTHENING FOOD VALUE CHAIN

May 2025

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.

ED
JR
25-040

**Project for
Strengthening Food Value Chain in Lao PDR**

Final Report

List of Volumes

Volume-I: Main Report

Volume-II: Master Plan for Strengthening Food Value Chain

Volume-III: Annexes (Available in digital format only)

Volume-IV: Pilot Projects

**Project for
Strengthening Food Value Chain in Lao PDR**

**Final Report
Volume-II: Master Plan for
Strengthening Food Value Chain**

Table of Contents

Table of Contents	
List of Abbreviations	
Measurement Units	
Executive Summary	
	<u>Page</u>
CHAPTER1 INTRODUCTION	1-1
1.1 Background.....	1-1
1.2 Schedule of Mater Plan Formulation	1-1
1.3 Structure of Master Plan Formulation	1-2
1.4 Selections of Target Commodities for Master Plan Formulation	1-2
CHAPTER2 NATIONAL PLANS AND POLICIES	2-1
2.1 National Plans and Policies	2-1
2.1.1 Categories of FVC-related Policies, Laws and Regulations.....	2-1
2.1.2 FVC-related Plans and Policies.....	2-1
2.1.3 FVC-related Laws and Regulations.....	2-7
2.2 Relevant Governmental Organizations Related to FVC Strengthening.....	2-14
2.2.1 Ministry of Agriculture and Forestry	2-14
2.2.2 Ministry of Industry and Commerce (MOIC)	2-19
2.2.3 Department of Food and Drugs (DFD) under Ministry of Health.....	2-20
2.2.4 Tariff Department (TD)/Custom Department (CD) under Ministry of Finance.....	2-21
2.2.5 Other Relevant Organizations Including Academic Institutes	2-21
2.3 FVC-related Projects	2-24
2.3.1 Outline of the FVC-related Projects	2-24
2.3.2 Good Practices and Lessons from Related Projects	2-28
CHAPTER3 CURRENT STATUS OF AGRICULTURE SECTOR IN LAO PDR.....	3-1
3.1 Natural Conditions.....	3-1
3.1.1 Topographical Situation	3-1

3.1.2	Climate Conditions.....	3-1
3.1.3	Natural Disasters	3-2
3.1.4	Soil	3-2
3.2	Social Conditions.....	3-3
3.2.1	Administrative Classification	3-3
3.2.2	Demographic Situation.....	3-3
3.2.3	Economic Situation	3-4
3.2.4	Land Use	3-6
3.2.5	Infrastructure	3-6
3.3	Agriculture Production	3-7
3.3.1	Crop Production	3-7
3.3.2	Livestock Production.....	3-9
3.3.3	Fishery Production	3-10
3.4	Farmers and Farmers' Groups	3-11
3.4.1	Farmers and Farm Households.....	3-11
3.4.2	Farmers' Income.....	3-11
3.4.3	Farmers' Groups and Cooperatives	3-12
3.5	Food Processing.....	3-13
3.6	Consumption.....	3-14
3.6.1	Market Price of Major Agricultural Crops and Commodities	3-14
3.6.2	Food Consumption	3-14
3.7	Import/Export of Agricultural Production	3-15
3.8	Regional Status of Agriculture Sector in Lao PDR	3-16
3.8.1	Regional Category of Lao PDR.....	3-16
3.8.2	Provincial Status of Agriculture Sector in 3 Target Provinces.....	3-17
CHAPTER4 RESULT OF FVC SURVEY FOR TARGET COMMODITIES.....		4-1
4.1	Overview of Target Commodities	4-1
4.1.1	Vegetables including Maize	4-1
4.1.2	Fruits.....	4-7
4.1.3	Medicinal Plants.....	4-10
4.1.4	Livestock	4-11
4.1.5	Fishery.....	4-13
4.2	Agricultural Production/Processing.....	4-14
4.2.1	Introduction	4-14
4.2.2	Current Status of Producers.....	4-15
4.2.3	Current Status of Processors.....	4-21
4.2.4	Survey results on Additional Producers and Processors.....	4-22
4.2.5	Key Findings on Producers	4-22
4.2.6	Key Finding on Processors.....	4-24

4.3	Agricultural Cooperative and Farmers' Group.....	4-24
4.3.1	Current Status of Agricultural Cooperative and Farmers' Group in Lao PDR	4-24
4.3.2	Results of the Joint Field Survey on Farmers' Group and Agricultural Cooperative.....	4-27
4.3.3	Findings on Agricultural Cooperative and Farmers' Group.....	4-30
4.4	Distribution and Retail.....	4-30
4.4.1	Middleman and Collector.....	4-30
4.4.2	Traditional Markets	4-34
4.4.3	Modern Retailers	4-40
4.4.4	Findings on Distribution and Retail	4-42
4.5	Agriculture Materials and Finance	4-43
4.5.1	Agricultural Materials	4-43
4.5.2	Agricultural Finance.....	4-45
4.5.3	Findings on Agricultural Materials	4-54
4.5.4	Findings on Agricultural Finance.....	4-55
4.6	Agricultural Extension and Technical Support.....	4-55
4.6.1	Public Agricultural Extension System in Lao PDR.....	4-55
4.6.2	Current Status of Public Agricultural Extension	4-58
4.6.3	Current Status of Private Technical Support.....	4-59
4.6.4	Findings on Public Agricultural Extension	4-60
4.6.5	Findings on Private Technical Support	4-60
CHAPTER5 FVC ANALYSIS FOR TARGET COMMODITIES		5-1
5.1	Introduction	5-1
5.2	Main Actors and Linkage of FVCs for Target Commodities	5-1
5.3	Key Issues on FVCs for Target Commodities	5-25
5.4	SWOT Analysis for Strengthening of FVC in Lao PDR.....	5-30
CHAPTER6 TECHNICAL MEASURES FOR STRENGTHENING FVC		6-1
6.1	Introduction	6-1
6.2	Technical Measures for Production and Processing.....	6-2
6.2.1	Overview	6-2
6.2.2	Technical Measures.....	6-2
6.3	Technical Measures for Farm Management	6-4
6.3.1	Overview	6-4
6.3.2	Technical Measures.....	6-4
6.4	Technical Measures for Marketing consisting of Distribution and Retail	6-5
6.4.1	Overview	6-5
6.4.2	Technical Measures.....	6-5
6.5	Technical Measures for Supporting Measures for Agricultural Input Supply and Finance.....	6-6
6.5.1	Overview	6-6
6.5.2	Technical Measures.....	6-6

6.6	Technical Measures for Extension Services by Public and Academia and Private Sector	6-8
6.6.1	Overview	6-8
6.6.2	Technical Measures	6-8
6.7	Evaluation and Prioritization of Technical Measures	6-9
CHAPTER7 DEVELOPMENT DIRECTION AND APPROACH.....		7-1
7.1	Introduction	7-1
7.2	Approach of Master Plan	7-2
7.2.1	Approach of Master Plan.....	7-2
7.2.2	Climate Resilience of Master Plan	7-7
7.3	Framework of Master Plan	7-8
7.3.1	Development Target.....	7-9
7.3.2	Term and Development Scenario	7-9
7.3.3	Focal Technical Measures	7-9
7.4	Implementation Structure	7-9
7.5	Measurable Figures for Monitoring.....	7-10
CHAPTER8 PRIORITY PROJECTS AND PROGRAMS		8-1
8.1	Introduction	8-1
8.2	Priority Projects and Programs	8-2
8.3	FVC-related Law, Regulation and Policy for Enabling Environment	8-4
8.4	Implementation Schedule and Cost	8-8

List of Tables

	<u>Page</u>
Table 1.4.1	Selection Criteria for Target Crops/Commodities.....1-2
Table 1.4.2	Long List of the Target Commodities1-3
Table 1.4.3	Target Commodities for FVC Survey1-3
Table 2.1.1	Categories of FVC-related Policies, Laws and Regulations.....2-1
Table 2.1.2	FVC-related Plans and Policies2-1
Table 2.1.3	FVC-related Plans and Policies in Lao PDR.....2-3
Table 2.1.4	FVC-related Laws and Regulations in Lao PDR.....2-8
Table 2.1.5	Legal Framework of Agricultural Cooperatives.....2-10
Table 2.3.1	Outline of the FVC-related Projects in Lao PDR2-24
Table 2.3.2	Good Practices and Lessons Learned from the FVC-related Projects.....2-28
Table 3.2.1	Number of Districts, Villages and Households in Each Province3-3
Table 3.2.2	GDP Growth Rate by Sector (%)3-5
Table 3.2.3	The Amount of Investment into Agriculture Sector (2011-2015).....3-5
Table 3.2.4	Land Use in Lao PDR3-6
Table 3.3.1	Planted Area of Major Crops (2019).....3-7
Table 3.3.2	Population and Farming Ratio of Livestock in Major Production Provinces.....3-10
Table 3.4.1	Number of Agriculture Cooperatives in Each Province.....3-12
Table 3.5.1	Number of Agriculture Processing Factory in Lao PDR.....3-13
Table 3.7.1	Import and Export Value of Agricultural Production in Lao PDR.....3-15
Table 3.8.1	Regional Category of Each Province3-17
Table 4.1.1	Target Commodities for FVC Survey4-1
Table 4.2.1	Basic Cultivation Methodologies Asked of Producers in This Survey4-14
Table 4.2.2	Outline of Interviewed Farmers.....4-15
Table 4.2.3	Sale/ha of Producers Team A interviewed4-17
Table 4.2.4	Issues-related to Soil Preparation and Cultivation of 9 Target Crops4-20
Table 4.2.5	Processors Interviewed.....4-21
Table 4.2.6	Issues-related to Raw Material Production, Mentioned by the Processors.....4-22
Table 4.2.7	Findings on Production4-23
Table 4.2.8	Findings on Processing.....4-24
Table 4.3.1	Main Differences between Farmers' Group and Agricultural Cooperative4-24
Table 4.3.2	Application for Establishment of Farmers' Group and Agricultural Cooperative4-25
Table 4.3.3	Simple Business Plan of Thongmang Organic Farming Cooperative (2020).....4-26
Table 4.3.4	Number of Agricultural Cooperative and Farmers' Group in 20204-26
Table 4.3.5	Survey Results of Vegetable Production Farmers' Group in Vientiane Capital4-28
Table 4.3.6	Survey Results of Vegetable Production Farmers' Group in Champasak Province.....4-28
Table 4.3.7	Survey Results of Organic Vegetable Production Cooperative in Vientiane Capital.....4-29

Table 4.3.8	Survey Results of Vegetable Production Cooperative in Champasak Province.....	4-29
Table 4.3.9	Findings on Agricultural Cooperative and Farmers' Group.....	4-30
Table 4.4.1	Conventional Handling Items at Traditional Market and the Recent Trends.....	4-38
Table 4.4.2	Conventional Handling Items at Modern Retailer and the Recent Trends.....	4-42
Table 4.4.3	Findings on Distribution and Retail	4-43
Table 4.5.1	Types of Business of Borrowers of APB.....	4-49
Table 4.5.2	Rate of Non-Performing Loan of APB.....	4-49
Table 4.5.3	Performance of the Loan of ACLEDA Bank	4-51
Table 4.5.4	Performance of the Loan of ACLEDA Bank	4-51
Table 4.5.5	Rate of Non-Performing Loan of ACLEDA Bank.....	4-51
Table 4.5.6	Findings on Agricultural Materials	4-55
Table 4.5.7	Findings on Agricultural Finance.....	4-55
Table 4.6.1	Number of Staff of DAFO Related to Extension Activities	4-59
Table 4.6.2	Findings on Public Agricultural Extension	4-60
Table 4.6.3	Findings on Private Technical Support	4-61
Table 5.2.1	Actors and Activities of Maize FVC in Vientiane Capital.....	5-1
Table 5.2.2	Actors and Activities of Spring Onion FVC in Vientiane Capital	5-3
Table 5.2.3	Actors and Activities of Banana FVC in Vientiane Capital	5-5
Table 5.2.4	Actors and Activities of Sweet Corn FVC in Champasak.....	5-7
Table 5.2.5	Actors and Activities of Cabbage FVC in Champasak	5-9
Table 5.2.6	Actors and Activities of Avocado FVC in Champasak.....	5-12
Table 5.2.7	Actors and Activities of Ginseng FVC in Sekong.....	5-14
Table 5.2.8	Actors and Activities of Cabbage FVC in Sekong	5-16
Table 5.2.9	Actors and Activities of Banana FVC in Sekong	5-19
Table 5.2.10	Actors and Activities of Fish FVC	5-21
Table 5.2.11	Actors and Activities of Pig & Cattle FVC	5-23
Table 5.3.1	Key Issues on Vegetable (including maize) FVC	5-25
Table 5.3.2	Key Issues on Fruit FVC.....	5-26
Table 5.3.3	Key Issues on Medicinal Plant (Ginseng) FVC.....	5-27
Table 5.3.4	Key Issues on Fish Culture FVC.....	5-28
Table 5.3.5	Key Issues on Pig & Cattle FVC.....	5-29
Table 6.1.1	Concept and Number of Technical Measures.....	6-1
Table 6.2.1	Technical Measures for Production and Processing.....	6-2
Table 6.3.1	Technical Measures for Farm Management.....	6-4
Table 6.4.1	Technical Measures for Marketing.....	6-5
Table 6.5.1	Technical Measures for Supporting Measures	6-7
Table 6.6.1	Technical Measures for Extension Services.....	6-8
Table 6.7.1	Evaluation and Prioritization of Technical Measures.....	6-9
Table 7.1.1	Lessons Learnt from PPs and Feedback from FVC Stakeholders	7-2

Table 7.2.1	Overall Target, Master Plan Target and Approaches of Master Plan.....	7-2
Table 7.2.2	FVC Category-wise Strengthening Approach.....	7-3
Table 7.2.3	FVC Model to be Developed through PP.....	7-4
Table 7.2.4	Summary of Provincial Status of Agriculture Sector	7-5
Table 7.3.1	Framework of Master Plan for Strengthening FVC in Lao PDR	7-8
Table 7.5.1	Proposed Indicators for Monitoring of FVC Strengthening Process (1/2) Master Plan Implementation Monitoring	7-11
Table 7.5.2	Proposed Indicators for Monitoring of FVC Strengthening Process (2/2) Project Implementation Monitoring	7-11
Table 8.1.1	Provincial-wise Priority FVC Model.....	8-2
Table 8.2.1	Priority Projects and Programs for 3 Models of FVC	8-3
Table 8.2.2	Priority Projects and Programs for Cross-cutting Activities	8-3
Table 8.2.3	Priority Projects and Programs for External Activities to Support FVC Strengthening....	8-4
Table 8.2.4	Current Situation of Testing of Chemical Residues	8-4
Table 8.3.1	FVC-related Law, Regulation and Policy for Enabling Environment.....	8-5
Table 8.3.2	Status of Quarantine Agreement and Negotiations between Laos and Neighboring Countries	8-8
Table 8.4.1	Overall Cost for the Master Plan Implementation (Summary).....	8-9
Table 8.4.2	Implementation Schedule of Priority Projects and Programs.....	8-10
Table 8.4.3	Related Technical Measures for Priority Projects and Programs	8-13
Table 8.4.4	Overall Cost for Proposed Projects and Programs	8-16

List of Figures

	<u>Page</u>
Figure 1.2.1	Flow and Schedule of Preparation of MP.....1-1
Figure 2.2.1	Organization Structure of Ministry of Agriculture and Forestry2-14
Figure 2.2.2	Organization Chart of Department of Agricultural Extension and Cooperatives.....2-15
Figure 2.2.3	Organization Structure of Ministry of Industry and Commerce.....2-19
Figure 3.1.1	Topographical Map in Lao PDR3-1
Figure 3.1.2	Climate of Lao PDR (average) and 3 Target Provinces3-2
Figure 3.1.3	Soil Map in Lao PDR3-2
Figure 3.2.1	Administration Division in Lao PDR3-3
Figure 3.2.2	Population (Total, Urban, Rural) in Lao PDR and Population of Each Province3-4
Figure 3.2.3	Ratio of GDP at Current Market Price by Sector3-4
Figure 3.2.4	Poverty Rate of Each Province.....3-5
Figure 3.2.5	Road Network in Lao PDR3-6
Figure 3.3.1	Production Trend of “Plants (Crops) as the National Priority Goods”3-8
Figure 3.3.2	Production Share of Vegetables and Fruit Trees of Each Province.....3-9
Figure 3.3.3	Population Trend of Major Livestock in Lao PDR (2011-2020)3-10
Figure 3.3.4	Production Trend of Capture and Culture Fish by Province3-10
Figure 3.4.1	Number of Farm Households (Urban, Rural with road access and without road access) by Province and Proportion of Farmland Size in Lao PDR and Target Provinces.....3-11
Figure 3.4.2	Farmers’ Income by Agricultural Products3-12
Figure 3.4.3	Number of Production Groups (approved and none approved) in Each Province3-12
Figure 3.6.1	Market Price of Major Agricultural Commodities in Lao PDR3-14
Figure 3.6.2	Composition of Food Consumption in Lao PDR3-14
Figure 3.8.1	Regional Category of Lao PDR.....3-16
Figure 4.1.1	Harvested Area and Yield of Maize by Province4-1
Figure 4.1.2	Production Chart and Data Map of Maize by Province.....4-2
Figure 4.1.3	Production, Import and Export Amount of Maize in Lao PDR.....4-2
Figure 4.1.4	Harvested Area and Yield of Spring Onion by Province4-3
Figure 4.1.5	Production Chart and Data Map of Spring Onion by Province4-3
Figure 4.1.6	Harvested Area and Yield of Sweet Corn by Province4-4
Figure 4.1.7	Production Chart and Data Map of Sweet Corn by Province.....4-4
Figure 4.1.8	Production, Import and Export Amount of Sweet Corn in Lao PDR.....4-5
Figure 4.1.9	Harvested Area and Yield of Cabbage by Province4-5
Figure 4.1.10	Production Chart and Data Map of Cabbage by Province.....4-6
Figure 4.1.11	Production, Import and Export Amount of Cabbage in Lao PDR.....4-6
Figure 4.1.12	Harvested Area and Yield of Banana by Province.....4-7
Figure 4.1.13	Production Chart and Data Map of Banana by Province.....4-7

Figure 4.1.14	Production, Import and Export Amount of Banana in Lao PDR.....	4-8
Figure 4.1.15	Harvested Area and Yield of Avocado by Province.....	4-8
Figure 4.1.16	Production Chart and Data Map of Avocado by Province	4-9
Figure 4.1.17	Production, Import and Export Amount of Avocado in Lao PDR	4-9
Figure 4.1.18	Harvested Area and Yield of Ginseng by Province.....	4-10
Figure 4.1.19	Production Chart and Data Map of Ginseng by Province	4-10
Figure 4.1.20	Population Chart and Data Map of Cattle by Province	4-11
Figure 4.1.21	Domestic Population, Import and Export Heads of Cattle in Lao PDR	4-11
Figure 4.1.22	Population Chart and Data Map of Pig by Province	4-12
Figure 4.1.23	Production, Import and Export Amount of Pig in Lao PDR	4-12
Figure 4.1.24	Production Chart and Data Map of Captured Fish by Province	4-13
Figure 4.1.25	Production Chart and Data Map of Cultured Fish by Province.....	4-13
Figure 4.3.1	Percentage of Agricultural Cooperatives and Farmers' Group in 2020.....	4-27
Figure 4.4.1	Bolaven Highland Vegetable Distribution Channel	4-31
Figure 4.4.2	Nakasang Wild Fish Distribution Channel.....	4-32
Figure 4.6.1	Concept of Lao Extension Approach	4-56
Figure 5.2.1	Linkage and Value Addition of Maize FVC in Vientiane Capital	5-2
Figure 5.2.2	Linkage and Value Addition of Spring Onion FVC in Vientiane Capital.....	5-4
Figure 5.2.3	Linkage and Value Addition of Banana FVC in Vientiane Capital	5-6
Figure 5.2.4	Linkage and Value Addition of Sweet Corn FVC in Champasak	5-8
Figure 5.2.5	Linkage and Value Addition of Cabbage FVC in Champasak.....	5-10
Figure 5.2.6	Linkage and Value Addition of Avocado FVC in Champasak	5-13
Figure 5.2.7	Linkage and Value Addition of Ginseng FVC in Sekong	5-15
Figure 5.2.8	Linkage and Value Addition of Cabbage FVC in Sekong	5-17
Figure 5.2.9	Linkage and Value Addition of Banana FVC in Sekong	5-20
Figure 5.2.10	Linkage and Value Addition of Fish FVC	5-22
Figure 5.2.11	Linkage and Value Addition of Pig & Cattle FVC	5-24
Figure 5.4.1	SWOT Analysis of Domestic FVC in Lao PDR	5-30
Figure 5.4.2	SWOT Analysis of Domestic FVC in Lao PDR	5-31
Figure 5.4.3	SWOT Analysis of Domestic FVC in Lao PDR	5-32
Figure 6.2.1	Concept of Technical Measures: PR (Production and Processing)	6-2
Figure 6.3.1	Concept of Technical Measures: FM (Farm Management).....	6-4
Figure 6.4.1	Concept of Technical Measures: MAR (Marketing).....	6-5
Figure 6.5.1	Concept of Technical Measures: SUP (Supporting Measures)	6-6
Figure 6.6.1	Concept of Technical Measures: EX (Extension Services).....	6-8
Figure 7.1.1	Sustainable FVC Framework	7-1
Figure 7.2.1	Approach of Master Plan.....	7-3
Figure 7.2.2	Image of PPCP for FVC Strengthening.....	7-6
Figure 7.3.1	Framework of Master Plan for Strengthening FVC in Lao PDR	7-8

Figure 7.4.1	Implementation Structure of Master Plan.....	7-10
Figure 8.1.1	Eight Regional Categories for FVC	8-1
Figure 8.1.2	Provincial-wise Priority FVC Model.....	8-2

List of Abbreviations

AC	Agricultural Cooperative
ADB	Asian Development Bank
APAPD	Agro-Processing and Agribusiness Promotion Division
APB	Agriculture Promotion Bank
APNPD	Agro-Processing and Nutrition Promotion Division
BOL	Bank of Lao
C/P	Counterpart
CADP	Clean Agriculture Development Project
CASC	Clean Agriculture Standards Center
CCI	Chamber of Commerce and Industry
CR	Chief Representative
CUDBAS	A Method of Curriculum Development Based on Vocational Ability Structure
DAEC	Dept. of Agricultural Extension and Cooperatives
DAFO	District Agriculture and Forestry Office
DFR	Draft Final Report
DG	Director-General
DGRV	German Cooperative and Raiffeisen Confederation
DICO	District Industry and Commerce Office
DOA	Dept. of Agriculture
DOI	Dept. of Irrigation
DOIE	Dept. of Import and Export
DOIH	Dept. of Industry and Handicraft
DOLF	Dept. of Livestock and Fishery
DOPC	Dept. of Planning and Corporation
DOPF	Dept. of Planning and Finance
DOPI	Dept. of Planning and Investment
DOSMEP	Dept. of Small Medium Enterprise Promotion
DRD	Dept. of Rural Development
DTEAP	Dept. of Technical Extension and Agro-Processing
DTP	Dept. of Trade Promotion
EC	Electric Conductivity
ERIA	Economic Research Institute for ASEAN and East Asia
EWEC	East-West Economic Corridor
EX	Extension Service
FAO	Food and Agriculture Organization of the United Nations
FDD	Food and Drug Dept.
FDI	Foreign Direct Investment
FM	Farm Management
FPG	Farmers Production Group
FR	Final Report
FSEW	Farming System Extension Worker
FVC	Food Value Chain
FVCWG	Food Value Chain Working Group
GAP	Good Agriculture Practice
GFIS	Government Financial Information System
GIZ	German Agency for International Cooperation
GMS	Greater Mekong Subregion
GOL	Government of Laos
HACCP	Hazard Analysis Critical Control Point

HVC	High-value crops
IC Dept	International Cooperation Department
ICR	Inception Report
IFAD	International Fund for Agricultural Development
IFRS	International Financial Reporting Standard
ILO	International Labor Organization
IPM	Integrated Pest Management
ISO	International Organization for Standardization
ItR	Interim Report
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
LACP	Lao Agriculture Competitiveness Project
Lao PDR	Lao People's Democratic Republic
LCA	Laos Census Agriculture
LDB	Lao Development Bank
LEA	Lao Extension Approach
LEAP	Laos Extension for Agriculture Project
LECS	Lao Expenditure and Consumption Survey
LFN	Lao Farmers Network
LNCCI	Lao National Chamber of Commerce and Industry
LQBI	Lao Quality Beef Initiatives
LURAS	Lao Upland Rural Advisory Service
MAF	Ministry of Agriculture and Forestry
MAR	Marketing consisting of Distribution and Retail
MFI	Micro Finance Institution
MOF	Ministry of Finance
MOH	Ministry of Health
MONRE	Ministry of Natural Resource and Environment
MOIC	Ministry of Industry and Commerce
MOTC	Ministry of Technology and Communication
MP	Master Plan
MPI	Ministry of Planning and Investment
MS	Monitoring Sheet
MST	Ministry of Science and Technology
NAFES	National Agriculture and Forestry Extension Service
NAFRI	National Agriculture and Forestry Research Institute
NPSC	National Project Steering Committee
NSEDP	5-years National Socio-Economic Development Plan
NUOL	National University of Laos
NZAID	New Zealand Agency for International Development
ODA	Official Development Assistance
OJT	On the Job Training
PAFES	Provincial Agriculture and Forestry Extension Service
PAFO	Provincial Agriculture and Forestry Office
PD	Project Director
PF	Platform
PG	Production Group
PHI	Preharvest Interval
PIAD	Participatory Irrigated Agriculture Development
PICO	Provincial Industry and Commerce Office
PIP	Public Investment Project

PM	Project Manager
PP	Pilot Project
PPA	Public-Private-Academia
PPC	Plant Protection Center
PPCP	Public-Private-Community Partnership
PR	Production and Processing
P/R	Progress Report
RCEP	Regional Comprehensive Economic Partnership
SDC	Swiss Agency for Development and Cooperation
SHEP	Smallholder Horticulture Empowerment and Promotion
SME	Small and Medium Enterprise
SMS	Subject Matter Specialist
SPS	Sanitary and Phytosanitary System
SUP	Supporting measures
ToT	Training of Trainer
UNIDO	United Nations Industrial Development Organization
USDA	United States Department of Agriculture
VC	Value Chain
VES	Village Extension System
VEW	Village Extension Worker
WB	World Bank
WUG	Water Users Group

Measurement Units

Length

mm	=	Milimetre(s)
cm	=	Centimetre(s)
m	=	Meter(s)
km	=	Kilometer (s)

Extent

cm ²	=	Square centimeter(s)
m ²	=	Square meter(s)
km ²	=	Square-kilometer(s)
ha	=	Hectare(s) (10,000 m ²)

Volume

cm ³	=	Cubic centimeter(s)
m ³	=	Cubic meter(s)
L	=	Liter (1,000 cm ³)

Weight

g	=	Gram (s)
kg	=	Kilogram(s)
ton	=	Metric ton(s)

Time

sec	=	Second(s)
min	=	Minute(s)
hr	=	Hour(s)

Others

°C	=	Degrees Celsius
%	=	Percent
MM	=	Man Month

Currency

JPY	=	Japanese Yen
LAK	=	Lao Kip
USD	=	US Dollar
USD 1.0	=	21,564 LAK
(As of February 2025)		

Executive Summary

CHAPTER1 INTRODUCTION

1.1 Background

The project developed a master plan for strengthening Food Value Chain (FVC) in Lao PDR with a target year of 2040. This report presents the results of the FVC survey, the FVC analysis, and the master plan, based on the activities conducted during the overall project period.

1.2 Schedule of Mater Plan Formulation

In the Phase I period (from April 2022 to December 2022), the project team prepared the master plan (MP) framework (draft). Based on the results of Pilot Project implementation in the Phase II period (from February 2023 to April 2025), the master plan was reviewed and updated and was finalized in February 2025.

1.3 Structure of Master Plan Formulation

The food value chain working group (FVCWG) under the Department of Agricultural Extension and Cooperatives (DAEC) of the Ministry of Agriculture and Forestry (MAF), is the main body responsible for formulating the master plan with technical support by JICA experts.

1.4 Selections of Target Commodities for Master Plan Formulation

Target commodities representing local agricultural crops were selected for grasping FVC characteristics of Lao PDR. Selected results of the target commodities are shown below:

Table 1.1 Target Commodities for FVC Survey

Province No.	Vientiane Capital	Champasak province	Sekong province
1	Maize	Sweet corn	Cabbage
2	Spring onion	Cabbage	Banana (Lao traditional)
3	Banana (Export)	Avocado	Ginseng
4	Pig & cattle	Cattle	Cattle
5	Fishery (tilapia)	Fishery (natural fish)	Fishery (tilapia)

Source: JICA project team

CHAPTER2 NATIONAL PLANS AND POLICIES

2.1 National Plans and Policies Related to Agriculture and FVC

FVC related national policies, laws and regulations are analyzed based on the following categories: 1) Inputs, 2) Production System, 3) Marketing System, 4) Processing System, 5) Food Risk Management and 7) Finance.

JICA project team analyzed FVC-related plans and policies. The outlines of plans/policies and results of analysis are summarized in the table below.

Table 2.1 FVC-related Plans and Policies

Policies	Outline of Policies	Results of Analysis
Agriculture Strategy 2025	<u>Target Period:</u> 2016-2030 <u>Outline:</u> This strategy showed the three overall goals on 1) Economy has strongly grown in line with industrialization and modernization direction, comprehensive infrastructure, ensuring economic growth at the constant level, effective, stable and ensuring food security and strongly ensures quality in terms of nutrition, producing agricultural products with quantity and quality that are highly competitive as well as are adaptable to climate change. 2) Agriculture production is in line with sanitary principles, clean, safe for producers and consumers health and environmentally friendly. 3) Agriculture Production contributes to stability and balance of ecological system.	✓ This strategy well captured priority elements of FVC such as seed, land, pesticide, fertilizer, animal feed, medicine for animal, farmers organization, processing and marketing, food safety, SPS, Agricultural Finance. ✓ Limited contents on soil management, farming system, wholesale marketing, retailing system, contract farming. ✓ This lacked government roles for mechanization in terms of machinery performance and safety test.
8th NSEDP	<u>Target Period:</u> 2016-2020 <u>Outline:</u> The directions are to develop firm and sustainable agriculture and forestry sectors. Continue allocating land for agriculture and production to secure food and commercial production; to increase the potential agricultural production of each locality using clean and organic agriculture and promote intensive agriculture using modern and high-quality techniques. To Improve farmer productivity by establishing farm production, production groups and enterprises to ensure the supply of agricultural products as inputs to processing industries and services quantitatively and qualitatively in order to add value to the products.	✓ This Plan well captured priority elements of FVC such as seed, soil, land, water, farmers organization, marketing, price stabilizing, food safety, SPS, and Agricultural Finance. ✓ Limited contents on pesticide, fertilizer, farming system, wholesale market, retailing system, contract farming,
Mid Review 8th NSEDP	<u>Target Period:</u> 2018-2020 <u>Outline:</u> The Government recognizes the challenges to the sustainability of its current growth model. Continued efforts to increase agricultural productivity. Farm production met or exceeded the national per-capita food production targets in 2017, even with flooding. The past two years saw nutrition-sensitive agriculture service delivery in 81 districts, and multi-sector efforts to support consumption of more diverse foods. Yet threats to food security persist from soil degradation, land pressure from population, and large-scale investment projects. The rapid commercialization of agriculture poses threats to local food security and nutrition strategies.	✓ This review well captured priority elements of FVC such as seed, farming system, farmers organization, contract farming, food storage, processing, food safety, custom system, Agriculture and SME Finance, but limited contents on wholesale and retail marketing. ✓ Remarkable points of this review are focusing on adverse effect of mono-cropping, threat on food security by increased commercial farming, balancing commercial development and national food security in several pages.
9th NSEDP	<u>Target Period:</u> 2021-2025 <u>Outline:</u> The agricultural sector is a potential sector that is further leveraged to maximize the benefits of the trade privileges that Lao PDR enjoys. Focus must be given to the following areas: (1) Agricultural production must be closely linked to the production chains of the processing industry; (2) Produce crops and livestock and support the needs of new markets; (3) Shift from single-crop farming to diversified or multi-crop farming (mixed crop system) ; (4) Promote GAP and organic farming; (5) Improve the efficiency of agricultural production with the use of new techniques and transform traditional and fragmented farming practices into production	✓ This Plan well captured priority elements of FVC such as seed, mechanization, soil & land, water, GAP and Organic Agriculture, farming system, farmers organization, E-Commerce, processing, food safety, food standard and packaging, custom system, SPS, Agriculture and SME Finance, but limited contents on contract farming. ✓ This plan also emphasized shift

Policies	Outline of Policies	Results of Analysis
	groups or the new cooperative production model; (6) Create access to credit and markets; (7) Develop strong agricultural infrastructure resilient to natural disasters; (8) Suitable land allocation, and (9) Establish higher food safety standards.	from single-crop farming to diversified or multi-cropping farming and integrated crop rotation.
9th Agriculture Plan	<u>Target Period:</u> 2021-2025 <u>Outline:</u> The overall direction of the 9th Five-Year Agriculture and Rural Development Plan is to make all efforts to boost agricultural production, to ensure food and nutrition security, and to produce quality and diversified agricultural products; increasing people's incomes has led to poverty alleviated, developed to create added value. The agricultural, forestry and rural development plan must focus on the conditions of integration, heritage, and potential of natural resources in each region, national socio-economic condition, and local wisdom for quality growth, balance, and sustainability to ensure adequate food, raw materials fed to processing plants, fresh, clean and safe products for consumption, to sell domestically and for export in accordance with sanitary standards and phytosanitary (SPS) and import regulations of trading partners, certified clean, organic agriculture in green, clean, safe and environmentally friendly orientation.	✓ This Plan well captured priority elements of FVC such as seed, animal feed, medicine for animal, mechanization, soil & land, water, fertilizer, GAP, Organic Agriculture, farming system, farmers' organization, wholesale market facilities, contract farming, GI, processing, pesticide, food safety, SPS, Agriculture & SME Finance. ✓ Limited contents on wholesale market system, food labeling.

Source: JICA project team

JICA project team analyzed the FVC laws and regulations. The project team identified the following points in laws and regulations that are lacking to strengthen FVC in Lao PDR.

Table 2.2 FVC-related Laws and Regulations

Sector	Results of Analysis
Farmers' Organization	✓ The regulation mostly focused on registration. Contents on how to support Ag-cooperative business are limited. Article 53 Access to Finance of the Decree No.606/GOL Nov 2020 has not been well implemented. Only high interest loan is available.
Wholesale Markets System	✓ The regulations on wholesale marketing have just mentioned licensing business, not mentioned wholesale marketing systems. It is necessary to establish functional wholesale marketing system by clarifying the details of the wholesale markets trading business on Article 29, Agreement on Market No.0930/MOIC, May 2013.
Price Stabilizing System	✓ The implementation of the Decree on Management of Goods Price and Services Fees No.474/PM Nov 2020 is limited due to few covering commodities and limited range of price control.
Food Safety	✓ Several Laws and Regulations have been promulgated and implemented but their enforcement is limited.
Processing	✓ Lacking meat inspection system. Implementation situation of HACCP, GMP is unclear.
Agricultural Finance	✓ Under existing legal financial framework for agricultural sector, most commercial banks feel difficult to provide loan for agriculture sector due to lack of minimizing risk from agricultural finance.
Contract Farming	✓ Weak law enforcement. Many troubles to implement contract have been made by stakeholders.
Plant Variety Protection	✓ Breeders' right of plant varieties by Law on Intellectual Properties by MST while another registration system for plant varieties is managed by MAF. The two systems need to be integrated in future to reduce breeders' burden. ✓ Lao PDR need to join UOPV to protect imported varieties. Introduction of new varieties of vegetative multiplication crops is difficult under current legal framework.

Source: JICA project team

2.2 Relevant Governmental Organizations related to FVC Strengthening

Relevant Governmental Organizations in Lao PDR related to FVC Strengthening is summarized in the table below:

Table 2.3 FVC-related Laws and Regulations

Organizations	Organizational Structure
Ministry of Agriculture and Forestry (MAF)	Department of Agriculture Extension and Cooperative (DAEC) Department of Agriculture (DOA) Department of Livestock and Fisheries (DOLF) Department of Planning and Corporation (DOPC) Department of Policy and Legal Affairs (DOPLA) Department of Rural Development (DRD)
Ministry of Industry and Commerce (MOIC)	Department of SME Promotion (DOSMEP) Department of Import and Export (DOIE) Department of Domestic Trade (DTD)
Ministry of Health (MOH)	Department of Food and Drugs (DFD)
Ministry of Finance (MOF)	Tariff Department (TD) Custom Department (CD)
Other Relevant Organizations	Soil, plant and fertilizer analysis center under department of Soil and Land Management, MAF Horticulture Research Center (Hodokeo) under NAFRI National Aquaculture Development Center in Nam Souang district, Vientiane Capital Agricultural Research Center (KM35) in Vientiane Capital Agriculture and Forestry Extension Center in Sekong province National University of Laos (NUOL)

Source: JICA project team

2.3 Related Project to Agriculture and FVC

The following table summarizes the good practices and lessons learned grasped from FVC-related projects in Lao PDR.

Table 2.4 Good Practices and Lessons Learned from the FVC Related Projects

No	Project name	Similarity and relevance to the Project	Good practice and lessons
(1)	Clean Agriculture Development Project (CADP)	✓ Support for technical improvement such as production of agricultural products and quality control ✓ Capacity building in order for farmers to develop crop production plants that meet market demands	✓ Vegetable production planning training based on farmers' profitability and market needs ✓ Organizing a business matching event that will promote development of new buyers such as restaurants and supermarkets with producers, and the expansion of sales channels ✓ Agri-marketing training (joint training with Savan PAD) ✓ The balance of commodity categories such as grains, vegetables, fruits, livestock, fishery etc. should be considered in the selection of target commodities

No	Project name	Similarity and relevance to the Project	Good practice and lessons
(2)	Project for Participatory Agriculture in Savannakhet Province (Savan PAD)	✓ Implementation of technical training including cropping techniques for horticultural crops to promote sales of crops other than rice	✓ PIAD model (Model for irrigation equipment/ water management, improvement of cropping technology and activation of regional agriculture) ✓ Increased yields and high return on funds due to seed and fertilizer lending activities ✓ Cost sharing of project activities by Savannakhet Province ✓ Collaboration with Lao Front for National Development (LFND): Expansion of seed and fertilizer lending activities with LFND funds
(3)	Northern Rural Infrastructure Sector Development Project - Additional Finance (NRI-AF)	✓ Promotion of diversification to highly profitable crops during the dry season ✓ Strengthening the capacity of central, provincial and district staff to enable the sector development approach	✓ Activities on establishment and strengthening the WUGs ✓ Establishment of FPGs, training for farmers regarding contract farming and marketing
(4)	Greater Mekong Sub-region East-West Economic Corridor Agriculture Infrastructure Sector Project (GMS-EWEC-AISP)	✓ Promotion of diversification and commercialization of agriculture with high value crops (HVC)	✓ Activities on establishment and strengthening the WUGs ✓ Establishment of FPGs, training for farmers regarding contract farming and marketing
(5)	Climate-Friendly Agribusiness Value Chains Sector Project	✓ Improvement of crop productivity and promoting commercialization ✓ Improvement of agricultural product storage, processing, quality and safety testing capabilities ✓ Creating an environment for improving the profitability of farmers and agribusiness ✓ Improvement of agribusiness value chain infrastructure	✓ Support for building technical capacity related to agribusiness policy reform ✓ Measures for storage and processing agricultural products and improving quality and safety testing capabilities ✓ Matching Grant Method for providing finance to farmers or processors
(6)	Lao Agriculture Competitiveness Project (LACP)	✓ Capacity building for farmers' organizations, agribusiness, public and private service providers ✓ Support for improvement of the value chains	✓ Measures for capacity building for farmers' organizations, agribusiness, and public and private service providers ✓ Measures related to value chain improvement support ✓ Matching Grant Method for providing finance to farmers or processors
(7)	Sustainable Rural Infrastructure and Watershed Management Sector Project (SRIWMSP)	✓ Expansion of market-oriented agricultural production ✓ Promotion of diversification to high value crops during the dry season	✓ Promotion measures of the diversification of high value crops during the dry season as a part of market-oriented strategy ✓ Matching Grant Method for providing finance to farmers or processors

No	Project name	Similarity and relevance to the Project	Good practice and lessons
(8)	Northern Smallholder Livestock Commercialization Project	✓ Strengthening livestock value chain actors ✓ Strengthening livestock value chain infrastructure ✓ Improvement of credit access capacity by farmers organizations	✓ The results of the “Northern Region Sustainable Livelihood through Livestock Development Project” (2007 - 2014)

Source: JICA project team

CHAPTER3 CURRENT STATUS OF AGRICULTURE IN LAO PDR

3.1 Natural Conditions and Social Conditions

The national and social conditions in Lao PDR is summarized as follows.

Table 3.1 National and Social Conditions in Lao PDR

Item	Description
Natural Conditions	
Topographical situation	✓ Lao PDR is a landlocked country in Southeast Asia, which shares borders with five other countries. ✓ Approximately 80% of the country’s land area is mountainous. The remaining 20% is low lying plains along the Mekong River.
Climate	✓ Lao PDR is characterized by a tropical climate, influenced by the southeast monsoon which brings 70% of annual rainfall and high humidity. ✓ There are two distinct seasons: the rainy season, or monsoon, from May to mid-October and the dry season from mid-October to April.
Natural disasters	✓ Lao PDR has extremely high exposure to flooding, including riverine and flash flooding. Lao PDR also has a risk of exposure to tropical cyclones and their associated hazards.
Soil	✓ Over 70 % of soils are clarified as Acrisols. This type of soil sometimes makes agriculture problematic. The soils of some other parts are clarified as Cabisol. This type of soil usually is exploited for agriculture.
Social Conditions	
Administrative classification	✓ Lao PDR is composed of 17 provinces and Vientiane Capital. Each province has several districts, which administer villages.
Demographic situation	✓ The population of the country has increased annually by average 1.3% and the population in 2020 is about 7.231 million. ✓ Savanakheth province has the highest number of people. Vientiane Capital, Champasak, Luangprabang also have a large population.
Economic situation	✓ GDP at current market price in Lao PDR is about 185 million LAK in 2021. The ratio of Agricultural production, industry and services is 15%, 34% and 38%, respectively. ✓ The poverty rate of Lao PDR has been decreased from 24.6% in 2012/2013 to 18.3% in 2018/2019. ✓ In the 5 years, from 2011 to 2015, the total amount into agriculture sector was 17,315 billion Kip. 70 % of the investment was from ODA and only 2.2% was Governmental budget.
Land use	✓ The land area in Lao PDR is 236,800km² and around 70% is occupied by forest. ✓ The land area of agriculture is about 10 % of the country land.
Infrastructure	✓ GMS Corridor provides Lao PDR with greater and better access to neighbouring countries. Recently, significant advances of nation road network have been realized. ✓ Lao PDR is rich in freshwater resources and potential for the development of irrigation system. The total irrigated area in Lao PDR is around 440,000 ha in 2020, which is around 27% of the agricultural land of the country.

Source: JICA project team

3.2 Agricultural Production

3.2.1 Crop Production

The arable land in Lao PDR is around 1.55 million ha. Rice is the most widely cultivated crop in the country, accounting for 848,000 ha of the planted area. Other major planted crops are maize, cassava, leafy stem vegetables, coffee, fruit bearing and leguminous, and job's tear.

Table 3.2 Planted Area of Major Crops (2019)

Crop Item	Planted Area (ha)			
	Lao PDR	Vientiane Capital	Champasak	Sekong
Total rice paddy	848,039	66,298 -	92,503 -	11,005 -
Maize	123,510	995 (4)	430 (17)	1,394 (5)
Cassava	101,494	1,580 (3)	16,590 (3)	2,125 (3)
leafy Stem Vegetables	98,020	5,907 (1)	30,225 (2)	5,085 (2)
Coffee	94,400	- -	51,340 (1)	13,370 (1)
Fruit bearing and Leguminous	62,462	4,073 (2)	7,185 (5)	1,025 (7)
Job's tear	50,580	580 (8)	- -	40 (21)
Sugar cane	30,160	855 (7)	520 (15)	215 (12)
Sweet corn	28,230	970 (5)	4,537 (6)	1,200 (6)
Banana	26,828	235 (12)	1,560 (10)	820 (8)
Cardamom	22,860	- -	3,285 (8)	1,480 (4)
Root, Bulb and Tuberous	20,475	875 (6)	3,540 (7)	85 (17)
Fruit Tree	17,100	280 (10)	8,575 (4)	220 (11)

Note: The number inside () indicates the rank of each crop. Rice is not covered under the Project.

Source: JICA project team based on Agricultural Statistics Year Book (MAF, 2019)

In Vientiane Capital, one of the target areas of the Project, suburban agriculture and commercial crop production have been mainly conducted, since the capital has the major consuming area and one of the largest fresh markets. The major crops in Vientiane Capital are leafy stem vegetables, fruit bearing and leguminous. In Champasak and Sekong province located in the south part of the country, coffee, leafy stem vegetables, cassava and fruit tree have been largely cultivated, especially in Bolaven Plateau which has large land area with suitable climate and fertile soil.

3.2.2 Livestock Production

The population of major livestock has been generally increasing. 3 provinces, Savanakheth, Saravane and Champasak, have ranked high in almost all of the major livestock types. Especially in Champasak, the number of poultry heads is the most in the country and its share reaches to around 18%.

3.2.3 Fishery Production

In Lao PDR, the production of culture fish has been increasing while that of captured fish has not been changed. The production of captured and cultured fish in 2020 accounts for 70,001 tons and 130,021 tons, respectively.

3.3 Farmers and Farmers' Group

2.30 million people engage in agriculture, which accounts for 61.4% of the whole labor force. The average size of farmland is 2 to 3 ha in almost all the provinces. In Lao PDR, around 80 % of farmlands are less than 3 ha. Especially in Vientiane Capital, the farmlands are small. On the other hand, in

Champasak, the farmlands are relatively large. The total number of the production groups is 4,420. As for the number of agriculture cooperatives, the total number is 51, including credit cooperatives.

3.4 Food Processing

In Lao PDR, the number of rice milling factories is the most, which accounts for 73 % of all the processing factories. The other major processing foods in Lao PDR are beverage (including pure drinking water), edible ice and slaughter, which are 13%, 6%, and 1%, respectively. Rice milling, beverage, edible ice and slaughter is categorized as the primary processing, meaning the processing techniques which do not largely alter the characteristics of agricultural raw products. In Lao PDR, the number of advanced processing factories (such as canning, retort, freeze-dry) are quite limited.

3.5 Consumption

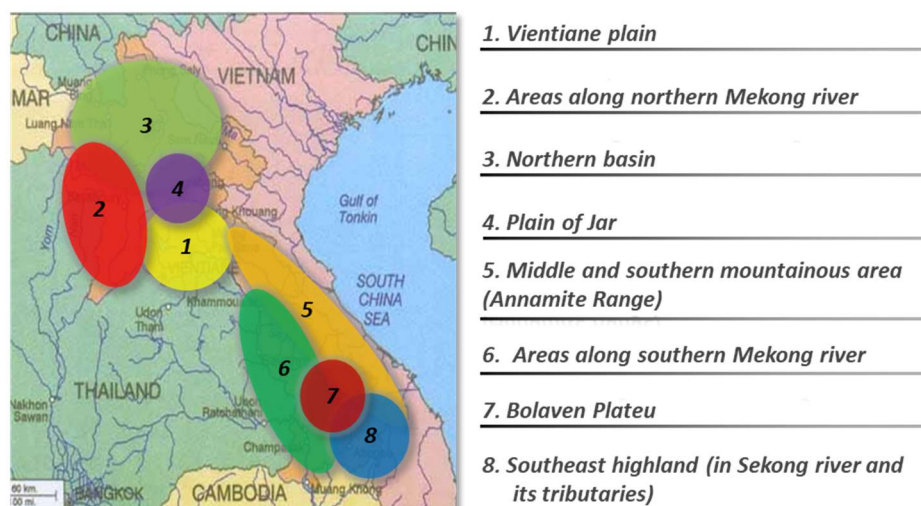
In Lao PDR, the composition of rice consumption in price has been getting lower from 43 % in 1992/1993 to 31 % in 2018/2019, while that of meat and vegetable consumption has been increasing.

3.6 Import/Export of Agricultural Production

The major items of export in 2020 are cattle, natural rubber, banana, cassava, fruits and coffee. On the other hand, the major items of import are fruits, vegetables and meats. The major countries from which Lao PDR imports products, are Thailand, China, Vietnam, Japan and United States. Lao PDR exports products mostly to the neighboring countries, Thailand, China, Vietnam, Cambodia and India.

3.7 Regional Status of Agriculture Sector in Lao PDR

Based on the features of agriculture and FVC, Lao PDR is regionally categorized into 8 areas.



Source: JICA project team based on “Strategy for Agricultural Development 2011 to 2020” (MAF, 2010)

Figure 3.1 Regional Category of Lao PDR

CHAPTER4 RESULT OF FVC SURVEY FOR TARGET COMMODITIES

4.1 Overview of Target Commodities

Overview of the target commodities is summarized as follows.

Table 4.1 Overview of Target Commodities

Item	Description
Vegetables including Maize	
Maize	✓ Next to rice, maize is the second most widely harvested crop in Lao PDR. The major harvested provinces of maize are Xayaboury, Oudomxay, Xiengkhuang, and Huaphanh. The average yield of the whole country is 5.14 ton/ha. The total production was 615,375 tons in 2019. ✓ The export amount has been around 200 tons/year, not relying on the domestic production, while the import amount is almost zero.
Spring onion	✓ Spring onion is harvested mainly in the central region of Lao PDR, in Borikhamxay, Khammuane, Vientiane, and Vientiane Capital. The average yield is 5.15 ton/ha. The total production of spring onion in Lao PDR was 14,676 tons in 2020.
Sweet corn	✓ Sweet corn is one of the major harvested crops in Lao PDR, which accounts for ninth largest harvested area. Sweet corn is widely harvested in the whole country, compared with maize. The total production of maize in Lao PDR was 178,250 tons in 2019. ✓ Sweet corn has not been imported and exported in Lao PDR. Therefore, sweetcorn, produced in Lao PDR, is overall consumed inside the country or traded after processed in Lao PDR.
Cabbage	✓ Cabbage is widely harvested in Lao PDR. The harvested area in Champasak is much larger than the other provinces. The average yield is 11.03 ton/ha. The total production was 273,826 tons. ✓ Only 5 % of cabbage was exported in 2020, while the import amount was almost 0. Therefore, cabbage, produced in Lao PDR, is mainly consumed in domestic market and the excess is exported to foreign countries.
Fruits	
Banana	✓ Banana is the most widely harvested fruit in Lao PDR. The major harvested provinces in Lao PDR are Oudomxay, Luangprabang and Bokeo. The average yield of the whole country is 27.78 ton/ha. The total production of banana in Lao PDR was 178,250 tons in 2019. ✓ In 2020, the export of banana is about 18 % of the domestic production, while the import amount is almost 0. Therefore, banana, produced in Lao PDR, is mainly consumed in domestic market and the excess is exported to foreign countries.
Avocado	✓ Avocado is only harvested in Champasak province and Vientiane Capital. The average yield is 18.86 ton/ha. The total production of avocado in Lao PDR was 5,260 tons in 2020. ✓ Although the amount of import has been increasing, it reached only 0.5 % of the domestic production.
Medicinal Crops	
Ginseng	✓ Ginseng is only harvested in Sekong province, which accounts for 141 ha. The yield is 1.47 ton/ha. The total production of ginseng in Lao PDR was 207 tons in 2020.
Livestock	
Cattle	✓ In Lao PDR, cattle have been widely raised. The population of cattle is the most in Savannakhet, as Champasak, Vientiane and Xiengkhuang province follow it. ✓ While the domestic population has been increasing, the import and export heads are almost unchanged. It is assumed that the domestic consumption is increasing.
Pig	✓ Pig has been also widely raised in Lao PDR. The population of pig is the most in Saravane, as Savannakhet, Champasak and Luangprabang province follow it. ✓ While the domestic population has been increasing, the import and export heads are almost unchanged. It is assumed that the domestic consumption is increasing
Fishery	
Capture fish	✓ Natural fish is widely captured in Lao PDR, mainly in the central and southern region. The production is the most in Savannakhet province.
Culture fish	✓ The production of culture fish is the most in Savannakhet province, which reached more than 63 % in 2019. Vientiane Capital and Champasak province are also the major production areas.

Source: JICA project team

4.2 Agricultural Production/Processing

The findings on production of Lao PDR through the FVC survey are summarized in the table below.

Table 4.2 Findings on Production

	Findings
Techniques	✓ Lack of knowledge and techniques for basic crop cultivation on; - how to grow new unknown vegetables - how to grow high-quality vegetables ✓ Lack of knowledge for crop monitoring on; - Disease diagnosis and control - Insect diagnosis and control - Weed control - Nutrient deficiency - Others ✓ Lack of knowledge for measures for crop protection on; - Soil preparation for soil aggregate structure and soil neutralization - Nutrient deficiency symptoms - Imbalance of fertilizer components - Diseases control - Insects control - Weeds control - Correct use of pesticides (type, timing and amount) ✓ Low level of cattle breeding and fattening technology.
Human Resources	-
Infrastructure/Material	-
Finance	-
Information	✓ Insufficient knowledge for farm management (accounting, cropping pattern arrangement, group management etc.)
Linkage with FVC	✓ PAFO/DAFO extension staff do not guide farmers properly, especially on crop cultivation, and pest and disease control ✓ Quality and quantity of agricultural products is not meet the market demand ✓ Low negotiation power to middlemen

Source: JICA project team

The findings on processing of Lao PDR through the FVC survey are summarized in the table below.

Table 4.3 Findings on Processing

	Findings
Techniques	✓ Instructing farmers to follow cultivation methods for matching demanded quality of processors is challenging.
Human Resources	✓ Capacity is limited for pesticide residual testing of soil or crops that meets GAP standards
Infrastructure/Material	✓ Number of swine slaughtered by local slaughterhouse is decreasing due to monopolized livestock market by large scale company. ✓ Sudden electricity failure of processing factory occurs. ✓ Raw fish for processing is facing shortage.
Finance	✓ Price of raw materials for processing is increasing.
Information	✓ Medicinal effect and ingredients of Ginseng are not confirmed ✓ Labelling of ingredients in processed Lao ginseng products is incorrect.
Linkage with FVC	✓ Crop production for processing has many issues on quality and quantity caused by pest and diseases etc.

Source: JICA project team

4.3 Distribution & Retail

The findings on distribution and retail of Lao PDR through the FVC survey are summarized in the table below.

Table 4.4 Findings on Distribution and Retail

	Findings
Techniques	✓ Temperature control during the transportation is inadequate. ✓ Middlemen in Laos often face small and unstable production amount issue for some agricultural products. ✓ Agricultural technologies are unable to meet new demand according to urbanization and income increase in the major cities in Laos. ✓ Vegetable consignment companies want to increase procurement of domestically grown vegetables and fruits, but it is often difficult to do so.
Human Resources	✓ Some Agricultural Cooperatives (ACs) and Farmers Production Groups (FPGs) are lack of motivation as an organization. ✓ There are few extension workers who have adequate knowledge and experience to instruct farmers on new crops whose demands are increasing.
Infrastructure/Material	✓ Poor road management leads to increased transport losses and transport costs. ✓ The necessary facilities are not increased in accordance with the expansion of the market. ✓ Insufficient cold chain system is causing poor temperature control.
Finance	✓ Conscientious middlemen buying at a high price from producers and selling at a low price to consumers result in low profits and tight cash flow.
Information	✓ Attempts have been made to regulate the demand and supply of agricultural products by using information on distribution and retail of agricultural products collected through middlemen, wholesalers, retailers, etc.
Linkage with FVC	✓ Purchase and sales price on agricultural products are controlled by middlemen and collectors. ✓ Consumer price of agricultural products tends to be high due to large number of middlemen and collectors involved between producers and consumers. ✓ Presence of foreign investment in agricultural production is greatly increasing in Laos. ✓ Most supermarkets in Vientiane Capital entrust vegetable consignment companies with vegetable delivery and quality control on shelves.

Source: JICA project team

4.4 Agricultural Materials and Finance

The findings on agricultural materials of Lao PDR through the FVC survey are summarized in the table below.

Table 4.5 Findings on Agricultural Materials

	Findings
Techniques	✓ Trainings necessary for input suppliers provided by PAFO is not enough for quality and safety control of agricultural inputs.
Human Resources	✓ Technical knowledge of input suppliers is limited. ✓ Technical knowledge of Plant Protection Center, Soil Department of MAF is limited.
Infrastructure/Material	✓ Quality of seed and fertilizer sold in input shops is not assured and varies in quality.
Finance	✓ Budget of Plant Protection Center, Soil Department of MAF is limited.
Information	✓ Compliance to Pesticide Law, Animal Medicine Law and other relevant regulations is low by input suppliers.
Linkage with FVC	✓ There is no quality control system for animal medicine. ✓ High dependence on imported agricultural inputs ✓ Consumers are unable to know at the time of purchase the production area and safety of vegetables and other products. For this reason, differentiation by production area is not possible.

Source: JICA project team

The findings on agricultural finance through the FVC survey are summarized in the table below.

Table 4.6 Findings on Agricultural Finance

	Findings
Techniques	-
Human Resources	-
Infrastructure/Material	-
Finance	✓ Finance service coverage and support for agriculture sector is limited.
Information	✓ A lot of efforts to get farmers' management information and market information is needed for financial institute.
Linkage with FVC	✓ Loan supply is not implemented at the necessary time for farmers and farmers groups. ✓ Group management by farmers is necessary to obtain a loan.

Source: JICA project team

4.5 Agricultural Extension and Technical Support

The findings on public agricultural extension on the FVC of Lao PDR through the FVC survey are summarized in the table below.

Table 4.7 Findings on Public Agricultural Extension

	Findings
Techniques	✓ Some DAFOs lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ Although there is a system to receive agricultural technical advice from PAFO, related departments of MAF, universities, etc., it is not fully functioning. ✓ There is a bias in the technical areas in which we can provide guidance to farmers. ✓ Some DAFOs/extension staffs can provide technical outlines but lack the capacity to provide individualized and specific guidance, e.g., diagnosis of pests and diseases and how to deal with them.
Human Resources	✓ Number of staff are limited for extension activities to meet farmers' needs.
Infrastructure/Material	✓ Agricultural extension materials are not frequently updated to meet farmers' needs. ✓ Necessary equipment for extension activities such as for soil testing is not available
Finance	✓ Budgets for extension activities, monitoring activities and capacity development of DAFO staff is limited. It is difficult to increase budgets for extension in a short period of time.
Information	✓ DAFOs are not fully utilizing the agricultural technology possessed by the private sector.
Linkage with FVC	✓ DAFOs have limited information of FVCs actors and do not play coordination role of FVCs.

Source: JICA project team

The findings on private technical support on the FVC of Lao PDR through the FVC survey are summarized in the table below.

Table 4.8 Findings on Private Technical Support

	Findings
Techniques	✓ Technical knowledge of input suppliers is limited for providing necessary agricultural knowledge to farmers. ✓ Very few companies are providing support necessary for farmers such as usage of pesticides, cultivation techniques etc. Most of the companies are providing only some advises and explanations to farmers.
Human Resources	✓ Human resources with technical knowledge of input suppliers etc. are very limited for providing support for farmers.

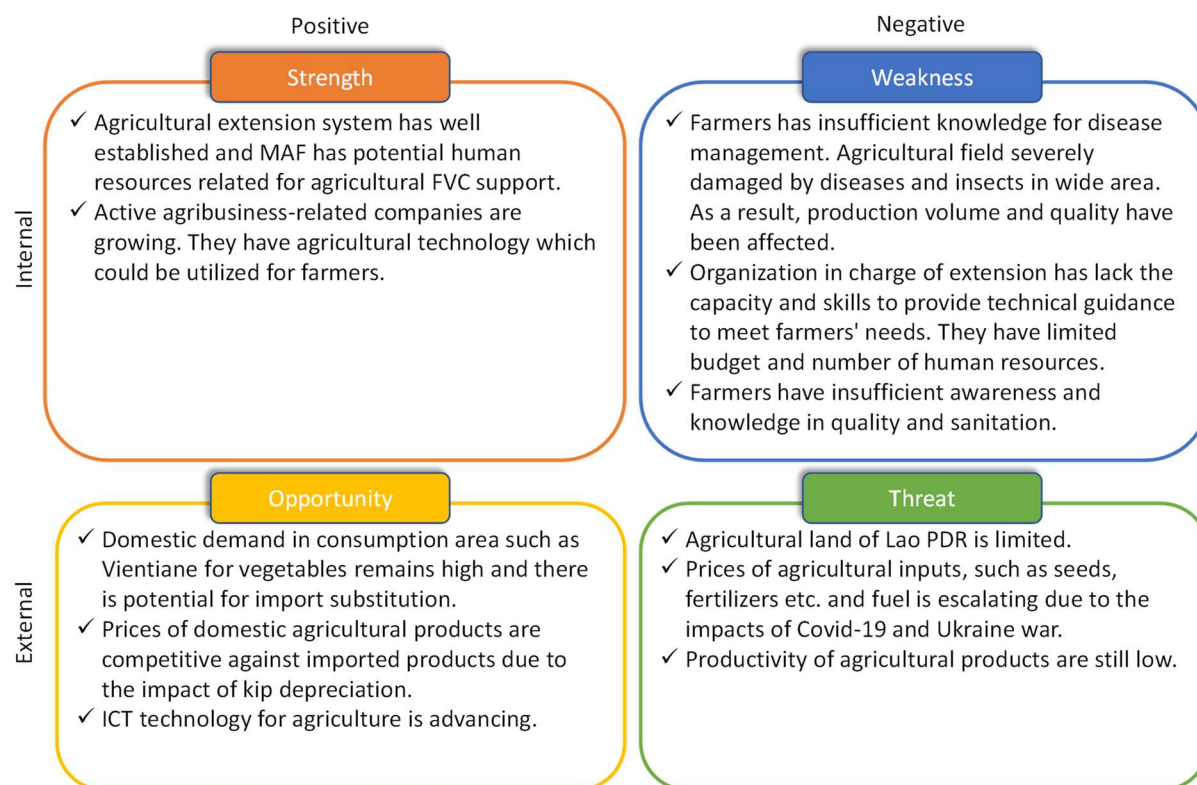
	Findings
Infrastructure/Material	✓ There are no quick reference materials for input suppliers or farmers to understand easily how to use pesticides. ✓ Many of private companies, especially input suppliers are marginal or small, therefore they cannot afford to provide support to farmers.
Finance	✓ Most of private companies have negative affects by changing of the exchange rate of Kip in recent period.
Information	✓ Though production companies or pesticide, fertilizers etc. have technical knowledge, there is no mechanism transferring the knowledge to farmers through suppliers.
Linkage with FVC	✓ Linkage with PAFOs and DAFO are weak for technical support activities matching for farmers' needs.

Source: JICA project team

CHAPTER5 FVC ANALYSIS FOR TARGET COMMODITIES

Based on the results of the FVC analysis, SWOT analysis of the characteristics of FVCs for three categories namely domestic, modern domestic and export FVCs in Lao PDR is presented in the figure below.

(1) FVC for domestic market



Source: JICA project team

Figure 5.1 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of domestic agricultural products from the surrounding area of the consumption area such as Vientiane to meet increasing demand of agricultural products

Strength & Threat: A strategy to manage threats with strengths

To promote and support activities for strengthening agricultural techniques to increase productivity of agriculture

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

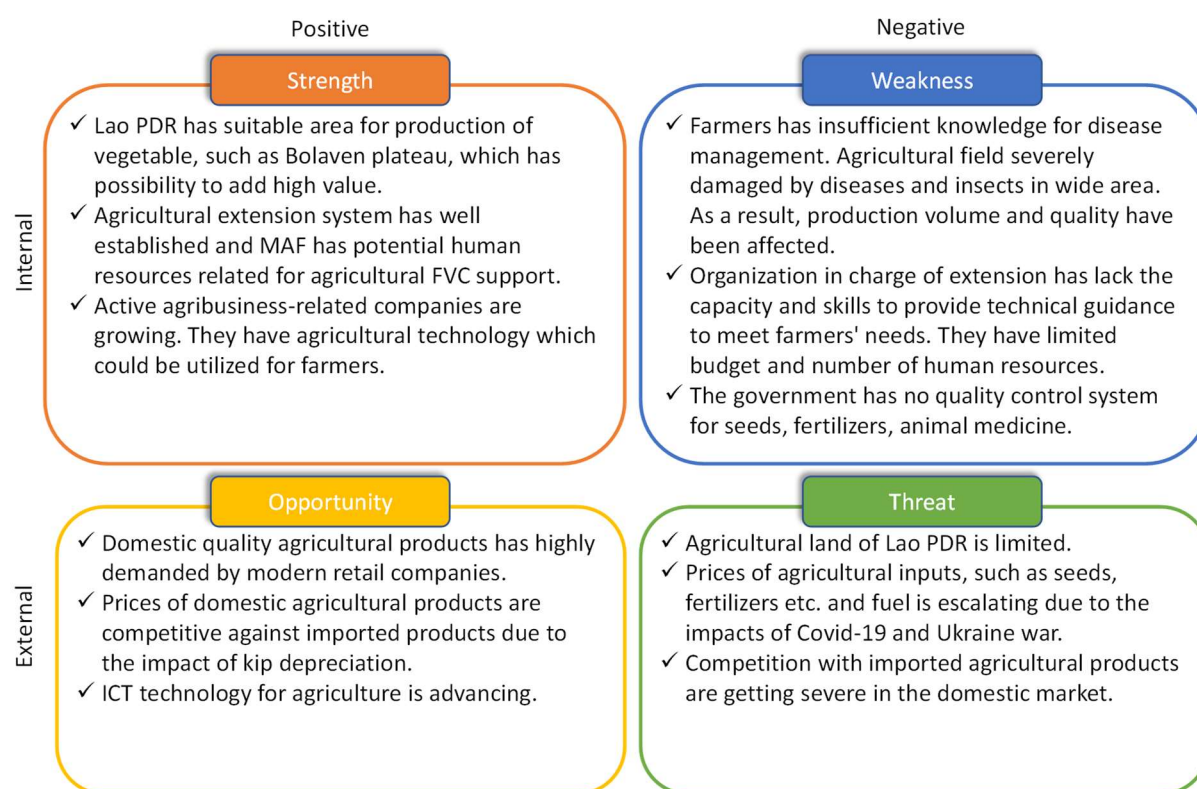
To improve awareness, capacity and knowledge of farmers to control pest and diseases and to improve quality control system by the government to meet quality and demand of agriculture

To introduce extension approach utilizing ICT technologies to overcome budget and human resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To support farmers technically to reduce agricultural input such as fertilizers, agro-chemicals etc. to address increase of price of agricultural input

(2) FVC for modern domestic market



Source: JICA project team

Figure 5.2 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for modern domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of domestic agricultural products in suitable area such as Bolaven plateau to

meet increasing demand of agricultural products

Strength & Threat: A strategy to manage threats with strengths

To promote and support activities outstanding agribusiness-related companies in Lao PDR to increase competitiveness of agricultural products in the country

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

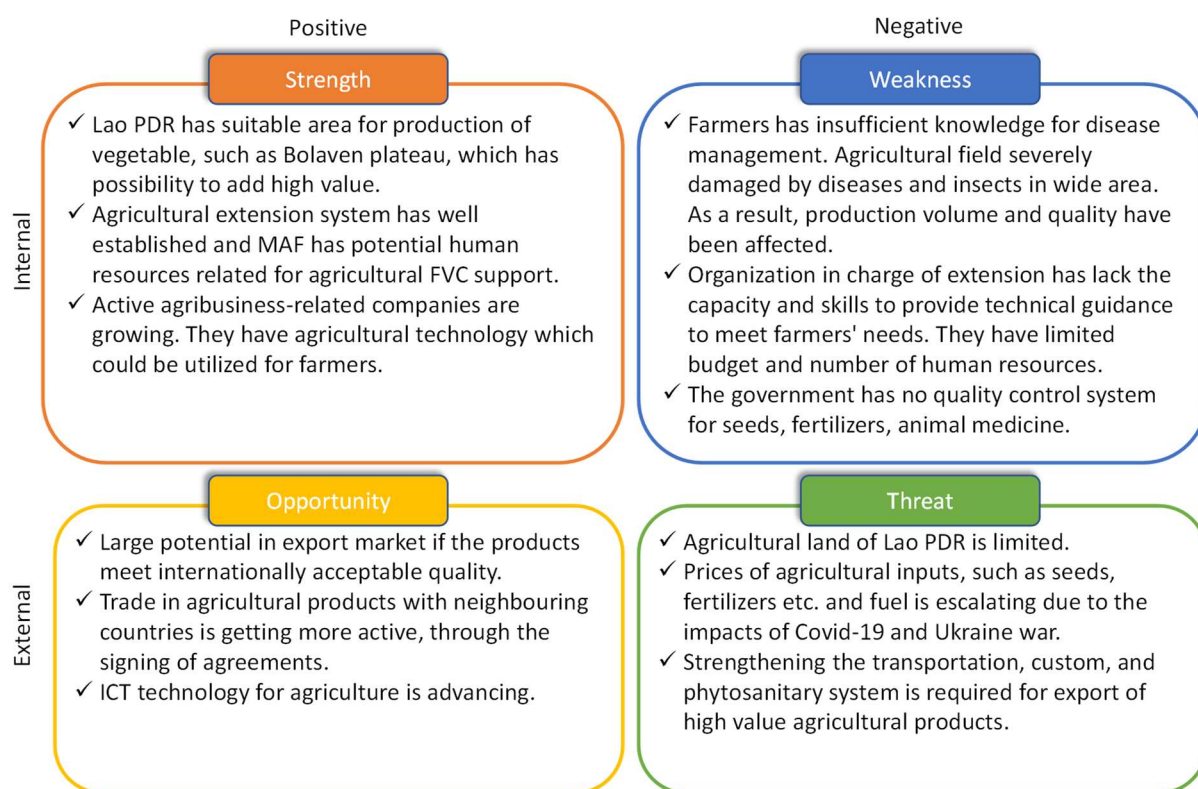
To improve capacity and knowledge of farmers to control pest and diseases and to improve quality control system by the government to meet quality and demand of agricultural products

To introduce extension approach utilizing ICT technologies to overcome budget and human resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To support farmers technically to reduce agricultural input such as fertilizers, agro-chemicals etc. to address increase of price of agricultural input

(3) FVC for export market



Source: JICA project team

Figure 5.3 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of export quality agricultural products in suitable areas such as Bolaven

plateau to meet increasing demand of neighbouring countries

Strength & Threat: A strategy to manage threats with strengths

To promote and support activities outstanding agribusiness-related companies in Lao PDR to increase competitiveness of agricultural products in the country

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

To introduce extension approach utilizing ICT technologies to overcome budget and human resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To strengthen the transportation, custom, and phytosanitary system including regulation, procedure etc. for accelerating export of agricultural products based on international standards.

CHAPTER6 TECHNICAL MEASURES FOR STRENGTHENING FVC

Based on the issues identified through preparatory study and field survey, technical measures have been considered. Technical Measures are the techniques to solve the issues on FVC processes categorized into 5 subjects, PR (Production and Processing), FM (Farm Management particularly in relation to farmers and farmer's group strengthening), MAR (Marketing consisting of distribution and retail), SUP (Supporting measures such as financial support, policy recommendation and quality checking), EX (Extension services by public, PAFO/DAFO, academic and private sector). The concept and number of the proposed technical measures are as follows:

Table 6.1 Concept and Number of Technical Measures

Category	Concept	Number
PR (Production and Processing)	To stabilize and increase quality products as the most upstream of FVC	15
FM (Farm Management particularly in relation to farmers and farmer's group strengthening)	To enhance farmers and their groups to be part of vital key actors in FVC process	12
MAR (Marketing consisting of distribution and retail)	To ensure delivering quality domestic agricultural and processed products to consumers in timely manner	9
SUP (Supporting measures such as financial support, policy recommendation and quality checking)	To increase value addition by supporting input supply, financial and policy intervention	7
EX (Extension services by public, PAFO/DAFO, academic and private sector)	To enhance extension services by public as well as private and other external resources	6
Total		49

Source: JICA project team

The proposed technical measures were prioritized through the evaluation on the criteria; (i) level of technology, (ii) cost to be required, and (iii) coverage whether the techniques is widely disseminated.

Table 6.2 Evaluation and Prioritization of Technical Measures

No.	Technical Measures	Possibility of extension of technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
Production and Processing							
PR-01	Crop rotation	Basic	Low	Wide	Yes	Yes	Yes

No.	Technical Measures	Possibility of extension of technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
PR-02	Intercropping and mixed cropping	Basic	Low	Wide	Yes	Yes	Yes
PR-03	Soil preparation	Basic	Low	Wide	Yes	Yes	Yes
PR-04	Coordination strengthening among research and extension	Intermediate	Moderate	Wide	Yes	Yes	Yes
PR-05	Fertilizer application	Basic	Low	Wide	Yes	Yes	Yes
PR-06	Disease management for agricultural products	Intermediate to high	Moderate	Wide	Yes	Yes	Yes
PR-07	Pesticide application	Basic	Low	Wide	Yes	Yes	Yes
PR-08	Product componential analysis	Intermediate	Low	Small	Yes	Yes	Yes
PR-09	Regulation of foreign investment in agricultural production (fishery)	High	Moderate	Medium	No	Yes	Yes
PR-10	Disease management for livestock	Intermediate	Moderate	Medium	No	Yes	Yes
PR-11	Livestock production	Basic	Moderate	Medium	No	Yes	Yes
PR-12	Local pig promotion	Basic	Moderate	Medium	No	Yes	Yes
PR-13	Fish yield control and management	Basic	Moderate	Medium	No	Yes	Yes
PR-14	Niche high valued products promotion	Intermediate	Moderate	Small	Yes	Yes	Yes
PR-15	Processing promotion of priority products	Basic	Moderate	Medium	Yes	Yes	Yes
Farm Management							
FM-01	Household accounting management	Basic	Low	Wide	Yes	Yes	Yes
FM-02	Book keeping (Farm Record)	Basic	Low	Wide	Yes	Yes	Yes
FM-03	Cropping Calendar (Cropping Pattern Arrangement)	Basic	Low	Wide	Yes	Yes	Yes
FM-04	Post Harvest	Basic	Low	Wide	Yes	Yes	Yes
FM-05	Business plan	Intermediate	Low	Medium	No	Yes	Yes
FM-06	Group formation/ Group strengthening	Basic	Low	Wide	Yes	Yes	Yes
FM-07	Group accounting management	Basic	Low	Wide	Yes	Yes	Yes
FM-08	Establishment of Cooperatives	Basic	Low	Wide	Yes	Yes	Yes
FM-09	Formulation of Water Users Association	Basic	Low	Wide	Yes	Yes	Yes
FM-10	Collective Selling / Purchasing	Basic	Low	Wide	Yes	Yes	Yes
FM-11	Rural finance accessibility improvement	Intermediate	Low	Medium	No	Yes	Yes
FM-12	Market information access improvement	Basic	Low	Wide	Yes	Yes	Yes
Marketing							
MAR-01	Cold storage installation	Basic to High	Low to High	Small	Yes	Yes	Yes
MAR-02	Strengthening financial scheme to middlemen	Intermediate to High	High	Medium	No	Yes	Yes

No.	Technical Measures	Possibility of extension of technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
MAR-03	Cold chain improvement	Basic to High	Low to High	Small	Yes	Yes	Yes
MAR-04	Price control policy by the Government	High	High	Wide	Yes	Yes	Yes
MAR-05	Foreign investment control by the Government	High	High	Wide	No	Yes	Yes
MAR-06	Market information system improvement	Intermediate to High	Moderate to High	Medium	Yes	Yes	Yes
MAR-07	Distribution improvement to preserve products	Intermediate	Moderate to High	Medium	No	Yes	Yes
MAR-08	Market facilities improvement to suit various level of traders	Basic	High	Medium	No	Yes	Yes
MAR-09	Packing improvement for distribution	Basic	Moderate	Medium	No	Yes	Yes
Supporting							
SUP-01	Strengthening financial support to farmers' group	Intermediate to High	Moderate to High	Wide	No	Yes	Yes
SUP-02	Strengthening farmers' group in financial management	Basic	Moderate	Wide	No	Yes	Yes
SUP-03	Strengthening coordination with private financial institutions	Intermediate	Moderate	Wide	No	Yes	Yes
SUP-04	Strengthen law and regulations enforcement in agriculture and livestock sector	High	High	Wide	Yes	Yes	Yes
SUP-05	Strengthen seed quality checking system	Basic	Moderate	Wide	No	Yes	Yes
SUP-06	Strengthen fertilizer quality checking system	Basic	Moderate	Wide	No	Yes	Yes
SUP-07	Product traceability system	Intermediate	High	Wide	No	Yes	Yes
Extension							
EX-01	Strengthening capacity of extension officers	Basic	Low	Wide	Yes	Yes	Yes
EX-02	Strengthening coordination mechanism with private sectors	Basic	Low	Wide	Yes	Yes	Yes
EX-03	ICT extension system development	High	Moderate	Wide	Yes	Yes	Yes
EX-04	Strengthening coordination role between PAFOs and DAFOs	Basic	Low	Wide	Yes	Yes	Yes
EX-05	Strengthening coordination role between public and input suppliers	Intermediate	Low	Wide	Yes	Yes	Yes
EX-06	Strengthening Coordination among extension and educational institutions	Intermediate	Moderate	Medium	No	Yes	Yes

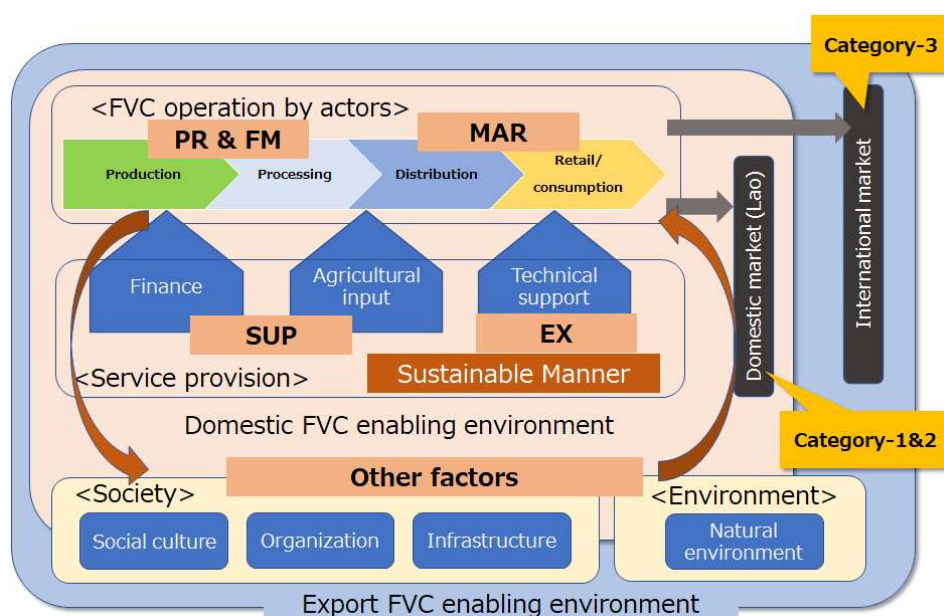
Source: JICA project team

CHAPTER7 DEVELOPMENT DIRECTION AND APPROACH

7.1 Introduction

The sustainable of FVC framework as a basis of formulating the master plan is depicted below. MP

contributes to develop 3 categories of FVC: Category-1 FVC for domestic market, Category-2 FVC for modern domestic market and Category-3 Export FVC.

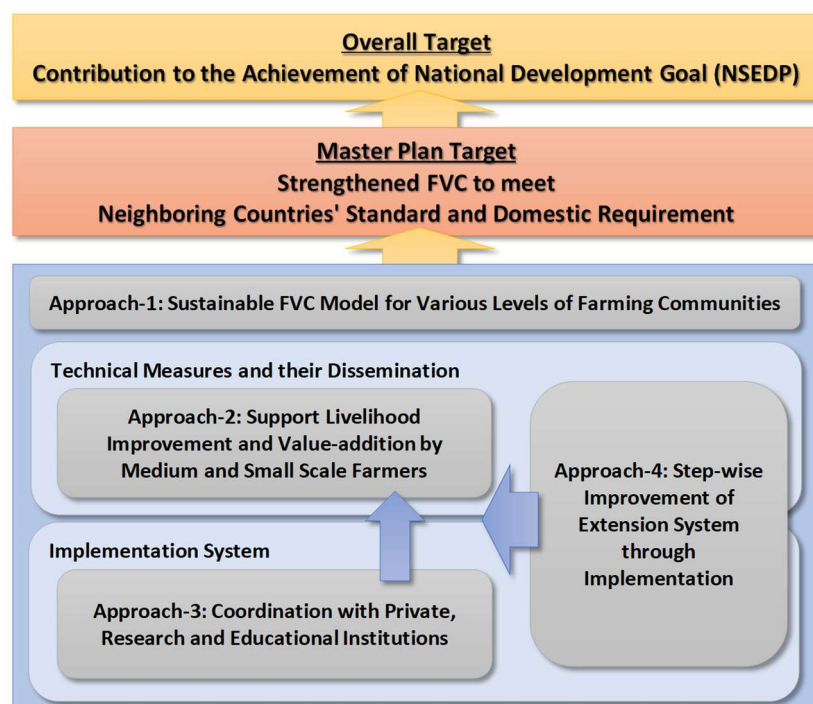


Source: JICA project team

Figure 7.1 Sustainable FVC Framework

7.2 Approach of Mater Plan

Overall goal, master plan goal and the approach of strengthening FVC in Lao PDR is formulated as shown in the following table and figure.



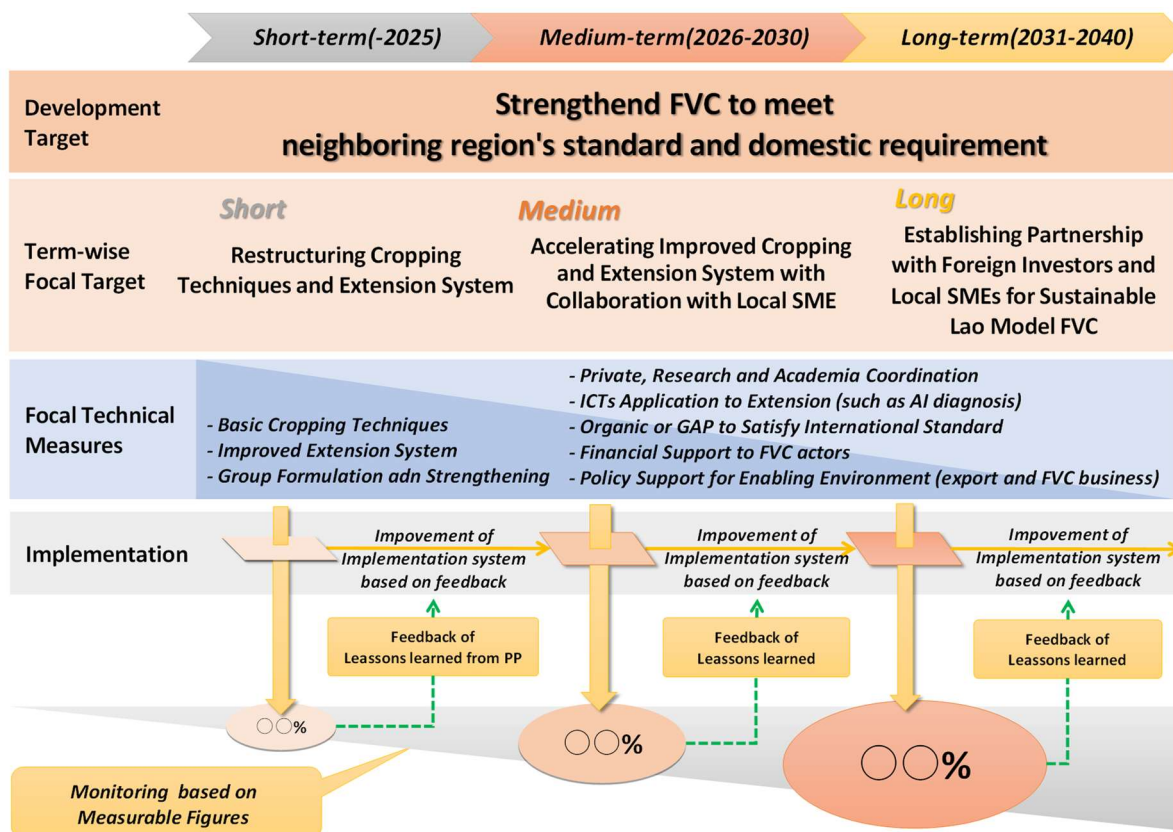
Source: JICA project team

Figure 7.2 Approach of Master Plan

MP was formulated aiming at climate resilience of agricultural infrastructures and to enhance crop productivity, diversification and commercialization through FVC strengthening process which will finally lead to increase of house income and improvement of overall value chain. MP for strengthening FVC was prepared to be consistent with the government policy particularly focusing on one of the effective measures, integrated farming.

7.3 Framework of Master Plan

Framework of MP for strengthening FVC is summarized as the following figure and table.



Source: JICA project team

Figure 7.3 Framework of Master Plan for Strengthening FVC in Lao PDR

Table 7.1 Framework of Master Plan for Strengthening FVC in Lao PDR

Subject	Description
Development target	Strengthened FVC to meet neighboring countries' standard and domestic requirement
Term	Three terms as follows: ◆ Short: from 2022 to 2025 (during JICA technical cooperation) ◆ Medium: from 2026 to 2030 ◆ Long: from 2031 to 2040
Term-wise development scenario	◆ Short: Restructuring production techniques and extension system ◆ Medium: Accelerating improved production techniques and extension system with collaboration with local SMEs ◆ Long: Establishing partnership with foreign investors and local SMEs for sustainable Lao model FVC
Focal technical measures	Proposed basic, intermediate and advanced technical measures for FVC strengthening are adopted and disseminated stepwise in the course of MP.

Subject	Description
Implementation structure	◆ Technical measures are disseminated by creating key model FVC promotion clusters in each province. ◆ Based on LEA, DAEC will promote improved implementation system by involving various FVC actors (private, research and educational institutions). ◆ Implementation structures are periodically improved by continuous monitoring.
Measurable figures for monitoring	Clear measurable figures are established consistently with NSEDP and MAF strategy in promotion of commercial agriculture.

Source: JICA project team

CHAPTER8 PRIORITY PROJECTS AND PROGRAMS

8.1 Introduction

Basic considerations for action plan for the master plan including proposing priority projects/programs for strengthening FVC is as follows:

- ◆ Priority projects and programs for FVC strengthening are designed by considering regional resources inherent in the provinces.
- ◆ Priority projects and programs are proposed for strengthening 3 models of FVC, cross-cutting activities (law, regulation, guidelines development, agriculture input and agriculture finance), and external activities in relation to strengthening FVC, and
- ◆ Priority projects and programs are the combination of technical measures proposed by the Project consisting of (i) production, (ii) farm management, (iii) marketing including distribution and retail, (iv) supporting measures for agricultural input supply and finance and (v) extension services by public, PAFO/DAFO, academic and private sector).

8.2 Priority Projects and Programs

In order to effectively achieve the thematic goals in the master plan, the following priority projects and programs to support strengthening FVC in Lao PDR are: (i) 3 models of FVC, (ii) cross-cutting activities, and (iii) external activities to support FVC strengthening.

Table 8.1 Priority Projects and Programs for 3 Models of FVC

Type of FVC	Priority Projects/Programs
FVC for domestic market <i>Targeting traditional market</i>	◆ Organic farming and/or clean agriculture production system standard strengthening and extension with business entities. ◆ Market-oriented crops production for traditional market ◆ Agriculture products processing and food system development ◆ Livestock production development and extension project ◆ Improved traditional fish culture promotion ◆ Quality brood stock supply for fish farmers
FVC for modern domestic market <i>Targeting modern domestic market</i>	◆ Organic farming and/or clean agriculture production system standard strengthening and extension with business entities ◆ Agribusiness promotion support ◆ Agriculture products processing and food system development ◆ Livestock production development and extension project ◆ Fish culture promotion ◆ Commercial high yield grass seed production and supply for livestock ◆ Quality brood stock supply for fish farmers ◆ Promotion of high value niche products

Type of FVC	Priority Projects/Programs
Export FVC <i>Targeting export</i>	◆ Organic farming and/or clean agriculture production system standard strengthening and extension with business entities ◆ Market-oriented crops production for export (priority crops such as coffee, maize, cassava, banana, watermelon, potential fruits crops etc.) ◆ Agriculture products processing and food system development ◆ Livestock production development and extension project ◆ Food safety in livestock products improvement ◆ Food safety in fishery products improvement ◆ Commercial high yield grass seed production and supply for livestock ◆ Promotion of high value niche products

Source: JICA project team

Table 8.2 Priority Projects and Programs for Cross-cutting Activities

Cross-cutting activities	Priority Projects/Programs
Law, decree and guidelines	◆ Law on agricultural finance facility system ◆ Upgrade from ministerial agreement to law for agriculture input ◆ Wholesale marketing system ◆ Prepare practical guidelines through the Project Details are explained in the next section
Agriculture input	◆ Biofertilizer production and promotion ◆ Livestock and fish feeds production promotion ◆ Legal Enforcement Program for Pesticide Control ◆ Legal Enforcement Program for Fertilizer Management
Agriculture finance	◆ Matching grant ◆ Agriculture financing scheme ◆ Agricultural Credit facilities System ◆ Accessibility improvement of farmers to formal financial institutions
Others (information sharing)	◆ ICT utilization for production and marketing support ◆ Information accessibility improvement and development
Capacity Development	◆ Strengthening agriculture extension and analysis capacity of extension offices ◆ Agriculture producer's group and cooperative formation and strengthening ◆ Subject-wise capacity development (insect, plant disease, laboratory testing and analysis, plant breeding etc.) ◆ Capacity development for plant quarantine staff at international checkpoints in the country ◆ Capacity development of coordination among national, provincial and district levels ◆ Capacity development for coordination among public, private academia for FVC ◆ Veterinary medical management system development ◆ Capacity development of livestock and fishery production and marketing ◆ Functional Extension System Development Program ◆ Research, testing and experiment infrastructure strengthening and development (including testing of chemical residues)

Source: JICA project team

8.3 FVC-related Law, Regulation and Policy for Enabling Environment

There are various of FVC-related Law, Regulation and Policy needs to be strengthened/improved to create enabling environment for FVC promotion. Among others, Table 8.2.2 listed agriculture finance, upgrade of ministerial decree, wholesale marketing system and strengthening guideline. Details are tabulated in the followings:

Table 8.3 FVC-related Law, Regulation and Policy for Enabling Environment

Topic	Necessary Measures
Land Management	✓ Expedite plan making process. ✓ Ambiguities of law implementation need to be removed in terms of land categories change, adjustment process on gaps between plans and actual occupation.
Plant Variety Protection	✓ Enlighten relevant staff on IP Protection as soon as possible. Plant Variety Right is IP. ✓ Expand the coverage of Examination Guidelines for DUS test as soon as possible, especially for fruits to invite foreign seed companies to sell their varieties in Laos.
Seed Quality	✓ Increase seed sampling by seed inspectors and laboratory check.
Food Safety	✓ Establish consistent legal framework and enforce the laws and regulation by developing implementing capacity including laboratory. ✓ Upgrade Lao GMP with HACCP to GMP or HACCP internationally accredited or establish internationally accredited HACCP certification body in Laos.
Pesticide Control	✓ Pesticide itself (Pesticide Formulation) analysis laboratory need to be established in Government. Private Sector cannot cover this analysis. ✓ Pesticide Registration System should be strengthened to prevent illegal, fake or low-quality pesticide marketing.
Fertilizer Control	✓ Nationwide fertilizer analysis network needs to be established by increasing more analysis centers. At least region by region.
Plant Quarantine	✓ Carry out more Pest Risk Assessments to establish agreed quarantine conditions for more kinds of crops with foreign countries, such as strawberry, jackfruits.
Animal Quarantine	✓ Construct more Border Check Points Laboratories with necessary equipment.
Animal Meat	✓ Based on the established legal framework, implementation framework needs to be established as soon as possible by developing capacity of veterinarian and other technical officers and laboratory capacity.
Animal Feed	✓ Strict law enforcement by fining shops to violate the decree.
Animal Medicine	✓ Strict law enforcement by fining shops to violate the law.
Organic Agriculture	✓ Carry out pesticide residue analysis to certify organic agriculture. Self-declaration on organic could not be reliable. ✓ Clarify the details of contamination situation about water and other elements.
GAP	✓ Prepare Control Points with Compliance Criteria on each management activity. ✓ Carry out pesticide residue analysis to certify appropriate use of pesticide. ✓ Make Lao GAO comply with ASEAN GAP, then Upgrade Lao GAP to internationally accredited GAP or establish internationally accredited GAP Certification Body in Laos.
Wholesale Market	✓ Make Wholesale Market Law in future after making regulations to strengthen market functions on information dissemination, trader licensing system.
Farmers' Organization	✓ The drafted Cooperative Law need to strengthen income tax exemption, and financial support to cooperatives that enables cooperatives to borrow money from commercial banks.
Contract Farming	✓ Strengthen Law Enforcement by clarifying duties of parties and imposing heavy penalty for infringement cases.
Agriculture Finance	✓ Prepare new Law on Agriculture Credit Facility by minimizing the risk of agriculture finance through several banks' participation supported by the Central Bank.
Investment Tax	✓ The list of goods and services exempted from value added tax need to include materials such as pipes for drip irrigation, mulching sheet plastic, vinyl sheet for green house.

Source: JICA project team

CHAPTER 1

INTRODUCTION

CHAPTER1 INTRODUCTION

1.1 Background

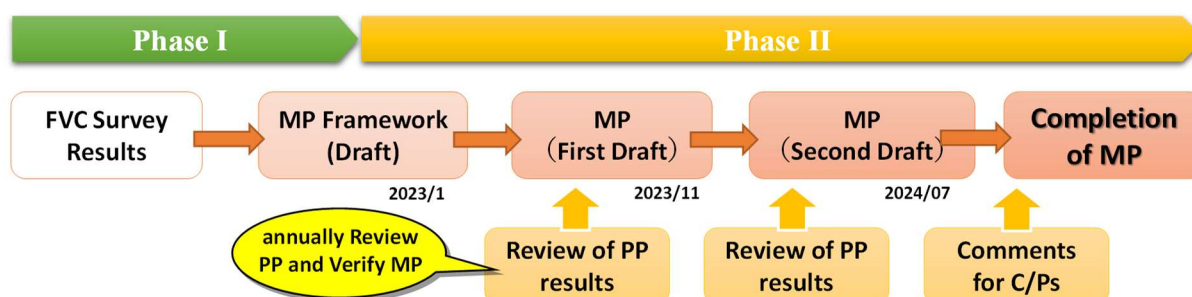
In Lao People's Democratic Republic (Lao PDR), against a background of urbanization by economic growth and change of dietary habit due to income increase, foreign-invested supermarket in Vientiane and other cities and food processing factories in rural areas are increasingly active in business. In such rapidly changing surroundings of, in particular, middle and downstream stage of food value chain (FVC) in Lao PDR, agricultural production, say, upstream stage of FVC is also facing the necessity to change. The Government of Lao, therefore, is required to pay critical attention to support small and medium scale farmers, agro-processing and marketing related-small and medium enterprises (SMEs).

In the Agriculture Development Strategy 2025 and Vision 2030 (Strategy 2025/Vision 2030) formulated in 2015, the Ministry of Agriculture and Forestry (MAF) describes specific and measurable indices for the promotion of commercial agriculture. In addition, in the 9th Five-Year National Socio-Economic Development Plan (2021-2025) (9th NSEDP), MAF explains overall directions, outcomes and outputs including priority thematic areas in the agriculture sector, however, both Strategy 2025/Vision 2030 and 9th NSEDP do not show clearly the approach and the implementation procedure to achieve outcomes and outputs. In such situation, MAF requested Japan International Cooperation Agency (JICA) for technical cooperation entitled the Project for Strengthening Food Value Chain (the Project).

The project developed a master plan for strengthening FVC with a target year of 2040. This report presents the results of the FVC survey, the FVC analysis, and the master plan based on the activities conducted through the project.

1.2 Schedule of Mater Plan Formulation

In the Phase I period (from April 2022 to December 2022), the project team prepared the master plan framework (draft). As shown in the figure below, based on the results of Pilot Project implementation in the Phase II period (from February 2023 to April 2025), the master plan was reviewed and updated annually, and was finalized in accordance with the formal procedures of formulation of master plan in Lao PDR based on the comments from relevant organization in December 2024.



Source: JICA project team

Figure 1.2.1 Flow and Schedule of Preparation of MP

1.3 Structure of Master Plan Formulation

The food value chain working group (FVCWG) under the Department of Agricultural Extension and Cooperatives (DAEC) of MAF, Lao PDR is the main body responsible for formulating the master plan with technical support by JICA experts (See Chapter 1, Vol-I for project implementation structure.).

1.4 Selections of Target Commodities for Master Plan Formulation

Target commodities representing local agricultural crops were selected for grasping FVC characteristics of Lao PDR based on the discussion in FVCWG and Provincial agriculture and forestry office (PAFOs)/ District agriculture and forestry office (DAFOs) through workshops for selection of the target commodities. Outlines of selection procedures and results are shown in the following section.

For the selection criteria, the Project focuses on the following principles for target crops/commodities.

Principles for selection of target crops/commodities

- ◆ Number of crops/commodities: Total number of crops/commodities is five varieties from each PAFO
- ◆ Government policy/strategy: Crops/commodities are prioritized in the government policy and strategy.
- ◆ Provincial priority: In addition to government strategy, PAFO/DAFO's intention will be also put priority from the viewpoint of effective utilization of field-based knowledge.
- ◆ Selection from each crop-group: Since the target crops/commodities are selected as samples of FVC analysis and not necessarily prioritized crops/commodities over MP period until 2040, at least, one crop/commodity is selected from each product group under agricultural products (grain, vegetable, fruit, livestock and fishery) to clarify typical FVC status in each sub-variety.
- ◆ Number of crops/commodities to be surveyed in each province: In order to complete the survey within specified time period, number of crops/commodities to be surveyed will vary depending upon the stage of FVC: (i) production/processing max 3 varieties and (ii) distribution/retail all 5 varieties in each province (see Selection steps for priority crops)

Based on the principles, the proposed selection criteria for target crops/commodities are as follows.

Table 1.4.1 Selection Criteria for Target Crops/Commodities

No	Selection criteria	Scoring Indicators	Score (1 to 3)
1	Government policy	Priority crops in the government policy and strategy	Low: 1 - Moderate:2 - High; 3
2	Domestic market needs	High need in domestic market and modern domestic market	Low: 1 - Moderate:2 - High; 3
3	Potential for expansion to other areas	Produced in multiple areas, including the target area	Low: 1 - Moderate:2 - High; 3
4	Involvement of small- and medium-scale FVC actors	Produced and processed by small- and medium-scale farmers and processors	Low: 1 - Moderate:2 - High; 3
5	Potential for high value addition	Large potential for value addition through improvement of cultivation, post-harvest processing, processing, etc.	Low: 1 - Moderate:2 - High; 3
6	Potential for import substitution	Imports account for a high percentage of domestic consumption	Low: 1 - Moderate:2 - High; 3
7	Intention of PAFO	Priority at the provincial level	Low: 1 - Moderate:2 - High; 3
Total			Min: 7 – Max: 21

Source: JICA project team

(1) Selection Procedure

The selection procedure of the target commodities are as follows.

Step-1: Preliminary selection by PAFO of each province prior to the workshop (five varieties from long list (See Table 1.4.2) prepared by DAEC/JICA Project team)

* Select at least one commodity from each commodity group (grain, vegetable, fruit, livestock & fishery and others, if any)

Step-2: Joint evaluation based on selection criteria for confirming the validity of selection by PAFO

Step-3: Final decision and confirmation of selected crops among DAEC and PAFOs during the Workshop

Step-4: Select 3 crops for the survey of production and processing stage of FVC

* All five crops will be surveyed for distribution and retail stage of FVC

Table 1.4.2 Long List of the Target Commodities

Commodity group (20 nos.)	Crops/Products/Commodities	
Grain (7 nos.)	- Maize (National priority goods, large planted area) - Sweetcorn (large planted area in Vientiane capital) - Sweet potato - Taro	- Cassava (National priority goods, large planted area) - Sugarcane (national priority goods) - Beans (potential cash crops) (large planted area)
Vegetable (5 nos.)	- Cabbage (potential cash crops) - Leafy stem vegetables (large planted area) - Onion (promote domestic production)	- Cardamom (larger planted area in Sekong province) - Pumpkin (export product)
Fruit (4 nos.)	- Banana (potential cash crops) - Avocado (potential cash crops) - Pineapple (potential cash crops)	Fruit bearing and Leguminous (such as Mango and Durian) (large planted area)
Livestock & Fishery (3 nos.)	- Livestock - Cattle (potential cash commodity) - Goat (potential cash commodity)	- Fishery - Inland fishery (Natural or fish culture) (recommended from DOLF) (potential cash commodity)
Others (1 nos.)	Tea (potential cash crops)	Others (sesame, medicinal crops such as Ginseng), if any, to be advised by PAFO

Source: JICA project team

(2) Results of selection of the target commodities

Selection results of the target commodities are shown below:

Table 1.4.3 Target Commodities for FVC Survey

Province No.	Vientiane Capital	Champasak province	Sekong province
1	Maize	Sweet corn	Cabbage
2	Spring onion	Cabbage	Banana (Lao traditional)
3	Banana (Export)	Avocado	Ginseng
4	Pig & cattle	Cattle	Cattle
5	Fishery (tilapia)	Fishery (natural fish)	Fishery (tilapia)

Source: JICA project team

CHAPTER 2

NATIONAL PLANS AND POLICIES

CHAPTER2 NATIONAL PLANS AND POLICIES

2.1 National Plans and Policies

2.1.1 Categories of FVC related Policies, Laws and Regulations

FVC related national policies, laws and regulations are analyzed based on the following categories: 1) Inputs, 2) Production System, 3) Marketing System, 4) Processing System, 5) Food Risk Management and 7) Finance. The following categories of FVC related policy were selected for analysis of the policies.

Table 2.1.1 Categories of FVC-related Policies, Laws and Regulations

Kinds of System	Categories of FVC related Policy
Inputs	Seed, Pesticide, Fertilizer, Animal Feed, Medicine for animal, agricultural machinery, soil, land water
Production System	Organic Agriculture, GAP, Farming System (Mix Cropping)
Marketing System	Farmers Organization for collective marketing, Wholesale Market, Contract Farming, E-Commerce, Retail Market, Price Stabilization
Processing System	Processing, Reserve
Food Risk Management	Food Safety, Food Labeling, Quality Standards, Animal Health, Slaughterhouse Management, Animal Movement SPS, Custom System including electrification
Finance	Agriculture Finance, SME Finance

Source: JICA project team

2.1.2 FVC related Plans and Policies

JICA project team analyzed FVC-related plans and policies. The outlines of plans/policies and results of analysis are summarized in the table below.

Table 2.1.2 FVC-related Plans and Policies

Policies	Outline of Policies	Results of Analysis
Agriculture Strategy 2025	<u>Target Period:</u> 2016-2030 <u>Outline:</u> This strategy showed the three overall goals on 1) Economy has strongly grown in line with industrialization and modernization direction, comprehensive infrastructure, ensuring economic growth at a constant level, effective, stable and ensuring food security and strongly ensures quality in terms of nutrition, producing agricultural products with quantity and quality that are highly competitive as well as are adaptable to climate change. 2) Agriculture production is in line with sanitary principles, clean, safe for producers and consumers health and environmentally friendly. 3) Agriculture Production contributes to stability and balance of the ecological system.	✓ This strategy well captured priority elements of FVC such as seed, land, pesticide, fertilizer, animal feed, medicine for animal, farmers organization, processing and marketing, food safety, SPS, Agricultural Finance, ✓ Limited contents on soil management, farming system, wholesale marketing, retailing system, contract farming. ✓ This lacked government roles for mechanization in terms of machinery performance and safety tests.
8th NSEDP	<u>Target Period:</u> 2016-2020 <u>Outline:</u> The directions are to develop firm and sustainable agriculture and forestry sector, to continue allocating land for agriculture and production to secure food and commercial production; to increase the potential agricultural production of each locality using clean and organic agriculture, and promote intensive agriculture using modern and high-quality techniques, to Improve farmer productivity by establishing farm production, production groups and enterprises to ensure the supply of	✓ This Plan well captured priority elements of FVC such as seed, soil, land, water, farmers organization, marketing, price stabilizing, food safety, SPS, and Agricultural Finance. ✓ Limited contents on pesticide, fertilizer, farming system, wholesale market, retailing system,

Policies	Outline of Policies	Results of Analysis
	agricultural products as inputs to processing industries and services quantitatively and qualitatively in order to add value to the products.	contract farming,
Mid Review 8th NSEDP	<u>Target Period:</u> 2018-2020 <u>Outline:</u> The Government recognizes the challenges to the sustainability of its current growth model. Continued efforts to increase agricultural productivity. Farm production met or exceeded the national per-capita food production targets in 2017, even with flooding. The past two years saw nutrition-sensitive agriculture service delivery in 81 districts, and multi-sector efforts to support consumption of more diverse foods. Yet threats to food security persist from soil degradation, land pressure from population, and large-scale investment projects. The rapid commercialization of agriculture poses threats to local food security and nutrition strategies.	✓ This review well captured priority elements of FVC such as seed, farming system, farmers organization, contract farming, food storage, processing, food safety, custom system, Agriculture and SME Finance, but limited contents on wholesale and retail marketing, ✓ Remarkable points of this review are focusing on adverse effects of mono-cropping, threat on food security by increased commercial farming, balancing commercial development and national food security in several pages.
9th NSEDP	<u>Target Period:</u> 2021-2025 <u>Outline:</u> The agricultural sector is a potential sector that can be further leveraged to maximize the benefits of the trade privileges that Lao PDR enjoys. Focus must be given to the following areas: (1) Agricultural production must be closely linked to the production chains of the processing industry; (2) Produce crops and livestock and support the needs of new markets; (3) Shift from single-crop farming to diversified or multi-crop farming (mixed crop system) ; (4) Promote GAP and organic farming; (5) Improve the efficiency of agricultural production with the use of new techniques and transform traditional and fragmented farming practices into production groups or the new cooperative production model; (6) Create access to credit and markets; (7) Develop strong agricultural infrastructure resilient to natural disasters; (8) Suitable land allocation, and (9) Establish higher food safety standards.	✓ This Plan well captured priority elements of FVC such as seed, mechanization, soil & land, water, GAP and Organic Agriculture, farming system, farmers organization, E-Commerce, processing, food safety, food standard and packaging, custom system, SPS, Agriculture and SME Finance, but limited contents on contract farming. ✓ This plan also emphasized shift from single-crop farming to diversified or multi-cropping farming and integrated crop rotation.
9th Agriculture Plan	<u>Target Period:</u> 2021-2025 <u>Outline:</u> The overall direction of the 9th Five-Year Agriculture and Rural Development Plan is to make all efforts to boost agricultural production, to ensure food and nutrition security, and to produce quality and diversified agricultural products; increasing people's incomes has led to poverty alleviated, developed to create added value. The agricultural, forestry and rural development plan must focus on the conditions of integration, heritage, and potential of natural resources in each region, national socio-economic condition, and local wisdom for quality growth, balance, and sustainability to ensure adequate food, raw materials fed to processing plants, fresh, clean and safe products for consumption, to sell domestically and for export in accordance with sanitary standards and phytosanitary (SPS) and import regulations of trading partners, certified clean, organic agriculture in green, clean, safe and environmentally friendly orientation.	✓ This Plan well captured priority elements of FVC such as seed, animal feed, medicine for animal, mechanization, soil & land, water, fertilizer, GAP, Organic Agriculture, farming system, farmers' organization, wholesale market facilities, contract farming, GI, processing, pesticide, food safety, SPS, Agriculture & SME Finance. ✓ Limited contents on wholesale market system, food labeling.

Source: JICA project team

From the points of view on the selected categories of FVC related policy, the existing national plans and policies in Lao PDR have well captured these elements with limited lacking points.

Table 2.1.3 FVC-related Plans and Policies in Lao PDR

	Priority Elements	Agriculture Strategy 2025	8th NSEDP	Mid Review 8th NSEDP	9th NSEDP	9th Agriculture-Plan
Input	Seed	✓ Variety research for Commercial Crops ✓ Measures related to Food Production, 6) Development and Improving the management system for the use of production input (Testing Center) 8) Research and Apply new technology	✓ Policy on intellectual property rights ✓ Policy on research of unique seedling species	✓ Improper agro-chemical import ✓ Improving access to inputs	✓ Improve the efficiency of agricultural production with modern tools, new techniques and science innovations, and new varieties of crops. Upgrade and modernize technical infrastructure such as ag-machinery, mills, dryers domes, seed sorting plants, drying plants, bio-fertilizer factories,	✓ Two Rice Varieties (Saimay 1 & 2) with multiplication system Agricultural Development Center ✓ Crop Varieties Development Research Vegetable & Fruits Varieties Development ✓ Fish Fry Production with increased hatcheries Cow, Pig, Goat & Poultry Breed Improvement by AI Fodder Crop Improvement Fish Species Improvement
	Pesticide	✓ Developing and Improving management system for use of production input				
	Fertilizer	✓ Developing and Improving management system for use of production input				
	Animal Feed	✓ Livestock Production, Animal Health (Animal Feed Analysis Center) ✓ Animal & Fish Feed production promotion				✓ Increased Feed Factory & Fodder Crop
	Medicine for Animal	✓ Livestock Production, Animal Health (Veterinary Drug Production Center)				✓ Increased Vaccination Rate
	Mechanization	✓ Measures related to Food Production, 7) Production Technique			✓ Promote the use of agricultural machinery	✓ Machinery Service by ADC Land Consolidation (Plot Expanding)
	Soil & Land	✓ Agricultural Food Crops Production 1) Determination and Zoning of Agriculture Land Use 3.2.2.1 1) Zoning for Agriculture Commodity Production	✓ Land Titling ✓ Balanced development among industries ✓ Allocate areas by classifying land use areas ✓ Formulate and improve legislation on zoning and plans for land use		✓ Identify areas and types of farming and animal husbandry that are suitable to the potential of each locality and the actual needs of the market ✓ Develop comprehensive plans for land allocation Land Management and Use: Develop sectoral and local land use strategies. land titles, Allocate land for clean agriculture, sustainable organic farming	✓ Land Use Survey and Planning including Soil Survey Agricultural Land Development with coordination mechanism ✓ Demarcation of Production Areas, Land Use Planning, Issuing Land Use Certificate Improving the fertility of agricultural land Management of land with soil improvement by composts Bio-Fertilizer, Green Manure (Bean Family) & other use
	Water	✓ Measures related to Food Production Irrigation Infrastructure Development and Irrigated Agro-irrigation focal area development	✓ Upgrading Irrigation		✓ National Water and Water Resources Management Strategy	✓ Network for research on soil, water, plants, fertilizer Agro-Irrigation
Production System	Organic Ag	✓ Measures related to Food Production, Clean Agriculture Production, Food Safety	✓ Promote clean and organic agriculture		✓ Promote GAP and OA for domestic consumption.	✓ Rice production based on OA Production Models as OA, GAP
	Mix Cropping (Farming System)		✓ Comprehensive Agriculture Production	✓ Intensive mono-cropping with considerable level of chemical use of cassava, maize, banana, eucalyptus, rubber, Intensive livestock production can affect soil fertility polluting water sources. ✓ Flash floods and landslides have also been on the rise, events exacerbated by intensive mono-cropping ✓ Availability of traditional and nutritious foods has declined in some communities where commercial farming has expanded. Balancing commercial development and national food security with support for subsistence farmers ✓ Mixing cultivation and aquatic species ✓ Balancing the support to commercialization of agriculture with the support to food security	✓ Shift from single crops farming to diversified or multi-crop farming ✓ Algae farming, Integrated crop rotation to reduce soil degradation, limit and reduce the cultivation of monoculture crops or growing a single crop for an extended period of time.	✓ Increased Inland Fisheries with more fishponds Integrated production and Rotation ✓ Green and Sustainable Agricultural Ecosystem ✓ Conservation Agriculture-Direct Munching Cultivation (DMC) ✓ Agricultural Promotion Center (APC) Agricultural Technical Service Stations (ATSS) ✓ Village Technicians Protected Area for Indigenous species ✓ Agro-Ecological Techniques Risk Management from disasters, Pest

	Priority Elements	Agriculture Strategy 2025	8th NSEDP	Mid Review 8th NSEDP	9th NSEDP	9th Agriculture-Plan
Marketing System	Farmers Organization	✓ Development of Agriculture Production Group/Ag-Cooperative	✓ farmers' organization with access to relevant information	✓ Specific initiatives include strengthening farmers' associations ✓ Support to farmers organization, rural finance and insurance	✓ Transform traditional and fragmented farming practice into production groups or the new cooperative production model.	✓ Organizing Food & Commodity Production Groups Agro-Processing Groups ✓ Agricultural & Credit Cooperatives
	Wholesale Market	✓ Processing and Marketing (But not mention WM)	✓ Ensure products are in line with market demand, Timely Production		✓ Create access to markets	✓ Infrastructure improvement of WM Permanent wholesale and retail markets
	Contract Farming			✓ Improving the quality of private investment in the areas of contract farming, mono-cropping Responsible Agribusiness		✓ Investment mechanisms by contract farming
	E-Commerce				✓ Review relevant legislation and regulation on the development and promotion of e-commerce ✓ Develop e-commerce system.	
	Retailing System			✓ Stable Food Shortage		✓ Products with GI
	Price Stabilizing System	✓ Policy to guarantee rice and priority cash crop prices	✓ Policy on Market Expansion, Price Control ✓ Risk Reduction Fund ✓ reducing the Instability of Agriculture Production caused by Disaster Impact	✓ Risk Reduction Fund ✓ Strategy such as rice storage. to ensure food security in the event of natural disasters and food crises		
Processing System	Processing		✓ Outcome 1 Output 1 Modern Mill	✓ Food Processing Industry accounted for 33.8% ✓ Supporting the development of SME in higher value-added agriculture products through increasing access and provision of capital, training, and implementation of the SME Road Map. ✓ Higher value added processed products in Northern Region One District One Products in Vientiane Province	✓ Ag-Production must be closely linked to the production chain of the processing. ✓ Upgrade and modernize technical infrastructure such as wholesale-retail markets, cold storage, feed mills and slaughterhouses ✓ Encourage SMEs to become more involved in value chains and international markets ✓ Potential areas, Agro-Processing	✓ Upgrade infrastructure for processing, cold warehouse ✓ Develop and transfer post-harvest techniques (cold storage, milling, drying) ✓ Agro-Processing Groups ✓ Transfer of technological techniques on planting and processing
Food Risk Management	Food Safety	✓ Livestock Production, Animal Health (Meat Sanitary Standards) ✓ Animal Products processing promotion-slaughterhouse	✓ Monitoring and Certifying system for food safety operators Quality Inspection of factories and slaughter houses ✓ Consumer behaviors (Sanitation)	✓ Study on Food Safety with regard to E.Coli, Salmonella and Clostridium ✓ Food Safety through inspection of food production, increased SPS measures for ASEAN integration	✓ Establish higher food safety standards	✓ Develop technical infrastructure on chemical residues, plant & animal quality, physical analysis ✓ Upgrade slaughterhouses to standard ✓ Cleanliness and Safety of the processing in accordance with GMP
	Food Labeling & Standard	✓ GMP Processing Quality Standard			✓ Food crops and commodities are to be classified, have standards packaging	
	Custom System (Electrification)			✓ Outcome 1 Output 7 Remove NTBs by simplifying and harmonizing customs procedures and standards	✓ Outcome 5 Output 2 e-Licensing, Electronic Certificate of Origin and e-Trade Modern Cross Border Markets between Lao and Vietnam, China, Cambodia, Myanmar	✓ Developing the Center for Clean Agriculture Standards and Nationwide Network
	SPS	✓ Plant Protection Pest Labo at Plant Protection Center List of Pest (by PRA) ✓ Variety Rebranch and technology for commercial crops cultivation GAP,SPS	✓ SPS Policies		✓ SPS, TBT ✓ Large livestock, cattle for export to China in Northern region, Agriculture Production and Agro-Processing in Southern region	✓ Animal Quarantine Centers for China Integrate production with markets by SPS certification ✓ Development of SPS standards and Market Integration Strengthen SPS system with facilities Upgraded Central Animal Disease Research Center
Finance	Agriculture Finance	✓ Studies to determine appropriate credit interests, long term credit	✓ Financial & Banking Policies to support producers, manufacturers etc. ✓ Policy for farmer credit loans	✓ Access to credit limited. Lack of access to micro- and small scale- credit Poorly functioning crop insurance	✓ Credit access to credit	
	SME Finance			✓ Strengthen and diversify financing mechanisms and extension services for both farmers and MSME	✓ Improving the mechanism and procedures for accessing credit for MSMES	✓ Investment mechanisms in the form of SME

Source: JICA project team

Some points that have been emphasized by National Plans and Policies are as follows.

“Shift from single-crop farming to diversified or multi-crop farming (mixed crop system) especially high-yield crops (9th NSEDP). This point is important for sustainable production system that is a basis to add value in terms of food function.”

The recent NSEDPs policy directions are summarized as follows.

“In 8th NSEDP, the economic sector to get higher added value and harvest early needed to be focused and its emphasis was placed on commercial agriculture promotion. Accordingly, FVC related policy focused more on expanding the production that is suitable for selling and processing. Based on reconsidering balancing commercial development and national food security by Mid-Term Review of 8th NSEDP, 9th NESEDP showed the policy direction on the shift from mono-cropping that is inclined to occur in commercial farming to diversified (mixed) farming for ensuring sustainable production system. In addition to the shift, in the environment conservation policy, promoting integrated crop rotation has been emphasized to reduce soil erosion in sustainable agriculture development.”

The following Sentences linked to mix cropping and balancing development are extracted from Mid-Term Review of the Eighth National Socio-Economic Development Plan, 2016-2020 (MAF, 20).

“1.1. Outcome 1, Output 1: Sustained and inclusive economic growth

Actions to promote agricultural productivity. During the first half of the Eighth NSEDP, the Government launched important actions that have positively affected the sector. It has targeted, for example, commodity production and commercialization along with more sustainable practices guided by the Green Extension. Recent years have also seen increased private sector involvement that has made many farming communities more food secure through investment in new products and value chains. But private investment (including in the agriculture and forestry fields but also other sectors with relevant spillovers such as mining and hydropower) has also at times brought negative environmental and social impacts on rural communities. These include possible loss of access to resources by local communities (e.g., encroachments into cultivated areas or forests)³⁶ and damages to the environment. Intensive **mono-cropping** with a considerable level of chemical use, for example, cassava, maize, banana, eucalyptus, rubber, as well as intensive livestock pig/poultry production can affect soil fertility and pollute water sources. The policy framework of the Ministry of Agriculture and Forestry (MAF) has been consequently reinforced to address these issues.

Natural disasters and farming. Progress during the Eighth NSEDP period has also been affected by natural disasters, and the impact of these has been worsened by poorly functioning early-warning systems and response mechanisms, including the availability access to crop insurance. For example, a locust outbreak seriously affected 402 villages in 24 districts across 5 provinces, with a loss estimated at 53 billion kip. Late 2017 also saw an Avian Influenza outbreak in 4 districts of 3

provinces (Vientiane Capital, Xaysomboun, and Champasak) and a loss of at least 22,000 chickens. Flash floods and landslides have also been on the rise, events exacerbated by intensive **mono-cropping**.

Promotion of agriculture commercialization and diversified services. Commercial farming increased during the first half of the 8th NSEDP, often accompanied by additional income and food security for many communities. Commercialization has been most prominent in farming for coffee, cassava, maize, sugar cane, rubber and beans. Demand for these crops is rising and prices are increasingly attractive to farmers. Higher domestic and foreign private investment has supported this shift.

Challenges to commercial farming. Increased commercial farming has also brought challenges. Access to and availability of traditional and nutritious foods has declined in some communities where commercial farming has expanded. Commercial opportunities are also not equally available, and in some areas non-commercial farmers have fewer productive resources due to competition from commercial ventures. Many commercial crops are also vulnerable to sharp price fluctuations (e.g., boom-bust crops such as rubber, maize, cassava, rice) that make farmers who lack strategies to inform and support the management of market cycles vulnerable.

Organization and coordination of farmers. There has been growth in farmers' organizations (e.g., coffee cooperatives, rubber associations, and cattle producers' groups) that have helped improve the efficiency and equity of market transactions. For example, rice farmers' groups have expanded to cooperatives, and machinery groups also support post-harvest processing services more systematically. But in some cases, a lack of clarity and inconsistent support for farmers' organizations has hindered their growth and effectiveness.

Balancing production and nutrition. During the 8th NSEDP period, GOL aims to continue to focus on **balancing commercial development and national food security** with support for subsistence farmers and food production that meets local nutritional needs. This is related to improving production for local consumption and pursuing efforts for nutrition-sensitive agriculture. MAF's Green Rice Landscapes approach illustrates this balance by increasing sustainable productivity while preserving eco-system services for food security and nutrition.

2.2. Outcome 2, Output 2: Food security ensured and malnutrition reduced

Implementation of the Agricultural Development Strategy. The Government has been promoting agro-ecological practices for sustainability and productivity. Irrigation schemes have been improved and expanded to make agriculture less rainfall dependent. The Government also contributed to inclusive growth by supporting Farmers Organizations and providing extension services to rural communities. Policy actions undertaken include the "Green Rice Landscapes" initiative on **mixing rice cultivation and aquatic species**, the Policy Brief on the '*Role of the Agriculture sector to promote Food Security and Nutrition in Lao PDR*,' the adoption of a Decree

on pesticides, together with awareness raising on the issue, and a study on food safety with regard to *E. Coli*, *Salmonella* and *Clostridium*.

The ministries concerned are undertaking a mid-term review of the National Nutrition Plan of Action. This review will look closely at the main challenges and apply the lessons learned. In the post-MTR period, the Government of Lao PDR is prioritizing the following strategies:

(i) **Balancing the support to commercialization of agriculture with the support to food security** and access to nutritional foods for all communities. This is discussed in the previous section on Challenges. It is also reflected in the Eighth Five-Year Agriculture and Forestry Development Plan (2016-2020)."

The following Sentences linked to mix cropping are extracted from **9th Five-Year National Socio-Economic Development Plan (2021-2025)**

"Outcome 1: Continuous quality, stable and sustainable economic growth achieved

Output 1: Quality and sustainable economic growth -1.2. Priority Activities:

- Agriculture sector: The agricultural sector is a potential sector that can be further leveraged to maximize the benefits of the trade privileges that Lao PDR enjoys, as well as to generate more income and jobs for the people. Focus must be given to the following areas: (1) Agricultural production must be closely linked to the production chains of the processing industry to serve domestic and international demands; (2) Produce crops and livestock that already have a market and support the needs of new markets; (3) **Shift from single-crop farming to diversified or multi-crop farming (mixed crop system)** especially high-yield crops; (4) Promote Good Agricultural Practices (GAP) and organic farming for domestic consumption and tourism attraction; (5) Improve the efficiency of agricultural production with the use of modern tools, new techniques and science innovations, and new varieties of crops, and transform traditional and fragmented farming practices into production groups or the new cooperative production model, using modern technology (Smart Farming); (6) Create access to credit and markets; (7) Develop strong agricultural infrastructure resilient to natural disasters; (8) Identify areas and types of farming and animal husbandry that are suitable to the potential of each locality and the actual needs of the market; and (9) Establish higher food safety standards."

2.1.3 FVC-related Laws and Regulations

(1) FVC-related Laws and Regulations

FVC-related laws and regulations also need to be identified based on relevancy to Categories of FVC related policy abovementioned, since such laws and regulations are implementation tools of national plans and policies.

The following laws and regulations have been collected and identified for the analysis shown in Table 2.1.4.

Table 2.1.4 FVC-related Laws and Regulations in Lao PDR

	FVC related Elements	Law & Regulations	Implementation Agency	Remaining Issues
Input	Seed	Dec 2012, Agreement of the Minister on the Management of Use of Plant Varieties	Management Unit Inspectors	*Quality Standard * Examination Guideline
	Seed	Dec 2011, Law on Intellectual Property (Amended in 2017, No.38/NA)	MIC	*Join UPOV 1992
	Seed	Dec 1997, Regulation on the Management and Use of Plant Species and seeds of Planting in Lao PDR	MAF	Still effective ?
	Animal Genetic Resources	Aug 2012 Decision on Registration and Identity Card of Domestic Animals	Livestock & Veterinary Management Authority, MAF	Only Individual Animal Statistical Management, No Genetic Resources Management
	Pesticide	Aug 2017, Decree on Pesticide Management	Center/Station for Registration (Efficacy Test ?)	* MRL ?
	Pesticide	Jun 2010, Regulation on the Control of Pesticides in Lao PDR		Can the Registration Unit carry out Efficacy Test?
	Pesticide	Dec 2008, Resolution of National Assembly of Lao PDR on Approval of Law on Plant Protection		This Law was replaced by Law on Plant Protection and Quarantine
	Pesticide	Nov 2016, Law on Plant Protection and Quarantine		
	Pesticide	2018, Guideline for Pesticide Labelling		
	Fertilizer (Chemical & Organic)	Oct 2014, Decision on Fertilizer Management	Fertilizer Management & Inspection Organization (VTE & Provinces, Districts)	* Who analyze contents of fertilizers ?
	Animal Feed	Jan 2020, Decree on Animal Feed	Animal Feed management & Inspection Organization (VTE, Provinces, Cities)	* Who analyze contents of Animal Feed (Protein, Carbohydrate,)?
	Medicine for Animal	Jul 2008, Law on Livestock Production and Veterinary Matter (Article 58-59)		* No registration system for shops
	Mechanization			*No Inspection System
	Soil & Land	Jun 2019, Land Law No.70 /NA	MNRE, MAF, MIC, MEM, MPI, MPWT,MICT	* Suitable Lands for agriculture have not yet analyzed in some areas.
	Soil & Land	Oct 1998, DECREE of the PRESIDENT of the LAO PEOPLE'S DEMOCRATIC REPUBLIC On the Promulgation of the Law on Agriculture	MAF, MNRE	Article 11 Use of Agricultural Land is managed by MAF based on Article 32-38 of Land Law.
	Water			No Irrigation Law
Production System	Organic Ag	Dec 2005, Decision of the Minister of Agriculture and Forestry on Organic Agriculture Standards	DOA	Important elements of OA are clearly stated in this Decision such as conversion period, drift and water source contamination. But it is difficult for most farmers to meet this standard. 12 months conversion period not enough for international standard 36 months.
	Organic Ag	Application Manual for Lao organic agriculture certification	DOA	Residue analysis included. Lacking group application management.
	Organic Ag	Aug 2011, Manual on the internal management system of organic agriculture groups	DOA	Group management is available in this manual.
	GAP (Integrated 4 modules GAP ?)	Jun 2022, Agreement of the Minister on Good Agriculture Practices for Food Safety Standard No.3004/ MAF	DOA, Accredited Labo is available?	MRL set, Residue checked
	GAP (Integrated 4 modules GAP ?)	Feb 2011, Agreement of the Minister on Good Agriculture Practices for Environmental Management Standard	DOA	District Level Soil Map available? Weak on Farm Management Aspect Article 10-6 provided IPM Article 10-7 Drift contamination Lacking Compost fermentation temperature (Not mentioned organic materials risk)
	GAP (Integrated 4 modules GAP ?)	Feb 2011, Agreement of the Minister on Good Agriculture Practices for Produce Quality Management Standard (Fruits & Vegetable)	DOA	No residue check
	GAP (Integrated 4 modules GAP ?)	Feb 2011, Agreement of the Minister on Good Agriculture Practices for Worker Health, Safety and Welfare Standard	DOA	
Marketing System	Farmers Organization	Nov 2020, Decree on Groups and Cooperatives Cooperative Law drafted in 2023 (Now under consideration by Ministry of Justice)	Some MAF staff can train cooperatives members in terms of collective activities ?	Cooperatives are open to all kinds of people ? (No discrimination on race, religion, party, etc.) Democratic management including equal voting rights. What kinds of business capacity need to be developed ? Can they conduct business as bank ? Collective lending really available ?
	Wholesale Marketing (WM) System	May 2015, Decision on Wholesale and Retail business	Internal trade Department, Department of Enterprise Registration of MOIC, Provincial and District Offices	No wholesale market regulation with price formulation function
	Wholesale Market	May 2013 No. 903/MOIC.ITD Agreement on Market	MOIC	Unclear for market development by trading
	Wholesale Marketing (WM) System	Sep 2015, Decision On Shopping Centers and Department Stores	Internal Commerce department of MOIC, Provincial, City, District Commerce Offices	No wholesale market regulation with price formulation function
	Contract Farming	Contract Law of Lao PDR		Incorporated into the Civil Law

	FVC related Elements	Law & Regulations	Implementation Agency	Remaining Issues
	Retailing System	Same as WM System	Same as WM System	
	Price Stabilizing System	Oct 2012, Recommendation to manage the price of beef, chicken and fish No.0312	MOIC	
	Price Stabilizing System	Nov 2011, DECREE ON MANAGEMENT OF GOODS PRICE AND SERVICE FEES	MOIC (VTE, Provinces, Districts)	
Food Risk Management	Food Safety	May 2004, Law on Food	Lao Government	
	Food Safety	Jan 2009, National Food Safety Policy	MOH	
	Food Safety	Mar 2009, MINISTERIAL REGULATION ON THE BASIC PRINCIPLES IN THE APPLICATION OF SANITARY AND TECHNICAL MEASURES FOR THE FOOD SAFETY MANAGEMENT	MOH	
	Food Safety	Feb 2012 Decision on Food Inspection	MOH	Based on Law on Food ?
	Food Labeling & Quality Standard	Mar 2009, Regulation on Labelling of prepackaged food	MOH	
	Food Labeling & Quality Standard	Dec 2015, Order of Minister on Lao Language Labelling	MOIC	
	Dairy Products Quality Control			No Dairy Product Quality Control Regulations
	Animal Health & Slaughter House Management, Animal Movement	Law on Livestock Production and Veterinary Matter (2016) Decree on Livestock Slaughtering and meat inspection (2020) Decree on Slaughterhouse of Animal, Destruction of Animal Remains and Compensation (2022) Mar 2019, Decision on Slaughterhouse Standards	MAF MOIC	
	Animal Health & Slaughter House Management, Animal Movement	Jun 2012, Decree on the Control of the Movement of Animal and Animal Products	Livestock & Veterinary Management Authority, MAF	
	Animal Health & Slaughter House Management, Animal Movement	Jun 2017, Order On the Monitoring, Inspection, and Prevention for the Import, Movement, and Distribution of Illegal Pigs, Pork (Fresh and Frozen), and Animal Parts	MOIC (Price Management, Supply & Demand Management)	
	Custom System (Electrification)	Mar 2012, Decision on the Procedures for Rice Import and Export in the Lao PDR		
	SPS	Jun 2011, Ministerial Decision on the Organization and Operation of SPS Enquiry Point		
	SPS	Jun 2019, MINITERIAL DECISION on PHYTOSANITARY MEASURES FOR THE IMPORT AND TRANSIT OF PLANTS, PLANT PRODUCTS AND OTHER REGULATED ARTICLES	DOA inspects imported fruits & vegetable based on Food Safety Standard ? MRL is analyzed ? No Export Phytosanitary Certification.	
	SPS	Jan 2012, MINISTERIAL DECISION ON THE BASIC PRINCIPLES FOR THE APPLICATION OF SANITARY AND PHYTOSANITARY MEASURES IN PLANT AND ANIMAL PRODUCT ADMINISTRATION	DOL, MAF	
	SPS	Nov 2016, Law on Plant Protection and Quarantine		
	SPS	Aug 2020, Instruction on registration of production facilities for export plants and plant products	DOA	
	SPS	Apr 2020, Instruction on the Standards of big livestock and farms to be exported from Lao PDR to China		
	SPS	Aug 2019, Minister Decision on approving the list of crops, crop products and controlled substances that are a priority for negotiation of opening market for exporting goods from Lao PDR to China		
	SPS	Jun 2017, Order On the Monitoring, Inspection, and Prevention for the Import, Movement, and Distribution of Illegal Pigs, Pork (Fresh and Frozen), and Animal Parts		
Finance	Agriculture Finance	Oct 2012, Decree on Microfinance Institutions		
	Agriculture Finance	Apr 2016, Implementation guidelines of Decree on Microfinance Institutions		
	Agriculture Finance	Aug 2003, Policy Statement for the Development of Sustainable Rural & Micro Finance Sector	Rural and Microfinance Committee, BOL	
	SME Finance			

Source: JICA project team

(2) Points to be considered in FVC Laws and Regulations

The project team identified the following points in laws and regulations that are lacking to strengthen FVC in Lao PDR.

1) Farmers' Organization

The regulation on organization establishment and management is available now. Based on this regulation, the Government can supervise agricultural cooperatives appropriately. But the contents on how to support agricultural cooperatives to develop their business is still limited in the regulation. The emphasis has been placed on supervising their organization management rather than their development.

It is necessary to develop more programs to support agricultural cooperatives and other organizations' business, especially for certificated organizations to receive loan from formal commercial banks to develop FVC business including collective marketing. According to “Decree on Groups and Cooperatives” (MAF, 2020), agricultural cooperatives have the right to borrow money from commercial banks. However, most commercial banks are not willing to lend money to agricultural cooperatives due to unclear legal status on management of their assets or properties such as processing facilities and vehicles. Most cooperatives do not have collateral due to lack of common assets. Each asset belongs to individual members, not to cooperatives.

The legal framework of agricultural cooperatives is as follows.

Table 2.1.5 Legal Framework of Agricultural Cooperatives

Policy legal framework	Aims of the documents	Direction and policy to promote cooperative and farmer group
Cooperative decree No.606/Gov. dated 26th November 2020 Decree No. 136. Issued 5/3/2010	Establish principles, regulations, and measures on the establishment, operation, and management of cooperatives to promote and develop products, services, and business operations to grow and be stable. Aims to alleviate poverty and improve the living standards of the multi-ethnic Lao people Contribute to the socio-economic development of the nation	✓ Creation of a conducive environment State land use ✓ Provision of necessary infrastructure ✓ Access to finance ✓ Tax and tariff incentives ✓ Technical, advisory, and development support ✓ Market access and expansion ✓ Use and protection of intellectual property ✓ Provision of and access to information
Ministerial agreement on agricultural cooperative No. 2983/MAF, dated 25th September 2014	This agreement sets out the principles, rules, and regulations for the organization and operation of agricultural cooperatives in order to promote the products and services of agricultural integration to grow into a productive and income-generating process. Aim to alleviate poverty and improve the living standards of farmers, contribute to the socio-economic development of the nation	✓ Creation of a conducive environment ✓ State land use ✓ Provision of necessary infrastructure ✓ Access to finance ✓ Tax and tariff incentives ✓ Technical, advisory, and development support ✓ Market access and expansion ✓ Use and protection of intellectual property ✓ Provision of and access to information

Policy legal framework	Aims of the documents	Direction and policy to promote cooperative and farmer group
Ministerial agreement on establishment and management of agricultural production group. No. 2984/MAF, dated 25th September 2014.	Establish principles, regulations, and measures for the organization and operation of smallholder farmers' groups to be ready to become production cooperatives, generate income and improve living standards. Aiming to alleviate poverty and contribute to the socio-economic development of the nation	✓ Technical, advisory, and development support, Provision of and access to information ✓ Access to finance and market ✓ Reduce taxes or taxes exception on imports of inputs and exports under tax laws, tax laws, and other government policies promulgated from time to time. ✓ Provision of necessary infrastructure to reduce the production cost

Source: JICA project team

According to NAFRI, many cooperatives and groups were not confident to borrow money from banks because they were afraid to have debts. The procedure to obtain the loan is inconsistency between regulations and implementation. The policy rate of interest should be given to farmer organization (3-7% per year), in practice the received was higher than 10% per year. The following are exiting loans for Agricultural Cooperatives.

<APB Loan>

- ✓ Short Term Loan; 12 months or one year Interest from 9.1 to 11.0%
- ✓ Medium Term Loan; Less than 60 months or 5 years Interest from 9.5% to 11.5%
- ✓ Long Term Loan; More than 60 months or 5 years Interest 10.5% to 12.5%

<SME Promotion Fund>

- ✓ 3% 5 Years Loan from the six commercial banks (LDB, Sacom Bank, Maruhan Bank, Laoviet Bank, Vietin Bank, Xay Sambon Development Fund). But no case of Ag-cooperative as of Dec 2022 due to too complicated procedure on business registration
- ✓ 12% 5 Years Loan from 9 MFI (Only one case on Thongmang Organic Agriculture Cooperative)

<Foreign Bank Loan>

- ✓ 6% 5 Years Loan from Banque Franco Lao (BFL) (One Case on Thaxang Organic Agriculture Cooperative, No Collateral)

In 2023, Cooperative Law and Decree on Contract Farming were drafted, and it has been considered by relevant stakeholders since drafting. MAF (DAEC) explained the reasons and necessity for creating a draft law on cooperatives and a draft decree on contract farming as follows;

The party and the Lao government have always given importance to the development and strengthening of the productive forces (groups and cooperatives). So, it is necessary to create options and attract investment and to protect the rights and interests of farmers and entrepreneurs or investors. And they need to focus on pushing agricultural production as a commodity and to increase income for farmers. This could provide service to members and create jobs for rural youth and improve the living conditions of the people of all ethnic groups.

The structure of the “draft” law on cooperatives is as follows; It contains 14 parts:

Part I: General provisions, article 1-7.

Part II: Cooperative type, article 8-13.

Part III: Cooperatives, article 14-31.

Part IV: Cooperative Finance and Assets, article 32-38.

Part V: The gathering, Separation and Dissolution of Cooperatives, article 39-41.

Part VI: Cooperative Promotion Fund, article 42-44.

Part VII: Policy to promote cooperatives, article 45-56.

Part VIII: Cooperative Federation and Cooperative Promotion Committee, article 57-60.

Part IX: Establish of production groups, article 61-64.

Part X: Prohibition, article 65-69.

Part XI: Management and supervision of cooperative work, article 70-78.

Part XII: Policy for those who work and measures for violators, article 78-80.

Part XIII: National Cooperative Day, Marks and Badges and Budget, article 81-83.

Part XIV: Final provisions, article 84-85.

2) Wholesale Markets System

Wholesale Markets need to play an important role in the selling and buying process of various kinds of agricultural products in every country. They are important for many kinds of commodities, especially for production and consumption fluctuating crops such as horticulture crops. Wholesale Markets are good mechanisms to connect fluctuated production with irregular consumption and strongly relevant to FVC strengthening. We cannot sell and buy all agricultural products by contract based due to such an irregular change of supply and demand. According to “Philippines Vegetable Industry Roadmap 2012-2025”, the importance of wholesale markets is as follows.

The current regulations on wholesale marketing have just mentioned licensing wholesale business, not mentioned wholesale market systems. It is necessary to establish a functional wholesale markets system nationwide by clarifying the details of the wholesale markets trading business. (Article 29 Agreement on Market No.0903)

3) Price Stabilizing System

Price Stabilizing Programs require huge budgets for effective implementation. Covering a very limited portion of the commodity market value by this system is not useful or effective. It is necessary to check the budget situation for this system. Now the price control program has covered only rice and gasoline.

4) Food Safety

Already several Laws and Regulations have been promulgated and implemented in Lao PDR. It is necessary to study details of the activity level situation. For example, What kinds of Food Safety measures have been taken for each kind of food hazardous elements such as E-Coli, Salmonella, Heavy Metal, Mycotoxin, etc. MRL has been set by applying Codex MRL. We could easily find weak law enforcement of food safety related laws and regulations including SPS.

5) Processing

Meat processing

Details of Slaughterhouse facilities and operation based on the Law and Regulations need to be studied. Meat Inspection System after slaughter need to be clarified.

HACCP, GMP

Details of implementation situation in processors and distributors need to be clarified to take future steps to improve the relevant legal schemes.

6) Agricultural Finance

Several finance schemes by State Banks and Commercial Banks are available for agriculture sector. Agriculture Purpose Bank is only APB. Agriculture Finance is different from other sector finance in terms of long investment cycle, unstable income with high risk, high operation costs for many small-scale farms scattered in rural places. Under existing legal finance framework for agricultural sector, most commercial banks feel difficulties to provide loan for agriculture sector due to lack of the system to minimize risk from agriculture finance. It is necessary to make new legal framework for agriculture finance to enable commercial banks to take higher risk of agriculture loan and to strengthen APB with higher specialty of risk management. High-interest rate issue was mentioned in the part of 1) Farmers' Organization.

7) Contract Farming

Contract Law in Lao PDR was promulgated in 1990, then it was incorporated into Civil Law recently. However, there are many troubles about implementing contracts made by stakeholders. The principle of Contract Farming is described in the following thesis written by Rich 2004. Contract farming cannot solve all issues related to food value chain development. Law Enforcement is quite important in terms of solving Contract Farming Issues.

8) Plant Variety Protection

Breeders' Rights of Plant Varieties are protected by Law on Intellectual Properties in Laos. This registration system is managed by Ministry of Science and Technology while another registration system for Plant Varieties is managed by Ministry of Agriculture on different purpose in terms of high quality. But both systems have some duplication in terms of novelty and distinctness. In the future two systems

need to be merged into one system to avoid unnecessary work from duplicated parts. For applicants it is too much workload to apply their registration in two systems and it is costly.

Even if the breeders' rights are protected, foreign breeders hesitate to sell new varieties of vegetative multiplication crops such as durian, pineapple that could be multiplied by third party in Lao PDR without paying license fee. It is difficult to protect imported varieties, because Lao PDR is not a member country of UPOV that could protect new varieties within member countries. As a result, in Sekong there are limited new varieties that could compete with Thai variety and domestic pineapple and durian have lost potentials in Sekong where the markets have been occupied by high quality Thai durian and pineapple. In these years, genetic resources holders' right has been strengthened through CBD discussion (Nagoya Protocol has been effective since 2014). Now it is difficult to introduce new varieties from foreign countries except for F1. Recently even some F1 seeds could be multiplied by third party. These points need to be paid attention for securing competitiveness in the markets.

2.2 Relevant Governmental Organizations related to FVC Strengthening

2.2.1 Ministry of Agriculture and Forestry

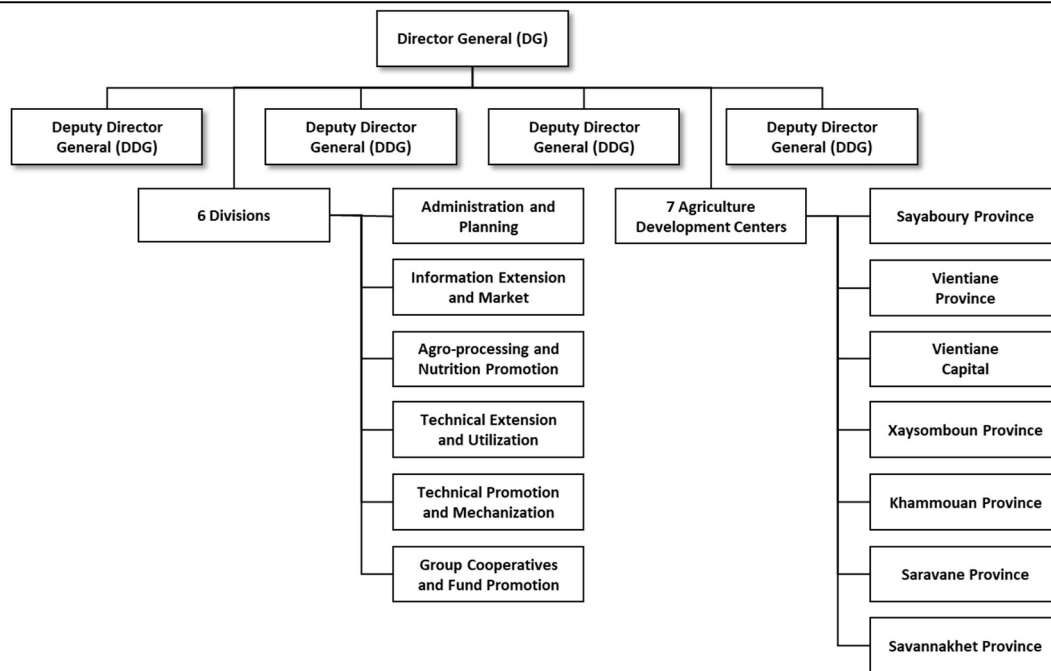
Ministry of Agriculture and Forestry	Department	Duties on FVC
	Department of Agriculture	Pest Control, Food Safety...
	Department of Agriculture Extension and Cooperatives	Extension, Farmers Grouping, Processing Technology...
	Department of Planning and Finance	Planning/Promotion/Financing of Donor projects...
	National Agriculture and Forestry Research Institute	Research and Development
	Department of Livestock and Fisheries	Livestock, Fisheries, Veterinary Service...
	Department of Rural Development	Rural Development...
	Department of Policy and Legal Affairs	Preparation of Policy/ Development Plan/ MP...
	Other departments	-

Source: JICA project team

Figure 2.2.1 Organization Structure of Ministry of Agriculture and Forestry

(1) Department of Agriculture Extension and Cooperative (DAEC)

The responsibilities of DAEC are mainly agriculture extension and agricultural grouping (agricultural cooperative and farmers' group), with some other activities such as processing and coordination of organizations. The annual budget of DAEC is around 1.3 billion LAK, which includes the activities of research and development, processing and so on. DAEC consists of 6 divisions and 7 regional development centers as shown in the figure below.



Source: JICA project team

Figure 2.2.2 Organization Chart of Department of Agricultural Extension and Cooperatives
Agriculture Extension

- Research, create and update legislation on agricultural extension activities and cooperatives
- Services and transfer techniques, technology in planting, raising, processing and marketing
- Build the capacity of extension staff at the central, provincial, district center and station and Families, farms, business units, groups and model cooperatives
- Develop centers to ensure activity according to the role by supporting funds, benefiting the activities of projects

The extension activities of DAEC focuses on cultivation techniques, introduction of seeds and varieties and post-harvest techniques (especially primary processing such as preservation of seeds, coffee, etc.). Also, DAEC plans to extend the activities into distribution and marketing, which were the responsibilities for MOIC. The activities will include the information service to connect farmers and markets, matching promotion between producers and buyers, demonstrations of processing, packaging and quality control and so on.

Agricultural Cooperative and Farmers' Group

- Organize and improve cooperatives, production groups, farms, agricultural business units
- Create a mechanism to manage and use the funds of groups, cooperatives

DAEC is in charge of creating a mechanism to manage and use the funds of groups and cooperatives under division of group, cooperatives and funds promotion (DGCFFP). In order to organize groups, the management committee needs to be organized (committee members from 5 to 9). The organized groups could be classified into Learning groups or Production groups for commercial activities. Learning groups exchange production technical knowledge among members. Production groups do

joint activities to sell products in markets. Saving funds are created for mutual help in the groups. The division teaches groups/ cooperatives the Rule of Saving Fund Management. Now DGCFP is making efforts to upgrade cooperative decree to cooperative law.

Others (such as processing and coordination among agriculture-related organizations)

- Introduction of R3 rice seeds, crop seeds, animal seeds, aquatic species for farmers
- Manage, encourage, promote and develop small-scale agricultural processing factories
- Coordinating and cooperating with offices, departments, institutions, universities of agriculture and forestry, second-level academic units

DAEC is also promoting the commercialization of agricultural products through processing. As the support of processing, the department has promoted tea and coffee through the improvement of marketing and product quality.

(2) Department of Agriculture (DOA)

DOA acts as a technical department for MAF in the management of crops and crop processing to promote the production of food crops, commercial crop production, domestic supply and export, following safe and clean agriculture and environmentally friendly policy. The major activities are 1) compliance management of agriculture-related laws and regulations, 2) standard on agriculture production management, mainly disease and insect pest control, and 3) safe control of agricultural products.

DOA has the following divisions and centers: Administrative division, Planning and Cooperation division, Agricultural Investment division, Regulation and Registration of Production Factors division, Plant Quarantine division, Standards and Certification division, Crop Processing Management division and Plant Protection Center (PPC), Clean Agriculture Standards Center (CASC). The work of each division and center is as follows.

Regulation and Registration of Production Factors Division

This division holds training courses for private sector in major provinces such as Luannamutha, Xienkhuong, Champasak, but this could not cover all areas, or all inputs shops nationwide.

The division does not take efficacy tests for newly registered pesticide, but uses the data submitted by pesticide companies. The companies get necessary data in similar condition with Lao PDR. They have recognized the necessity of more training on analysis in terms of pesticide residue, and others for PPC.

The division responsible for checking pesticide residue in fresh food such as vegetable, milled rice, milled corn is under the responsibility of MAF.

Plant Quarantine Division

This division has a responsibility to negotiate plant quarantine conditions with other countries. The division agreed 13 items with China, 15 items with Thailand, 16 items with Vietnam respectively.

Standards and Certification Division

This Division issues GAP & OA Certificate. The division has been making efforts to make Lao GAP aligned with ASEAN GAP, supported by ASEAN Agri Trade Project funded by GIZ. However, Lao GAP has not yet been aligned with ASEAN GAP. The division has established GAP inspection and certification system supported by this project. As of Nov 2022, there are only 27 certified GAP farms, 64 certified organic farms in Lao PDR. The official GAP standards were established in 2011. During these 11 years, certified GAP farms have been fluctuating depending on the project intervention. Once some project encourages farmers to implement GAP, some farmers do it. But after the termination of the project, the farmers cultivation practices restored as the previous practices. So, the total numbers of certified GAP farmers have never increased so far. And very low consumer awareness on GAP and no incentive for farmers has discouraged farmers to implement GAP.

This division has 15 GAP Inspectors trained by GIZ project. The targets of certified GAP farms are 100,000 certified organic farms are 70,000 by 2025.

There are 4 Agreements of GAP Standards in Lao PDR that consists of GAP for Produce Quality, Food Safety and Environment Management, Worker Health, Safety and Welfare, but these standards are lacking “Farm Management” component. GAP of Farm Management need to include visualization of farm management such as farm maps and risk assessment related to the map, responsibility of top management such as farm staff organization, management of machineries, and the like.

Plant Protection Center (PPC)

PPC has two functions; One is research on plant protection, the other is analysis on all kinds of agriculture matter except for soil analysis. PPC has all kinds of equipment for analysis such as GC-MS, HPLC, LC-MS MS, AAS, Flame Photometer, Distilled water maker, Draft chamber funded by ADB, Improved SPS in Greater Mekong Sub-region. Fertilizer analysis equipment was funded by FAO 20 years ago. Now some staff are being trained by ADB and Hungary.

PPC can analyze some kinds of pesticide residue, NPK and minerals and heavy metals, Organic matter. But more training on analysis is urgently needed. PPC can analyze carbamate pesticide and organic phosphate pesticide by using GT test kit developed by Thailand. But they cannot analyze organic chlorine pesticide. PPC has plant pathologists, entomologists for research. Seed test laboratory for rice will be set up by WB project (Agriculture Competitiveness Enhancement Project) soon.

Clean Agriculture Standards Center (CASC)

Mandate of the Center is to extend Clean Agriculture Standards nationwide. So far extended a few provinces (Xiangkwang, Luan Prabang, Sayabury, Vientiane Capital) CASC has Organic Agriculture Division (13 staff), GAP Division (7 staff), Post-Harvest Tech Division (12 staff), but no specialists such an entomologist, soil specialist. If needed, the center invites such specialists from outside. GAP includes Post Harvest Management, but this center places emphasis on post-harvest technology. Activities to train farmers to get OA/GAP certificate. They do not know how many GAP farmers and train trainers from other provinces (TOT) for clean agriculture GAP certificates that require to be

renewed every two years. Certified Farmers sell their products with GAP LOGO at higher prices at specific places. GAP farmers can use pesticide in accordance with Pesticide law and regulation, but they do not have weighing machines to measure 0.01-gram level. (Only rough dilution always takes place in the application of pesticide nationwide).

(3) Department of Livestock and Fisheries (DOLF)

DOLF is in charge of veterinary service, livestock and fishery production. The department consists of 6 divisions (Livestock, Veterinary, Fishery, Administration, Planning and Cooperation, Sanitary) and 4 centers (Livestock technique, Livestock disease, Feed production, Fishery development). The major activities of DOLF on commercial activities are branding of domestic products of poultry, pig and fish through breeding, promotion of export (especially to China) by establishment of quarantine inspection facilities and laboratories and so on.

However, there are some difficulties with livestock export, such as monitoring disease and obtaining of ISO. Also, DOLF recognizes the following issues on livestock and fishery: 1) dependence on import for parent stock, 2) insanitary condition of farm, 3) lack of veterinarian, 4) lack of feeds especially in dry season, and 5) lack of farmers' budget etc.

(4) Department of Planning and Corporation (DOPC)

DOPC has a responsibility for the promotion of implementation and planning of development projects and securing project funds. The department consists of 8 divisions (Finance, Statistics, Planning, Budget, Accounting, International corporation, ODA implementation management, Business investment). International corporation division has been doing supports for preparation of project requests for development partners, promotion of development projects, supports of procedure in Laos side, coordination between development partners and technical departments of MAF.

(5) Department of Policy and Legal Affairs (DOPLA)

DOPLA consists of 1) Administration office for policy research, 2) National policy and plan division, 3) Master plan formulation division, and 4) Exchange opinion and direction division. DOPLA mainly deals with formulation of national policies and master plan for implementation of development plan and some other works, such as training for MAF, PAFO and DAFO staffs to promote understandings of agriculture policies.

(6) Department of Rural Development (DRD)

DRD is in charge with rural development, resettlement and employment support. DRD consists of administration division, planning division, evaluation division, rural development division, resettlement/employment support division.

2.2.2 Ministry of Industry and Commerce (MOIC)

Ministry of Industry and Commerce	Department	Duties on FVC
	Department of SME Promotion	Promotion of domestic SMEs
	Department of Import and Export	Management, Coordination of import and export
	Department of Domestic Trade	Management of domestic trade, Price control...
	Other departments	

Source: JICA project team

Figure 2.2.3 Organization Structure of Ministry of Industry and Commerce

(1) Department of SME Promotion (DOSMEP)

DOSMEP has responsibilities on SME registration, improvement of access to finance for SME, promoting E-Commerce, capacity building SME and enabling environment for SME business development. DOSMEP established the fund to promote SME activities according to the decree on the promotion and development of small SME, No. 123/PM, dated March 3, 2010, supported by ADB. Since then, DOSMEP has been managing SME Promotion Fund through commercial banks, MFIs and Funds supported by WB. The Fund sources are not only from development partners but also from GOL. There are several kinds of SME loans with different interest rates. This SME fund covers agriculture, agro-processing, handicraft and tourism. In addition to finance services, DOSMEP provides training to strengthen SMEs capacity on skill of planning and bookkeeping for SMEs.

(2) Department of Import and Export (DOIE)

DOIE has responsibilities on implementing law enforcement about trade and managing entire trade procedures in collaboration with other trade related agencies. DOIE has control import and export on rice and cattle in collaboration with DOA of MAF. One of the issues found in import and export of agricultural products is loss of freshness of perishable food, which requires prompt procedure of trade, including SPS.

(3) Department of Domestic Trade (DTD)

DTD has responsibilities on managing and developing trade networks, processing industry and trade associations, foreign trade chambers, research work, analyzing and forecasting the product market and prices, collecting and monitoring the supply and demand of goods in society, the managing activity of goods and prices, protecting the rights and interests of users, work of managing business competition and trade inspection work,

DTD has the duty to manage, monitor and inspect enterprises engaged in wholesale-retail trade, shopping centers and department stores, to promote and develop the internal trade network to be diverse, the flow of goods is flexible, free, legal and regulatory

According to Article 29 of Agreement on Market No.0903, the central market management organization

needs to research, draft policies, development plans, and legislation on the market to consider the market system and to expand it widely, to promote people to know how to buy, know how to sell and participate in the promotion of production as a commodity.

Trade Cooperative has collaboration with agriculture cooperative to support farmers through providing production equipment such as tractors. Trade Cooperatives find markets for farmers

MOIC has an inspection system to monitor price of commodities, by creating guidelines, implementation of trade inspection work, No. 0807 and guidelines, implementation of product price management and service charges, No. 1405, for relevant units at the provincial and district levels, bring it as a tool for implementation in the area, which they are responsible for.

District staff under MOIC go to markets and check the price. Or call entrepreneurs, advisor traders or market managers to collect price data in markets. Once manipulated price is found in markets, MOIC publicizes the price through media.

Concerning controlling market mechanism, MOIC implements the following activities.

- 1) Identify price structure of the commodities
- 2) Identify balance between demand and supply of commodities
- 3) Reduce tax at high price commodities
- 4) Establish the funds, to buy two commodities of rice and fuel and to sell them to consumers at lower price (5%) than buying price for everybody and at every place
- 5) Warning to consumers about high price and low price of commodities

For the warning about increase and decrease in the price of goods, DTD has notified the website of DTD and the website of DOPC, and also has notified on trade newsletter channel of the MOIC, another channel will be given to the relevant department at the provincial and district levels in conjunction with the market managers to do actual work in the market, such as making announcements, attaching prices of some goods in the market and monitoring and inspecting the actual market on a regular basis. The notifications by DTD will not be made regularly, will be made periodically and when the economy has strong fluctuation. This notification is made for certain products specified in the product list.

Fill Up Deficit in Article 10 of wholesale and retail business regulation means price compensation.

2.2.3 Department of Food and Drugs (DFD) under Ministry of Health

FDD is in charge of food safety of processed or packaged food and inspect both processors and fresh markets vendors. FDD is instructing 44 food GMP processors and 2 HACCP processors.

FDD has recognized that Food Safety is an essential element to strengthen FVC. They have acknowledged the situation of almost free use of unregistered pesticide and animal-drugs. Without upstream food value chain control on pesticide, only downstream inspection could not ensure food safety along the food value chain.

FDD has a laboratory, FDQC (ISO 17025) with many equipment, but still lacking enough capacity to

analyze food and hazardous elements. They can analyze heavy metal, Aflatoxin, Pathogen such as E Coli, some kinds of pesticide residue but they cannot analyze unknown pesticide residue in food. They have strong needs to develop analysis capacity.

2.2.4 Tariff Department (TD)/Custom Department (CD) under Ministry of Finance

Import Tariff Rate is controlled by TD based on HS code in collaboration with DOIE of MOIC. Since January 1, 2022, Tariff and Certificate of Origin conditions of RCEP have been applied to trading commodities in Laos with application of ASEAN Trade in Goods Agreement on ASEAN common preferential duty. Electrified National Single Window has been introduced, but this system has not yet been well operational due to software bugs, limited staff capacity, and weak linkage with other agencies on proceeding with inspection.

2.2.5 Other Relevant Organizations including Academic Institutes

(1) Soil, plant and fertilizer analysis center under department of Soil and Land Management, MAF
Target materials of this center are soil, fertilizers including chemical fertilizer and compost, and water. The items the center can analyze are macro nutrients, micronutrients, heavy metals in environment. The center can also analyze chemical and physical analysis of fertilizer. Biological analysis will be able to be done soon with equipment for soil microbiology. The center analyzes soil as service (Price list has been prepared in the Center).

The total number of annual samples is about 1000. Customers are Government Project, Soil survey, Investors and Farmers.

Including this center, there are 3 offices related to land.

- Soil, plant, and fertilizer analysis center
- Soil Improvement center
- Land management center which makes land policy and land laws

They have a plan to increase soil research laboratory in Oudomxay Province, Savannakhet Province and Champasak province. The plan in Oudomuxay has been already submitted to the Government.

(2) Horticulture Research Center (Hodokeo) under NAFRI

In the past, the center conducted research on vegetables, rice, corn, and beans. At present, since 1999, it belongs to NAFRI, working on vegetables, fruit trees, and seed multiplication. The research on Cultivation Technique and Seed production is conducted for the following 15 crops.

Chinese flowering cabbage, Mustard, Coriander, Spinach, dill, Dry season Lettuce, Rainy season Lettuce, Long eggplant, Round eggplant, Bird pepper (small chili), Long bean, Tomato No 5, Tomato No 6, Dry season cucumber, Rainy season cucumber

The research on techniques includes Fertility, Variety (inbred only, not hybrid), Seed production.

The number of varieties developed so far is 3 varieties of lettuce, 2 varieties of chili, 1 variety of pak

choi, 1 variety of mustard, 1 variety of coriander, 1 variety of Amaranthus, 1 variety of dill, 1 variety to long eggplant, 1 variety of small eggplant, 2 varieties of long bean, 2 varieties of tomato, 2 varieties of cucumber. New variety developed in this center needs on-farm trial. 2800 isolates as genetic resources have been collected so far.

Some manuals are also made in the center. Hand book published by this center includes many cultivation techniques for 22 crops, such as, cultivation, pest management and fertilization (IPM is not included) . Manuals are delivered to Extension via DAEC.

(3) National Aquaculture Development Center in Nam Souang district, Vientiane Capital

This center used to be named as “Aquaculture Improvement Center”. JICA AQIP project supported the center for 10 years from 2000 to 2010.

- AQIP supported fishponds, a project building and hatchery for fish
- JICA experts and JOCV volunteers are stationed at the center

Also, JICA “Project for Strengthening Research and Development on Fisheries & Aquaculture” project supported research and development in this center.

- Development: This center. The name is changed to the National Aquaculture Development Center.
- Research: Fishery Research Center in Non Taeng (belonging to NAFRI).
- This project constructed additional facilities.

Basic activities of the center are training the staff, students and farmers and improvement of the following technique: 1) production of seeds, 2) fish kindergarten, 3) raising technique, 4) fish diseases analysis, and 5) quality review, new fish species are created by the center in Non Taeng.

The capacity of this center is as follows.

- Fry production capacity is 10 million per year.
- In 2021 production of fry was 1 million because of COVID-19 lockdown.
- In 2022, production of fry will recover to 5 million.
- In 2023, production of fry will be 10 million.
- The problem is soaring price of fish feed. From 90,000 – 150,000 kip per bag to 200,000 – 300,000 kip per bag. So, they use rice husk and other materials for feeding.
- With the new fishpond, the fish survival rate was improved from 20 – 30 % to 60 – 70 %.

(4) Agricultural Research Center (KM35) in Vientiane Capital

Tomato variety trial is being conducted by the technical staff with three varieties taken from Hadokeo Horticulture Research Center. This aimed to select resistance varieties to Tomato Bacterial disease and Nematode by eye observation. This center conserves coffee varieties, tea and other tree crops including avocado. However, there are only 18 technical staff and no researcher and no laboratory (no soil analysis) in this center.

(5) Agriculture and Forestry Extension Center in Sekong province

This center had been established since 2018 under PAFO management in this extension center has 13 people (12 extension staffs). They are cooperating with Xaysana Sole Co.,LTD for implementing 2 activities, meaning Raising ducks for eggs and Fish propagation or small fish production).

1. Raising ducks for eggs:

- The Xaysana Sole Co. LTD is supporting small duck, duck feeds
- 4 workers of company take care ducks and 1 staff of extension center is supporting techniques
- Now the center has 2,000 ducks and can collect 1,200-1,600 eggs per day
- Markets for selling eggs are Sekong, Attapeu and Salavanh Provinces

2. Fish propagation:

- In this center has 21 fishponds, 16 ponds are cement ponds
- In this year plan to propagate small fishes about 1,000,000 fingerling fish 5 species
- The market for sales fingerling fish or small fishes is in Sekong Province

Since 2018, the extension center conducted training to farmers on fish raising and fish propagation techniques which supported budget by ILO project

(6) National University of Laos (NUOL)

Faculty of Agriculture (FAG) in NUOL has 4 departments: Plant science, Animal Production and Fishery, Rural economics and Food Technology and Veterinary. And also, it has some laboratories (Food Technology, Food Safety, Animal Science, Plant Protection, Veterinary, Soil), 62 ha farm field for practical training, animal clinics and so on.

The university conducts research activities and education/extension activities.

As the research activities, each department separately has been conducting plenty of research, funded by mainly Lao Government and development partners (such as ADB, French, Hungary, Korea....). However, the Lao Governmental budget is limited and highly competitive.

As education/agriculture extension activities, the university provides education for students and some agricultural extension services to external actors, including farmers, MAF, PAFO, DAFO staff. The major external services from the university are as follows.

- Training (crop, livestock, fish production and food processing, GAP, food safety analysis, marketing analysis, farming systems analysis)
- Consultancy (crop, livestock, food processing, agriculture economics, marketing, agribusiness, agricultural project formulation and evaluation for rural development projects)

2.3 FVC-related Projects

2.3.1 Outline of the FVC-related Projects

In Lao PDR, the following 8 projects are related to FVC. The outline of these projects is summarized in Table 2.3.1.

Table 2.3.1 Outline of the FVC-related Projects in Lao PDR

No	Project Name	Project Period	Donor Agency	C/P Organization	Target Area	Project Objectives/ Main Activities
(1)	Clean Agriculture Development Project (CADP)	2017 – 2022	JICA	MAF/DOA Clean Agriculture Standard Center	<u>Vientiane Capital</u> , Luang Prabang, Sayaboury, Xiengkhouang	✓ Support for farmers in the target provinces to improve their skills such as production of clean agricultural products and quality control. ✓ Support for technical guidance and system strengthening so that the technical officers of the Ministry of Agriculture and Forestry at the central, provincial, and district levels can provide production and marketing instructions as an intermediary between producers and purchasers.
(2)	Project for Participatory Agriculture in Savannakhet Province (Savan PAD)	2017 – 2022	JICA	Savannakhet Province (PAFO, DOPI, DOIC, DOF) and DAFOs	Savannakhet	✓ Training in rice cultivation techniques ✓ Development and practice of cropping plans based on market trends and sales balance ✓ Support for market channel development and sales promotion by government technical staff ✓ Capacity building for irrigation facility management and water management technology
(3)	Northern Rural Infrastructure Sector Development Project - Additional Finance (NRI-AF)	2017 – 2023	ADB	MAF/DOI	Phongsaly, Oudomxay, Luang Namtha, Bokeo	✓ Improvement of rural infrastructure ✓ Various initiatives to enhance the impact of infrastructure improvement ✓ Capacity building of central, provincial and district government agencies ✓ Efficient and effective project implementation
(4)	Greater Mekong Sub-Region East-West Economic Corridor Agriculture Infrastructure Sector Project (GMS-EWEC-AISP)	2013 – 2022	ADB	MAF/DOI	Savannakhet, Saravan	✓ Improvement of rural infrastructure ✓ Enhancement of capacity for efficient management and utilization of agricultural infrastructure by farmers ✓ Efficient project management

No	Project Name	Project Period	Donor Agency	C/P Organization	Target Area	Project Objectives/ Main Activities
(5)	Climate-Friendly Agribusiness Value Chains Sector Project	2018 – 2026	ADB	MAF/ DAEC	<u>Vientiane Capital,</u> Khammouane, Savannakhet, <u>Champasak,</u> <u>Sekong,</u> Saravan	✓ Improvement of the value chain infrastructure of major agribusiness and strengthening resilience to climate change ✓ Promotion of climate smart agriculture and agribusiness ✓ Creating an environment that promotes climate friendly agribusiness
(6)	Lao Agriculture Competitiveness Project (LACP)	2018 – 2024	WB	MAF/ DOPC	<u>Vientiane Capital,</u> Vientiane Prov, Borikhamsay, Khammouane,, Sayaboury,	✓ Improvement of agriculture efficiency and sustainability ✓ Enhanced agricultural commercialization ✓ Project management
(7)	Sustainable Rural Infrastructure and Watershed Management Sector Project (SRIWMSP)	2020 – 2027	ADB/ EU	MAF/ DOI	Huaphanh, Luang Prabang, Sayaboury, Xiengkhouang	✓ Expansion of market-oriented agricultural production ✓ Conservation of ecological services in catchment areas ✓ Improvement of irrigation reliability in the command area
(8)	Northern Smallholder Livestock Commercialization Project	2015 – 2022	ADB	MAF/ DOI	Huaphanh, Luang Namtha, Luang Prabang, Xiengkhouang	✓ Strengthening small-scale farmers and other livestock value chain actors ✓ Strengthening livestock value chain infrastructure ✓ Improvement of credit access capabilities ✓ Strengthening project management capabilities

Source: JICA project team

(1) JICA – Clean Agriculture Development Project (CADP)

The project provides technical supports to farmers in the target provinces on production, quality control, marketing of clean agricultural products. The project also provides technical assistance on technical guidance and institutional strengthening for the technical staffs of Ministry of Agriculture and Forestry at central, provincial and district levels as a facilitator between producers and purchasers. In addition, the project supports awareness-raising activities to increase demands of distributors and buyers through understanding the value of clean agriculture. Through these activities, the project aims to expand the production and supply of clean agricultural products, to respond to market needs and to expand sales channels.

(2) JICA – Project for Participatory Agriculture in Savannakhet Province (Savan PAD)

Savannakhet province is the most populous province in Lao PDR, bordering on Thailand and Vietnam. The province has favourable geographical conditions as a production base because of good access to both domestic and foreign markets. In Savannakhet province, JICA had implemented the “Participatory Irrigated Agriculture Development Project (PIAD Project)” for five years from 2010 to 2015. PIAD project established PIAD model, which is a combination of irrigation facilities and water management,

improvement of cultivation techniques, and revitalizing of local agriculture. The PIAD model consists of the following three pillars.

- ① Promote “participatory” farmer’s proactive maintenance and operation of irrigation facilities
- ② Promote technical guidance to improve productivity and promote sales of rice and other crops including cultivation techniques for horticultural crops
- ③ Strengthen the farmer’s organization through the collection of water users fee, financial management and the maintenance of agricultural land booklets

The purpose of the project is to implement the “PIAD model” established in the PIAD project more progressively and sustainably and aims to increase the income of farmers by strengthening the capacities of government staff, water users groups, and farmers related to cropping, marketing and irrigation.

- (3) ADB – Northern Rural Infrastructure Sector Development Project - Additional Finance (NRI-AF)

The purpose of the project is to promote commercialization of agriculture in northern Laos through the development of rural infrastructure such as irrigation facilities and rural roads, the improvement of agricultural production, the organizing farmers, and development of market access in the target areas. The project consists of four components: (i) improvement of rural infrastructure, (ii) various initiatives to enhance the impact of infrastructure improvement, (iii) capacity building of central, provincial and district government agencies, and (iv) efficient and effective project implementation.

To improve rural infrastructure, a total of 8,651 ha of paddy fields will be irrigated by 22 small and medium-sized gravity irrigation systems and rural access roads will be repaired and constructed in the four target northern provinces. In addition, various initiatives to enhance the impacts of infrastructure improvement include (i) establishment and organizational strengthening of Water Users Group (WUG) and Farmers Production Group (FPG), (ii) promotion of contract farming and promotion of high value-added varieties, and agricultural extension activities through value-added, (iii) securing and stabilizing agricultural water through catchment area conservation activities, (iv) fostering ownership by creating land certificates for command areas, and (v) extension activities targeted for poor ethnic minority female headed households.

- (4) ADB – Greater Mekong Sub-Region East-West Economic Corridor Agriculture Infrastructure Sector Project (GMS-EWEC-AISP)

The Greater Mekong Sub-region (GMS) East-West Economic Corridor (EWEC), which is the target area of the project, provides a route for Laos’ agricultural surplus to reach markets in neighbouring countries of Thailand and Vietnam, and even beyond to other countries.

This project aims to diversify and add value to agricultural products, reduce agricultural production costs and marketing costs, and increase agricultural and non-agricultural income through the construction and renovation of irrigation facilities and rural access roads.

The output of the project is (i) improvement of agricultural infrastructure, (ii) enhancement of capacity for efficient management and utilization of agricultural infrastructure by farmers, and (iii) efficient project management.

(5) ADB – Climate-Friendly Agribusiness Value Chains Sector Project

The project increases the competitiveness of the rice value chains in Khammouane, Saravan and Savannakhet provinces, as well as the vegetable value chains in Vientiane Capital, Champasak and Sekong provinces and support the governments; agricultural development strategy 2025. The project aims to improve resilience to climate change and promote crop productivity, diversification, and commercialization. The project also improves the capacity of agricultural storage, processing, quality and safety testing, and supports the use of biofertilizers and the promotion of organic farming. Through these activities, the project strengthens the technical and institutional capabilities of climate smart agriculture, promote environmental sustainability for climate-friendly agribusiness, and create an environment for improving the profitability of farmers and agribusiness.

The project consists of 3 components; those are (i) improving the value chain infrastructure of major agribusiness and strengthening resilience to climate change, (ii) promoting climate smart agriculture and agribusiness, and (iii) creating an environment that promotes climate friendly agribusiness.

(6) WB – Lao Agriculture Competitiveness Project (LACP)

The project aims to enhance the competitiveness and sustainability of the agricultural sector through technical and financial support to improve agricultural productivity and commercialization in several selected value chains. The project focuses on (i) the geographical areas with high agricultural development potentials, (ii) the farming systems with high potentials for commercialization (i.e. rice, maize, vegetables), (iii) promotion of good agricultural practices and climate smart agricultural technologies and farming systems diversification to enhance food and nutritional security, (iv) building capacity for farmers' organizations, agribusinesses, public and private service providers, and (v) building on and developing synergies with other government/donor programs.

The project targets 3 value chains of commercial rice production, corn, and vegetables. The project consists of the following three components: (i) improve agriculture efficiency and sustainability, (ii) enhanced agricultural commercialization, and (iii) project management.

(7) ADB/ EU – Sustainable Rural Infrastructure and Watershed Management Sector Project

The project uses a comprehensive land use planning approach, which integrates efficient, sustainable and climate resistant rural infrastructure construction and watershed conservation measures in the target areas. The project aims to address the challenges of rural infrastructure and watershed management. The expected impact of the project is to achieve sustainable and comprehensive rural development. The outcome of the project is to enhance sustainable market-oriented agricultural production and natural resource management in some selected watershed.

Regarding improving livelihoods through the diversification of cultivated crops, especially for high-value crops (HVCs) in the dry season, and to improve the livelihood by increasing the yield of rice in the rainy season by rehabilitation of the irrigation facilities.

(8) ADB – Northern Smallholder Livestock Commercialization Project

This is a successor project that utilizes the results of the “Northern Region Sustainable Livelihood through Livestock Development Project” which was carried out from June 2007 to March 2014.

The project aims that small-scale livestock producers in the target area sell more beef and pork, resulting in an average annual income of 8 million kip in 2026, up from the baseline of 3.2 million kip in 2014.

The project has four outputs: (i) strengthening small-scale farmers and other livestock value chain actors, (ii) strengthening livestock value chain infrastructure, (iii) improving credit access capabilities, and (iv) strengthening project management capabilities.

2.3.2 Good Practices and Lessons from Related Projects

The following table summarizes the good practices and lessons learned grasped for the abovementioned FVC-related projects.

Table 2.3.2 Good Practices and Lessons Learned from the FVC-related Projects

No	Project name	Similarity and relevance to the Project	Good practice and lessons
(1)	Clean Agriculture Development Project (CADP)	✓ Support for technical improvement such as production of agricultural products and quality control ✓ Capacity building in order for farmers to develop crop production plants that meet market demands	✓ Vegetable production planning training based on farmers’ profitability and market needs ✓ Organizing a business matching event that will promote the development of new buyers such as restaurants and supermarkets with producers, and the expansion of sales channels ✓ Agri-marketing training (joint training with Savan PAD) ✓ The balance of commodities such as grains, vegetables, fruits, livestock, fishery etc. should be considered in the selection of target commodities.
(2)	Project for Participatory Agriculture in Savannakhet Province (Savan PAD)	✓ Implementation of technical training including cropping techniques for horticultural crops to promote sales of crops other than rice.	✓ PIAD model (Model for irrigation equipment/ water management, improvement of cropping technology and activation of regional agriculture) ✓ Increased yields and high return on funds due to seed and fertilizer lending activities ✓ Cost sharing of project activities by Savannakhet Province ✓ Collaboration with Lao Front for National Development (LFND): Expansion of seed and fertilizer lending activities with LFND funds

No	Project name	Similarity and relevance to the Project	Good practice and lessons
(3)	Northern Rural Infrastructure Sector Development Project - Additional Finance (NRI-AF)	✓ Promotion of diversification to highly profitable crops during the dry season ✓ Strengthening the capacity of central, provincial and district staff to enable the sector development approach	✓ Activities on establishment and strengthening the WUGs ✓ Establishment of FPGs, training for farmers regarding contract farming and marketing
(4)	Greater Mekong Sub-region East-West Economic Corridor Agriculture Infrastructure Sector Project (GMS-EWEC-AISP)	✓ Promotion of diversification and commercialization of agriculture with high value crops (HVC)	✓ Activities on establishment and strengthening the WUGs ✓ Establishment of FPGs, training for farmers regarding contract farming and marketing
(5)	Climate-Friendly Agribusiness Value Chains Sector Project	✓ Improvement of crop productivity and promoting commercialization ✓ Improvement of agricultural product storage, processing, quality and safety testing capabilities ✓ Creating an environment for improving the profitability of farmers and agribusiness ✓ Improvement of agribusiness value chain infrastructure	✓ Support for building technical capacity related to agribusiness policy reform ✓ Measures for storage and processing agricultural products and improving quality and safety testing capabilities ✓ Matching Grant Method for providing finance to farmers or processors
(6)	Lao Agriculture Competitiveness Project (LACP)	✓ Capacity building for farmers' organizations, agribusiness, public and private service providers ✓ Support for improvement of the value chains	✓ Measures for capacity building for farmers' organizations, agribusiness, and public and private service providers ✓ Measures related to value chain improvement support ✓ Matching Grant Method for providing finance to farmers or processors
(7)	Sustainable Rural Infrastructure and Watershed Management Sector Project (SRIWMSP)	✓ Expansion of market-oriented agricultural production ✓ Promotion of diversification to high value crops during the dry season	✓ Promotion measures of the diversification of high value crops during the dry season as a part of market-oriented strategy. ✓ Matching Grant Method for providing finance to farmers or processors
(8)	Northern Smallholder Livestock Commercialization Project	✓ Strengthening livestock value chain actors ✓ Strengthening livestock value chain infrastructure ✓ Improvement of credit access capacity by farmers organizations	✓ The results of the "Northern Region Sustainable Livelihood through Livestock Development Project" (2007 - 2014)

Source: JICA project team

CHAPTER 3

CURRENT STATUS OF AGRICULTURE SECTOR IN LAO PDR

CHAPTER3 CURRENT STATUS OF AGRICULTURE SECTOR IN LAO PDR

3.1 Natural Conditions

3.1.1 Topographical Situation

Lao PDR is a landlocked country in Southeast Asia, located between latitudes 14° and 23°N and longitudes 100° and 108°E. The nation, which shares borders with five other countries, lies in the lower Mekong River Basin of Southeast Asia. The country stretches 1,700 km from north to south and 100 km to 400 km from east to west, with a total surface area of 236,800 km². Approximately 80% of the country's land area is mountainous. The remaining 20% is low lying plains along the Mekong River and threatened by annual floods. The altitude ranges from 104 m above sea level in Attapeu to 2,820 m in Xiengkhuang, at Phoubia Mountain. Figure 3.1.1 shows the topographical map in Lao PDR.



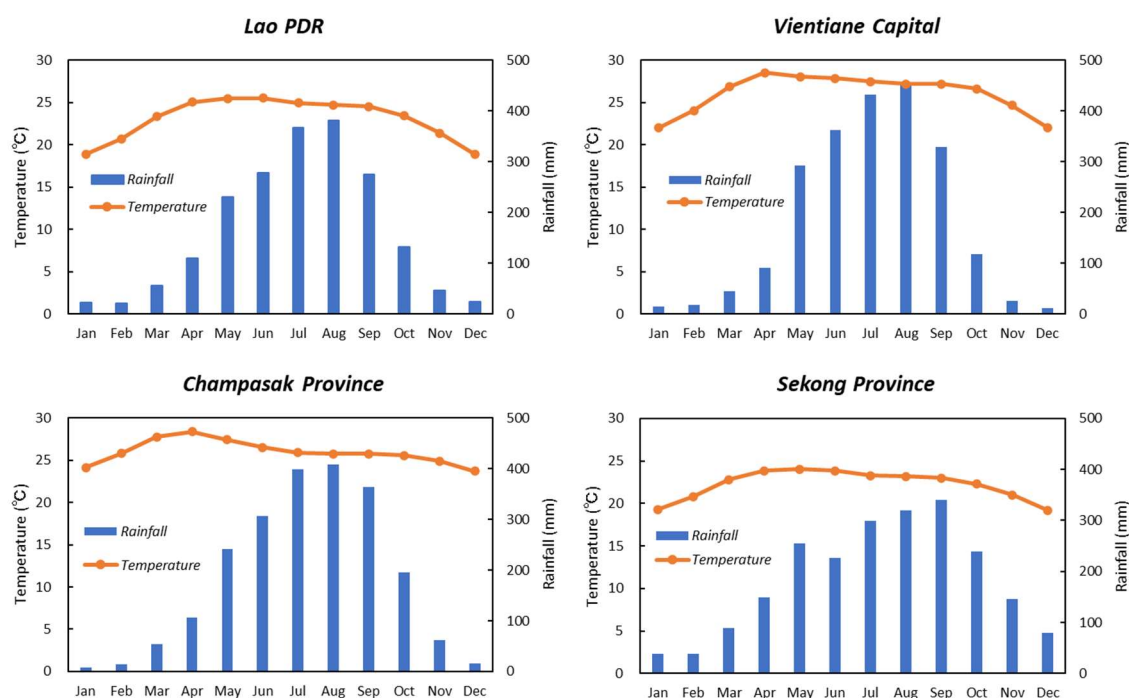
Source: JICA project team based on elevationmap.net

Figure 3.1.1 Topographical Map in Lao PDR

3.1.2 Climate Conditions

Lao PDR is characterized by a tropical climate, influenced by the southeast monsoon which brings 70% of annual rainfall and high humidity. There are two distinct seasons: the rainy season, or monsoon, from May to mid-October and the dry season from mid-October to April. Average rainfall can be as high as 3,000 mm per year. Mean annual temperatures of 20°C was observed in the northern and eastern mountainous areas and the plateaus, whereas temperatures are higher in the plains at 25–27°C. Based on the country's altitude, Lao PDR can be divided into three different climatic zones. The northern mountainous areas above 1,000 m have a montane temperate and hilly sub-tropical climate. Here, temperature ranges are lower than the rest of the country. The central mountainous areas in the Annamite Chain vary in altitude between 500 to 1,000 m and are characterized by a tropical monsoonal climate with high temperatures and average rainfall totals. More than 50% of the population lives in the tropical lowland plain and floodplains along the Mekong River and its main tributaries.

Figure 3.1.2 shows the average temperature and monthly rainfall of Lao PDR and 3 target provinces.



Source: JICA project team based on Climate Change Knowledge Portal

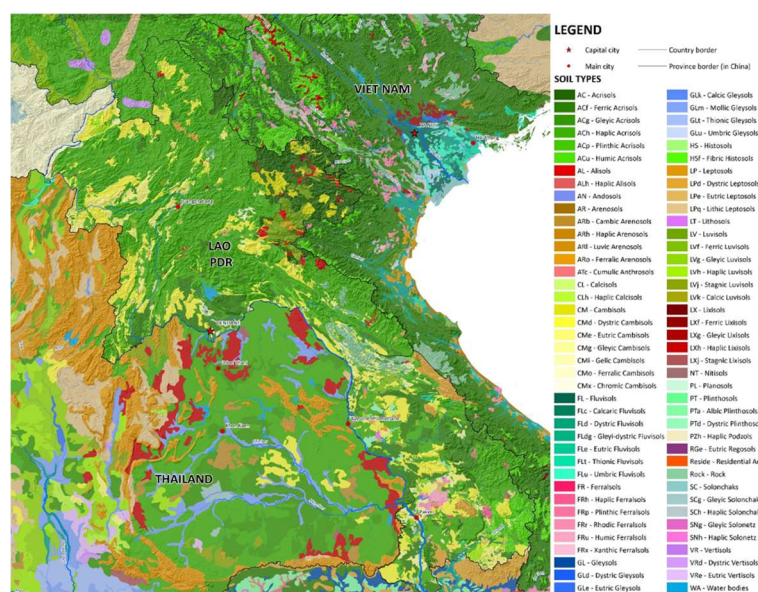
Figure 3.1.2 Climate of Lao PDR (average) and 3 Target Provinces

3.1.3 Natural Disasters

According to the survey of European Commission (2019) for INFROM index, Lao PDR has extremely high exposure to flooding, including riverine and flash flooding. Lao PDR also has a risk of exposure to tropical cyclones and their associated hazards. Drought exposure is lower but must be monitored as hydropower development on the Mekong River significantly alters the hydrology of the region.

3.1.4 Soil

In Lao PDR, over 70% of soils are clarified as Acrisols. This type of soil is generally low levels of plant nutrients, excess aluminum and high erodibility, which sometimes make agriculture problematic. On the other hands, the soils of some other parts of Laos are clarified as Cabisol. Because of their favorable aggregate structure and high content of weatherable minerals, Cabisol usually can be exploited for agriculture.



Source: JICA project team based on “Soil Types in GMS countries” (FAO/UNESCO, 2015)

Figure 3.1.3 Soil Map in Lao PDR

3.2 Social Conditions

3.2.1 Administrative Classification

Lao PDR is composed of 17 provinces and 1 municipality (Vientiane Capital). Northern region has 7 provinces (Phongsaly, Luangnamtha, Oudomxay, Bokeo, Luangprabang, Huaphanh, Xayaboury). Central region has Vientiane Capital and 6 provinces (Xiengkhuang, Vientiane, Borikhamxay, Khammuane, Savannakhet, Xaysomboon). Southern region has 4 provinces (Saravane, Sekong, Champasak, Attapeu). Each province has several districts, which administer villages. The numbers of districts, villages and households in 2020 are shown in the table below.



Source: JICA project team

Figure 3.2.1 Administration Division in Lao PDR

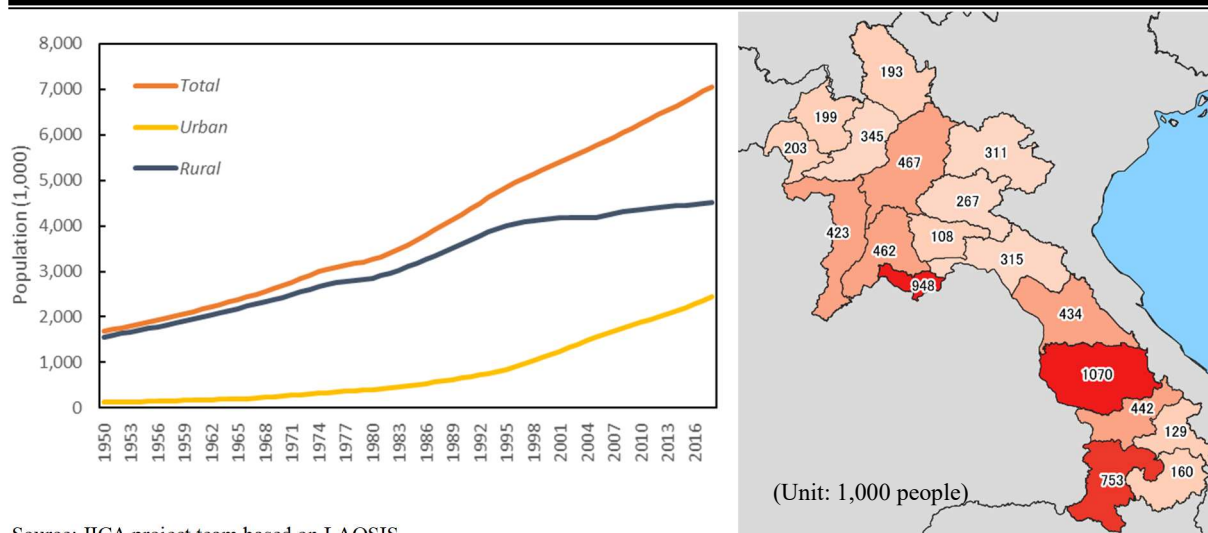
Table 3.2.1 Number of Districts, Villages and Households in each Province

Province Name	District	Villages	Households
Northern Region	57	3,501	392,723
Phongsaly	7	515	35,255
Luangnamtha	5	354	37,372
Oudomxay	7	472	64,725
Bokeo	5	248	36,757
Luangprabang	12	755	84,370
Huaphanh	10	728	53,675
Xayaboury	11	429	80,569
Central Region	67	3,837	706,766
Vientiane Capital	9	481	178,893
Xiengkhuang	7	477	47,645
Vientiane	11	422	86,392
Borikhamxay	7	284	57,206
Khammuane	10	569	84,242
Savannakhet	15	1,025	173,260
Xaysomboon	8	579	79,128
Southern Region	24	1,078	203,995
Saravane	4	197	21,007
Sekong	10	641	135,164
Champasak	5	142	31,485
Attapeu	5	98	16,339
Total	148	8,416	1,303,484

Source: JICA project team based on LAOSIS

3.2.2 Demographic Situation

The population of the country has increased annually by average 1.3% from 2012 to 2020 and the population in 2020 is about 7.231 million. Population trend (Total, Urban and Rural) is shown in Figure 3.2.2. As for the provincial population, Savannakhet province in the central region has the highest number of people, which is around 1,070 thousand. Vientiane Capital (948 thousand), Champasak (753 thousand), Luangprabang (467 thousand), Vientiane province (462 thousand) also have a large population. The population by province in 2020 is shown in the following figure.



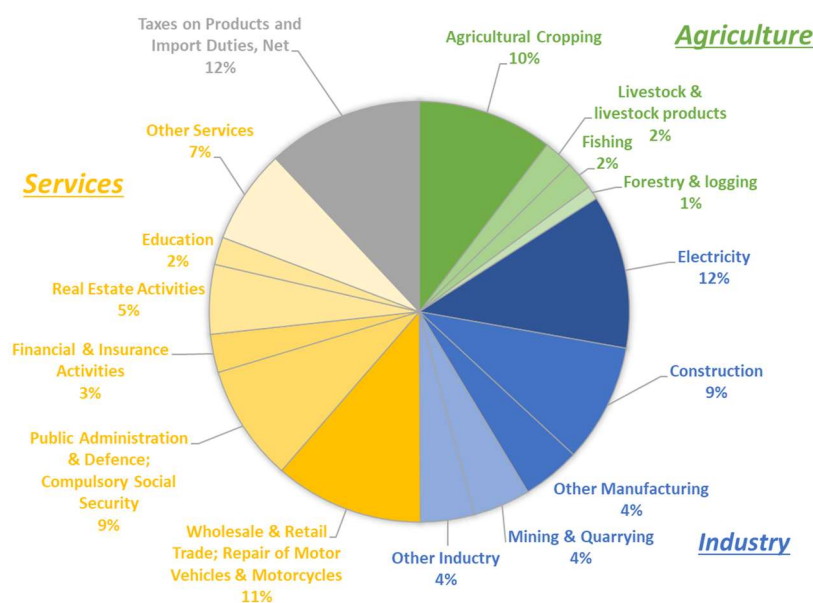
Source: JICA project team based on LAOSIS

Figure 3.2.2 Population (Total, Urban, Rural) in Lao PDR and Population of Each Province

3.2.3 Economic Situation

(1) Gross Domestic Product at Current Market Price

GDP at current market price in Lao PDR is about 184,982 billion LAK (10.8 billion USD) in 2021. The ratio of Agricultural production, industry and services is 15%, 34% and 38%, respectively. The rest is taxes on products and import duties. Figure 3.2.3 shows the percentage of GDP by sector. In addition, Table 3.2.2 shows the growth rate of GDP by sector from 2017 to 2020. While the annual growth rate had been more than 5% until 2019, the growth rate has decreased to around 3% since 2020 due to COVID-19. The growth rate of agricultural production is on average 1-2%. That of industry has been the highest, which is higher than 5% every year. However, the service industry has been significantly affected by COVID-19. In 2020, the growth rate was negative and in 2021 it is still low, 1.4%.



Source: JICA project team based on LAOSIS

Figure 3.2.3 Ratio of GDP at Current Market Price by Sector

Table 3.2.2 GDP Growth Rate by Sector (%)

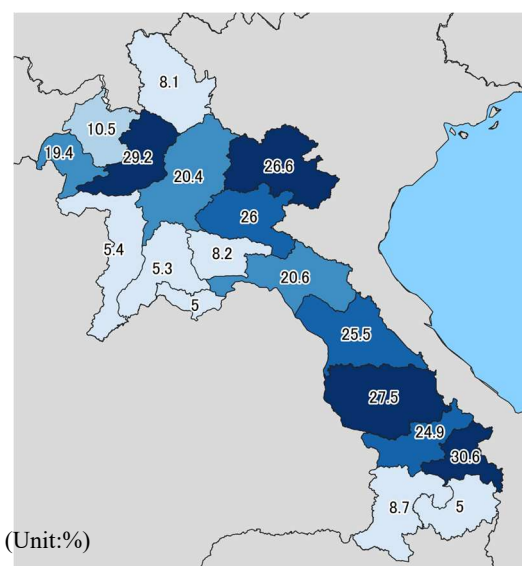
Sector	2017	2018	2019	2020	2021
Gross Domestic Product (GDP)	6.89	6.29	5.46	3.28	3.50
Agricultural	2.87	1.27	1.22	1.16	2.50
Industry	11.61	7.81	5.60	9.21	6.10
Services	4.51	6.89	6.86	-1.19	1.40

Source: JICA project team based on FAOSTAT

(2) Poverty Rate

The poverty rate of Lao PDR has decreased from 24.6% in 2012/2013 to 18.3% in 2018/2019. Especially, the poverty rate of northern and southern area (except for Attapeu) has been improved and the disparities across regions and provinces have narrowed. Five provinces account for more than half of the poor in Lao PDR: Savannakhet (20.6%), Oudomxay (8.7%), Khammuane (8.3%), Saravane (8.0%) and Luangprabang (7.7%).

Figure 3.2.4 shows the poverty rate of each province. In 2019, Sekong province is the highest, 30.6% and Oudomxay (29.2%), Savannakhet (27.5%) and Huaphanh (26.6%) are also high percentages.



(Unit: %)

Source: JICA project team based on Poverty Profile (Lao Statistics Bureau, 2021)

Figure 3.2.4 Poverty Rate of Each Province

(3) Investment to Agriculture Sector

Table 3.2.3 shows the amount of investment into Agriculture sector from 2011 to 2015. In that 5 years, the total amount was 17,315 billion Kip. 70% of the investment was from Official Development Assistance (ODA) and only 2.2% was Governmental budget. The rest, 28.3% was private sector from Foreign Direct Investment (FDI).

Table 3.2.3 The Amount of Investment into Agriculture Sector (2011-2015)

Unit: billion kip

Financial Source	Value (Billion Kip)	Share (%)
Total investment in Agriculture sector	17,315	100
Government budget / Public Investment Project (PIP)	385	2.2
Official Development Assistance (ODA)	12,030	69.5
Foreign Direct Investment (FDI)	4,900	28.3

Source: Agriculture Development Strategy to 2025 and Vision to the year 2030 (MAF, 2015)

3.2.4 Land Use

The land area in Lao PDR is 236,800 km² and around 70% of the land is occupied by forest. On the other hand, the land area of agriculture is about 10% of the country land, which accounts for 23,940 km². Within the agricultural land, the arable land is 15,500 km². Table 3.2.4 shows the land use in Lao PDR in 2019.

Table 3.2.4 Land Use in Lao PDR

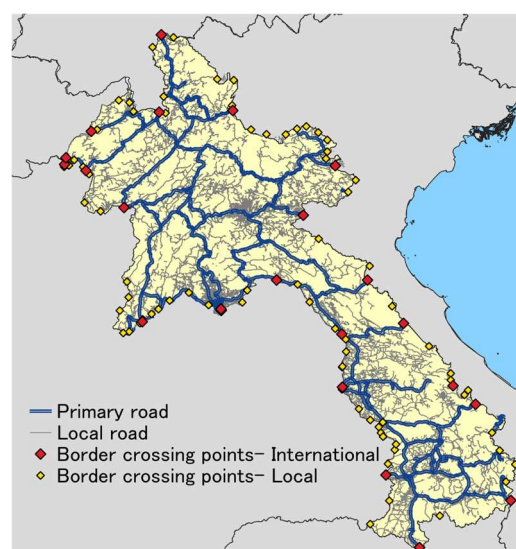
Unit: 1,000 ha	
Item	Value
Country area	23,680
Land area	23,080
Agricultural land	2,394
Arable land	1,550
Forest land	16,630
Land area equipped for irrigation	439
Agriculture area under organic agric.	8.95

Source: JICA project team based on FAOSTAT

3.2.5 Infrastructure

(1) Road

Since Lao PDR is a landlocked country, the country strongly depends on road transport for internal and external trade. Especially, the Greater Mekong Subregion (GMS) Corridor provides Lao PDR with greater and better access to neighbouring countries in the Southeast Asian Region. GMS comprises Cambodia, Lao PDR, Myanmar, Thailand, Vietnam, and Yunnan province in China. And recently, significant advances of nation road network have been realized: the road network has been extended from just 14,000 km in 1990 to over 59,000 km in 2020. However, only 23% of these roads were paved as of 2020, while 40% were gravel and 36% were earthen.



Source: JICA project team

Figure 3.2.5 Road Network in Lao PDR

(2) Irrigation

Agricultural system of Lao PDR can be broadly divided into two seasonal cultivations for the temporary crops namely wet season and dry season crops. Mostly, in wet season cultivation, farm household depends on rain-fed system while in dry season additional irrigation is needed. Lao PDR is rich in freshwater resources and potential for the development of irrigation system. The Mekong and its tributaries are the major water sources for irrigation in most parts of the country.

The total irrigated area in Lao PDR is around 440,000 ha in 2020, which is around 27% of the agricultural land of the country. According to Lao Census of Agriculture 2019/2020, the agricultural households which use the irrigation are mainly for the spillway, water pump, and reservoir, which account for 53%.

3.3 Agriculture Production

3.3.1 Crop Production

(1) Planted area of major crops

The arable land in Lao PDR is around 1.55 million ha. Rice is the most widely cultivated crop in the country, accounting for 848,000 ha of the planted area. Other major planted crops in Lao PDR are maize (123 thousand ha), cassava (101 thousand ha), leafy stem vegetables (98 thousand ha), coffee (94 thousand ha), fruit bearing and leguminous (62 thousand ha), job's tear (51 thousand ha). In Vientiane Capital, one of the target areas of the Project, suburban agriculture and commercial crop production have been mainly conducted, since the capital has the major consuming area and one of the largest fresh markets. The major crops in Vientiane Capital are leafy stem vegetables, fruit bearing and leguminous. In Champasak and Sekong province located in the south part of the country, coffee, leafy stem vegetables, cassava and fruit tree have been largely cultivated, especially in Bolaven Plateau which has large land area with suitable climate and fertile soil. The planted area of major crops in the whole country and the 3 target areas are shown in Table 3.3.1.

Table 3.3.1 Planted Area of Major Crops (2019)

Crop Item	Planted Area (ha)				
	Lao PDR	Vientiane Capital	Champasak	Sekong	
Total rice paddy	848,039	66,298	-	92,503	-
Maize	123,510	995 (4)	430 (17)	1,394 (5)	
Cassava	101,494	1,580 (3)	16,590 (3)	2,125 (3)	
leafy Stem Vegetables	98,020	5,907 (1)	30,225 (2)	5,085 (2)	
Coffee	94,400	-	51,340 (1)	13,370 (1)	
Fruit bearing and Leguminous	62,462	4,073 (2)	7,185 (5)	1,025 (7)	
Job's tear	50,580	580 (8)	-	40 (21)	
Sugar cane	30,160	855 (7)	520 (15)	215 (12)	
Sweet corn	28,230	970 (5)	4,537 (6)	1,200 (6)	
Banana	26,828	235 (12)	1,560 (10)	820 (8)	
Cardamom	22,860	-	3,285 (8)	1,480 (4)	
Root, Bulb and Tuberous	20,475	875 (6)	3,540 (7)	85 (17)	
Fruit Tree	17,100	280 (10)	8,575 (4)	220 (11)	
Black bean & Red bean	15,285	10 (23)	116 (19)	-	
Peanuts	15,270	50 (20)	1,050 (13)	643 (9)	
Taro	9,460	170 (15)	2,370 (9)	520 (10)	
Watermelon	7,650	95 (18)	85 (21)	50 (19)	
Sesame	6,980	-	-	40 (21)	
Sweet Potatoes	6,355	30 (21)	883 (14)	137 (15)	
Tobacco	5,590	108 (17)	95 (20)	110 (16)	
Pineapple	5,128	30 (21)	1,100 (12)	150 (14)	

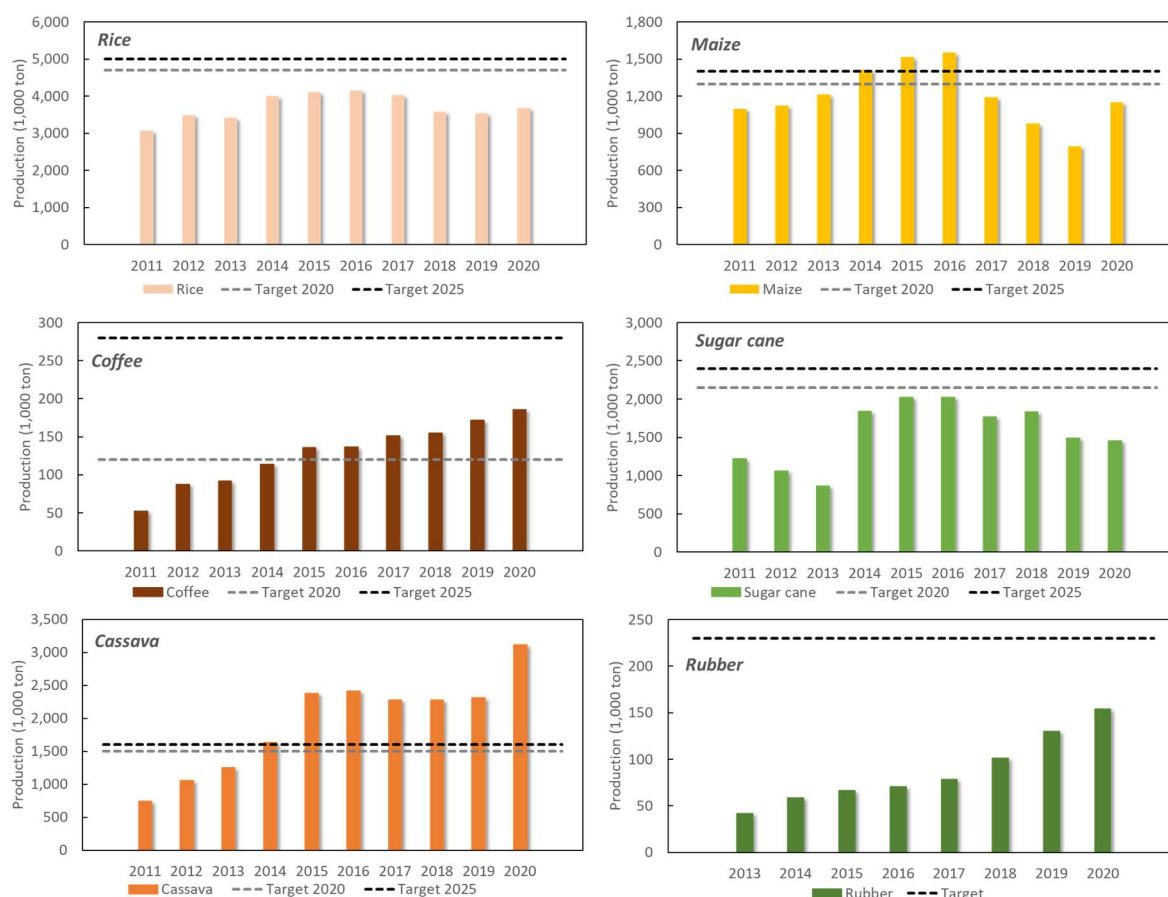
Note: The number inside () indicates the rank of each crop. Rice is not covered under the Project.

Source: JICA project team based on Agricultural Statistics Year Book (MAF, 2019)

In the Agriculture Development Strategy 2025 and Vision 2030, rice, maize (animal feed), coffee, sugar cane, cassava and rubber tree are selected as “Plants (crops) as the national priority goods”. In addition, job's tear, sesame, tea, tobacco, legumes/beans, vegetables and fruit trees are chosen as “Other potential cash crops that are special and unique in the local areas”. The overview of “Plants (crops) as the national priority goods” and “Other potential cash crops that are special and unique in the local areas” are as follows.

(2) Production of “Plants (crops) as the national priority goods”

Figure 3.3.1 shows the production trend of “Plants (crops) as the national priority goods” from 2011 to 2020. The production of coffee and cassava has been gradually increasing since 2011 and in 2020 the target production has been achieved. In particular, cassava has achieved the 2025 target production since 2014 and the production has been still increasing. While maize (animal feed) achieved the target production from 2014 to 2016, the production had decreased since 2017 and at present the target production has not been achieved. Rice, sugar cane and rubber tree have not yet reached to the target production.



Note: As for rubber tree, the data is from 2013 to 2020 and the year of the target production is not mentioned in Strategy 2025.

Source: JICA project team based on FAOSTAT

Figure 3.3.1 Production Trend of “Plants (Crops) as the National Priority Goods”

(3) Production of “Other potential cash crops that are special and unique in the local areas”

Figure 3.3.2 shows the production share of “Other potential cash crops that are special and unique in the local areas” by province. In the northern region of the country, job’s tears, sesame, tea and legumes/beans, in the central region, tobacco and vegetables, in the southern region, vegetables and fruit trees are largely produced. As for the production of the target provinces, in Champasak province, the productions of vegetables and fruit trees are the largest in Lao PDR. The shares of Champasak province account for 31% and 61%, respectively. In Vientiane Capital and Sekong province, the production share of vegetables is relatively high, which account for 7% and 6% of the production in the whole country.

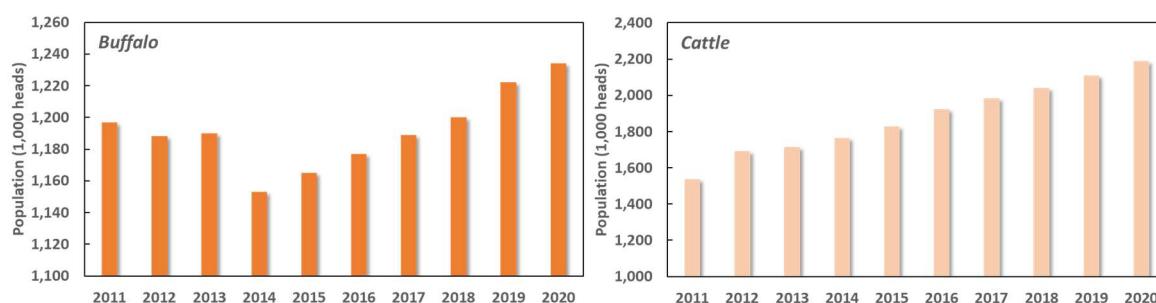


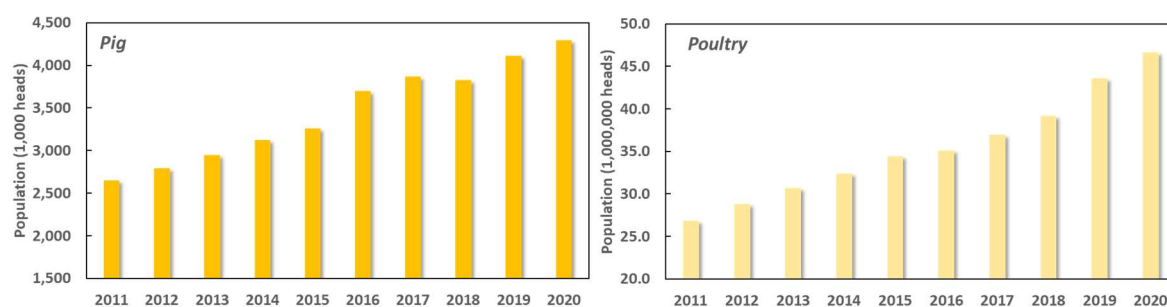
Source: JICA project team based on Agricultural Statistics Year Book (MAF, 2019)

Figure 3.3.2 Production Share of Vegetables and Fruit Trees of Each Province

3.3.2 Livestock Production

Figure 3.3.3 shows the population trend of major livestock from 2011 to 2020. The population of the major livestock has been generally increasing. As shown in Table 3.3.2, 3 provinces, Savannakhet, Saravane and Champasak, have ranked high in almost all the major livestock. Especially in Champasak, the number of poultry heads is the most in the country and its share reaches around 18%. Aside from the 3 provinces abovementioned, as for the cattle, Vientiane and Xiengkhuang province, as for the pig, Luangprabang and Phongsaly province, as for the poultry, Attapeu and Xayaboury province are the major areas of breeding. In the Agriculture Development Strategy 2025 and Vision 2030, shifting from traditional or natural based livestock to farming practices was set as one of the goals in the livestock sector. At present, especially in Vientiane Capital the farming of pig and poultry is widely conducted.





Source: JICA project team based on LAOSIS

Figure 3.3.3 Population Trend of Major Livestock in Lao PDR (2011-2020)

Table 3.3.2 Population and Farming Ratio of Livestock in Major Production Provinces

Rank	Province	Heads	Farming Ratio
1	Savannakhet	313,000	0.2%
2	Champasak	154,000	0.0%
3	Saravane	103,000	0.0%
4	Khammuane	77,000	0.2%
5	Vientiane	62,000	0.1%
Total		1,222,000	0.1%

Rank	Province	Heads	Farming Ratio
1	Savannakhet	485,000	0.5%
2	Champasak	192,000	3.2%
3	Vientiane	188,000	1.5%
4	Xiengkhuang	160,000	0.6%
5	Saravane	155,000	0.5%
Total		2,110,000	2.1%

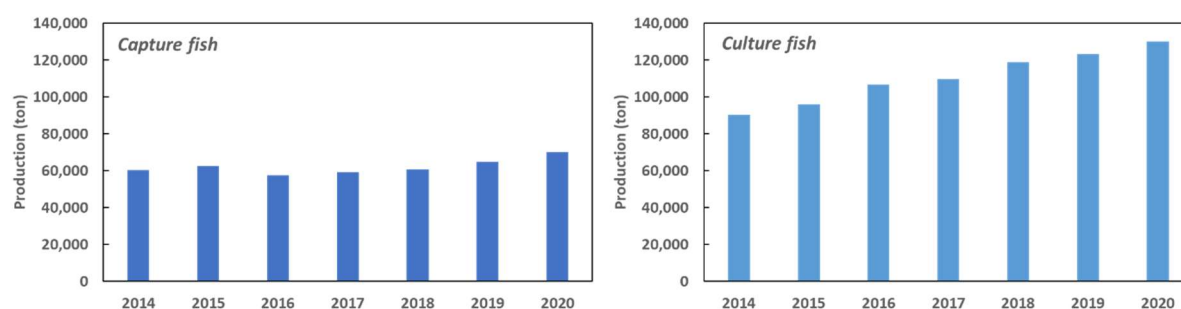
Rank	Province	Heads	Farming Ratio
1	Saravane	1,003,000	0.3%
2	Savannakhet	403,000	4.1%
3	Champasak	301,000	8.8%
4	Luangprabang	291,000	9.5%
5	Phongsaly	290,000	0.1%
7	Vientiane Capital	215,000	92.3%
Total		4,114,000	9.0%

Rank	Province	Heads (1,000)	Farming Ratio
1	Champasak	8,156	12.2%
2	Savannakhet	4,375	0.9%
3	Saravane	4,206	0.0%
4	Attapeu	3,837	0.2%
5	Xayaboury	3,504	1.4%
7	Vientiane Capital	2,624	39.0%
Total		43,600	6.3%

Source: JICA project team based on Agricultural Statistics Year Book (MAF, 2019)

3.3.3 Fishery Production

In Lao PDR, the production of culture fish has been increasing while that of capture fish has not changed. Figure 3.3.4 shows the production trend of capture and cultured fish from 2014 to 2020. The production of capture and cultured fish in 2020 accounts for 70,001 tons and 130,021 tons, respectively.



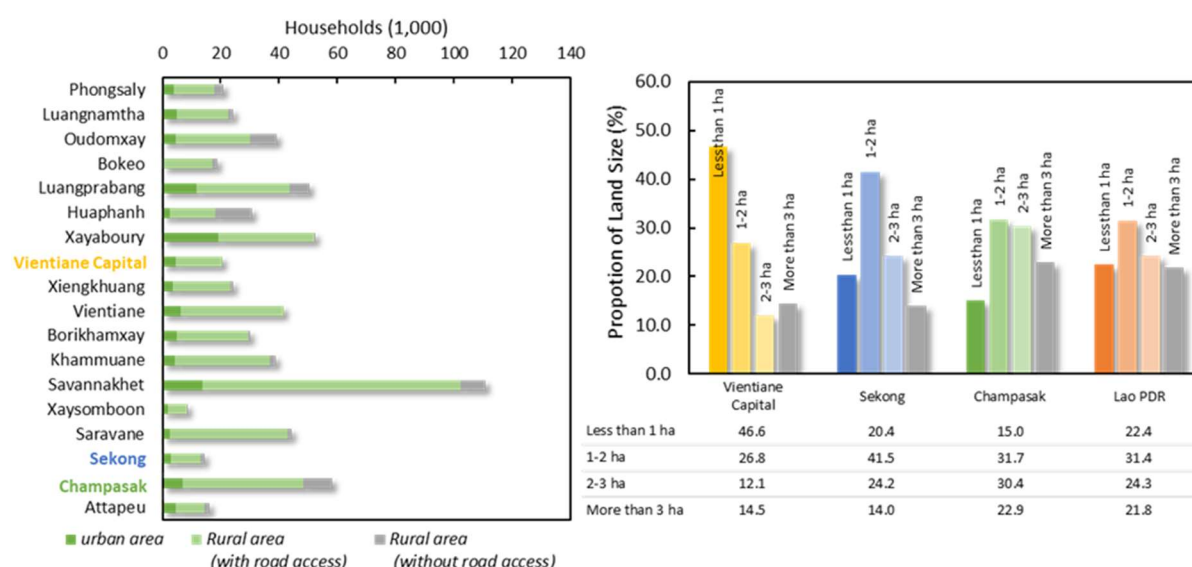
Source: JICA project team based on LAOSIS

Figure 3.3.4 Production Trend of Capture and Culture Fish by Province

3.4 Farmers and Farmers' Groups

3.4.1 Farmers and Farm Households

The size of labor force in Lao PDR is around 3.75 million and 2.30 million people engage in agriculture, which accounts for 61.4% of the whole labor force. The number of farm households in the country is 644.1 thousand and the average size of farmland is 2 to 3 ha in almost all the provinces. About 62.1 thousand households do not have access to roads. Figure 3.4.1 shows the number of farm households (urban, rural with road access and without road access) by province and proportion of farmland size in Lao PDR and 3 target provinces. In Lao PDR, around 80% of farmlands are less than 3 ha. Especially in Vientiane Capital, the farmlands are small. 48.6% of farmland is less than 1 ha. On the other hand, in Champasak, the farmlands are relatively large. The proportions of 2-3 ha and more than 3 ha farmlands are 30.4% and 22.9%, respectively.

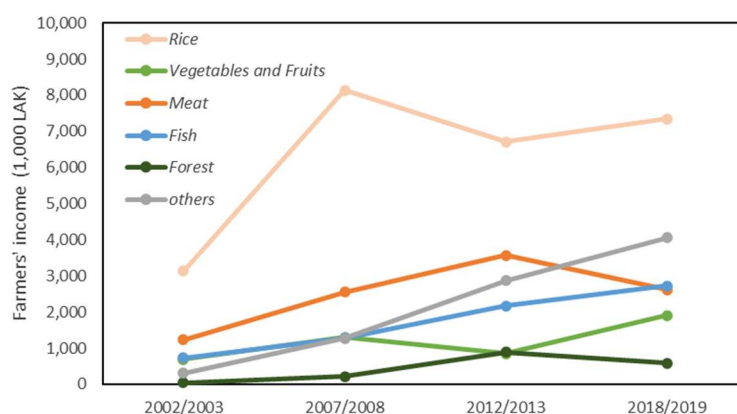


Source: JICA project team based on Laos Census Agriculture 3 (MPI, 2021)

Figure 3.4.1 Number of Farm Households (Urban, Rural with road access and without road access) by Province and Proportion of Farmland Size in Lao PDR and Target Provinces

3.4.2 Farmers' income

Figure 3.4.2 shows the annual income of farmers by selling commodities. Within the commodities, the income of rice is the highest, which is about 7,342,000 LAK per year in the survey of 2018/2019. As follows rice, the income of meat and fish is higher than that of vegetables and fruits and forest. In general, the income of farmers has been getting higher. From 2002/2003 to 2018/19, the income of meat, fish and vegetables and fruits has increased 112%, 271% and 174%, respectively.

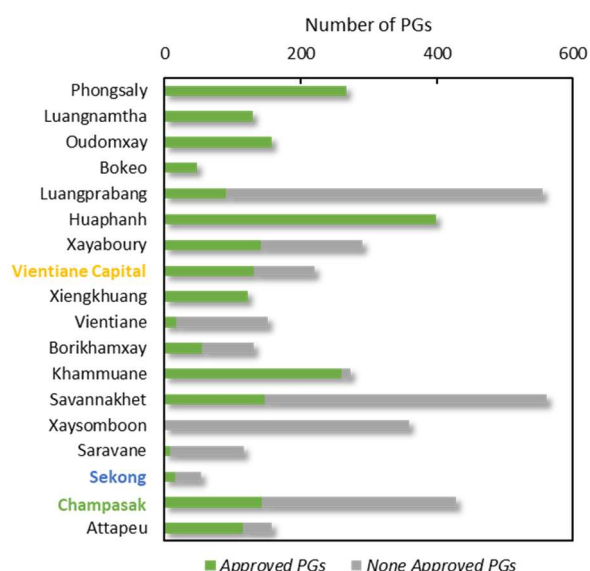


Source: JICA project team based on Lao Expenditure and Consumption Survey (III, IV, V, VI)

Figure 3.4.2 Farmers' Income by Agricultural Products

3.4.3 Farmers' Groups and Cooperatives

The total number of production groups (PGs such as cooperatives) is 4,420, in which 2,245 PGs are approved by DAFO based on the agreement. Figure 3.4.3 shows the number of PGs (approved and none approved) of each province. The number of approved PGs is the most in Huaphanh province. On the other hand, the number, including none approved PGs, is the most in Luangprabang province. As for the number of agriculture cooperatives (ACs), shown in Table 3.4.1, the total number is 51, including credit cooperatives. In Champasak province, one of the target provinces of the project, the number of ACs is the most, which accounts for 12. Currently, the number of cooperatives has been increasing.



Source: JICA project team based on "Stakeholder analysis of agricultural cooperative in Laos: Current status and ways forwards" (NAFRI, 2022)

Figure 3.4.3 Number of Production Groups (approved and none approved) in Each Province

Table 3.4.1 Number of Agriculture Cooperatives in each province

Province Name	Number
Agriculture Cooperatives	26
Champasak	12
Xiengkhuang	5
Vientiane Capital	4
Luangnamtha	1
Bokeo	1
Huaphanh	1
Xayaboury	1
Vientiane	1
Credit	25
Total	51

Source: JICA project team based on "Stakeholder analysis of agricultural cooperative in Laos: Current status and ways forwards" (NAFRI, 2022)

3.5 Food Processing

In Lao PDR, the number of rice milling factory is the highest, which accounts for 73% of all the processing factories. The other major processing foods in Lao PDR are beverage (including pure drinking water), edible ice and slaughter, which are 13%, 6% and 1%, respectively. Rice milling, beverage, edible ice and slaughter can be categorised as the primary processing, meaning the processing techniques which do not largely alter the characteristics of agricultural raw products. In Lao PDR, the number of advanced processing factories (such as canning, retort, freeze-dry) are quite limited. Table 3.5.1 shows the number of agriculture processing factories in Lao PDR in 2020. With a few exceptions, the majority of processors has been operated on very small scale. Over 90% of factories are small scale, which means 10-50 staffs or machines with 10-50 horsepower engine or small impact on environment. This table only include the factories with more than 10 staffs. In Lao PDR, smaller scale factories with less than 10 staffs are existing and mainly operating the traditional processing (such as fermentation, drying, salting). In addition, some farmers or farmers' groups/cooperatives conduct primary processing after harvesting agricultural products.

Table 3.5.1 Number of Agriculture Processing Factory in Lao PDR

Type of Processing	Large	Medium	Small	Total
Rice mills	207	80	3,709	3,996
Beverage (including pure drinking water)	18	63	604	685
Edible Ice	9	16	296	321
Slaughter and Meat Processing	1	7	59	67
Noodles		8	48	56
Tea		10	34	44
Baked beans/fruits	4	20	18	42
Coffee	7	4	25	36
Alcohol	5	5	20	30
Bio-Fertilizer production	4	12	7	23
Bakery and bread		2	20	22
Fruit and vegetable processing		3	18	21
Flour (maize, cassava)	9	7	4	20
Sugar	3	5	2	10
Tobacco	8	1		9
Canned food	2	1	5	8
Ice cream			8	8
Other food products	5	6	8	19
Total	282	250	4,885	5,417

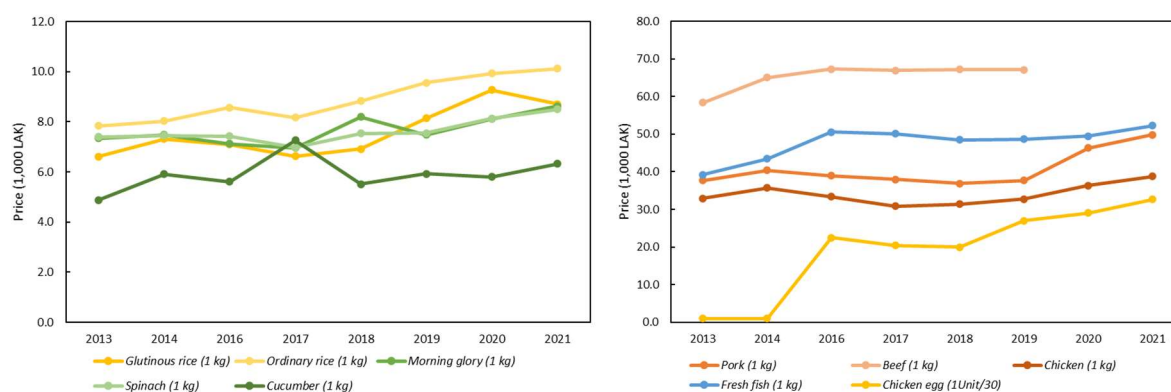
Note: Large scale means more than 200 staff or using machine with more than 200 horsepower engine or large impact on environment, medium scale means 50-200 staffs or machine with 50-200 horsepower engine or medium impact on environment, small scale means 10-50 staffs or machines with 10-50 horsepower engine or small impact on environment. The factories which have less than 10 staffs are not included.

Source: JICA project team based on "Yearbook of Manufacturing Establishment 2020" (MOIC, 2021)

3.6 Consumption

3.6.1 Market Price of Major Agricultural Crops and Commodities

Figure 3.6.1 shows the market price of major commodities from 2013 to 2021 in Lao PDR (the left graph is for crops, the right one is for livestock and fishery). The prices of all the crops have been generally getting higher. Within the crops, ordinary rice is the highest price. As for livestock and fishery, the price of beef is the highest and then fish, pork, and chicken follow.



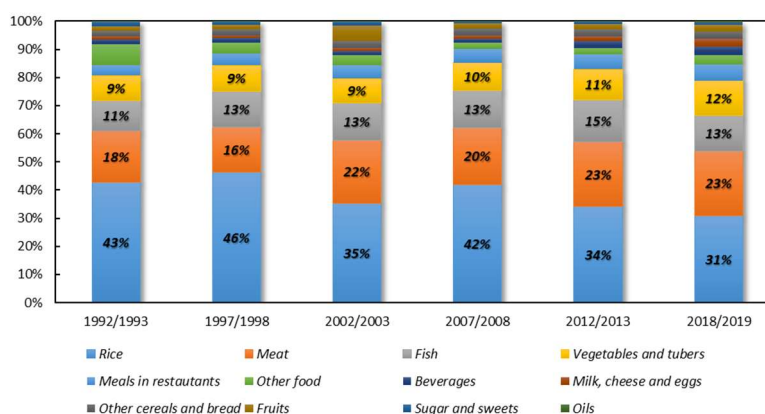
Note: The data on beef from 2020 to 2021 is reported as the wrong price. The correct data is missing.

Source: JICA project team based on LAOSIS (Lao Statistical Bureau, 2021)

Figure 3.6.1 Market Price of Major Agricultural Commodities in Lao PDR

3.6.2 Food Consumption

Figure 3.6.2 shows the composition of food consumption in Lao PDR from 1992/1993 to 2018/2019, which was calculated on price basis. In Lao PDR, the composition of rice consumption has been getting lower from 43% in 1992/1993 to 31% in 2018/2019, while that of meat and vegetable consumption has been increasing.



Source: JICA project team based on “Lao Expenditure and Consumption Survey 6” (Lao Statistical Bureau, 2018/2019)

Figure 3.6.2 Composition of Food Consumption in Lao PDR

3.7 Import/Export of Agricultural Production

Table 3.7.1 shows the import and export value of agricultural production in Lao PDR. The major export items in 2020 are cattle, natural rubber, banana, cassava, fruits and coffee. On the other hand, the major import items are fruits, vegetables and meats. The major countries, which Lao PDR imports products from, are Thailand, China, Vietnam, Japan and United States. On the other hand, Lao PDR exports products mostly to the neighboring countries, Thailand, China, Vietnam, Cambodia, and India.

Table 3.7.1 Import and Export Value of Agricultural Production in Lao PDR

Export Items (Crop)		Value		
		2018	2019	2020
1	Natural rubber	168,159	217,486	214,520
2	Banana	112,000	197,842	227,439
3	Cassava	85,489	111,491	209,626
4	Coffee (green)	96,699	64,323	85,895
5	Fruits (Watermelon, Passion fruit, Tamarind)	55,828	89,937	69,790
6	Maize	31,650	42,523	35,211
7	Cabbage	14,125	16,775	12,580
8	Onion, Garlic	6,388	10,071	9,054
9	Vegetable	8,634	29,753	8,632
10	Peanut, Soybean	6,615	9,109	8,551

Unit: 1,000 USD

Export Items (Livestock)		Value		
		2018	2019	2020
1	Cattle, Buffalo	90,300	226,864	250,114
2	Pig	0*	74	40,317
3	Meat	2,603	5,024	5,607
4	Poultry	1,377	1,832	2,350
5	Other livestock (Horse, Goat, Donkey)	202	813	1,582

*Export was prohibited due to animal infectious disease

Import Items (Including Food Production)		Value		
		2018	2019	2020
1	Fruits (Watermelon, Mango, Longan)	34,652	57,003	36,476
2	Plants derived powder/food	20,424	20,421	30,730
3	Vegetable (fresh)	16,715	28,804	30,710
4	Products derived from crops, rice, maize	22,059	24,352	26,029
5	Meat	14,327	8,792	11,993
6	Products (Milk, Egg, Honey, etc.)	12,402	12,182	11,193
7	Coffee, Tea, Spice	1,325	2,945	5,033
8	Crops	2,676	3,376	4,126
9	Processed food (vegetables/fruits)	3,170	3,081	3,729
10	Processed food (livestock/fishery)	2,883	4,378	3,012

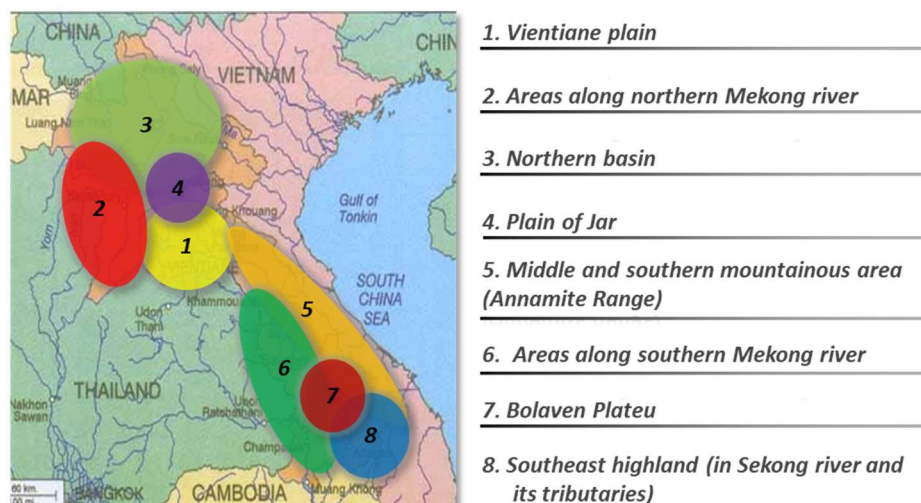
Note: Rice is excluded from the list

Source: Draft survey reports of the Detailed Planning Survey on Project for Strengthening Food Value Chain (JICA, 2022)

3.8 Regional Status of Agriculture Sector in Lao PDR

3.8.1 Regional Category of Lao PDR

Based on the features of agriculture and FVC, Lao PDR is regionally categorized into 8 areas as shown in Figure 3.8.1. This regional categorization is updated based on the zoning of agricultural ecosystem in “Strategy for Agricultural Development 2011 to 2020” (MAF, 2010).



Source: JICA project team based on “Strategy for Agricultural Development 2011 to 2020” (MAF, 2010)

Figure 3.8.1 Regional Category of Lao PDR

1. Vientiane plain
Peri-urban agriculture and commercial crop production are common. Supermarkets and mini mart in city areas including Vientiane capital and food processing factories in suburbs are active in business.
2. Areas along northern Mekong River
Commercial crop production is increasing, export target of which are shifting from Thailand to China.
3. Northern basin
Located along the boundary with China, commercial crop production is increasing. Crops with primary processing are also common.
4. Plain of Jar
Beef and dairy cattle, mushroom and plum production are active for supply to domestic market and export to Vietnam.
5. Middle and southern mountainous area (Annamite range)
The area is comparatively poor since it is practicing upland rice, sweet corn and Job’s tear through slash burn and shifting cultivation.

6. Areas along southern Mekong River
Granary for rice production encompassing southern two large cities. There are many large-scale rice millers, foreign-invested sugar factories and crop processing factories.
7. Bolaven Plateau
The areas are advanced in agriculture with rich annual precipitation and fertile soil conditions. Therefore, high land plain vegetable production, fruits production and exports are active.
8. Southeast highland (in Sekong river and its tributaries)
This area is comparatively poor. Agriculture development is recently on-going with the support of improvement of physical market accessibility.

The regional category of each province is shown in Table 3.8.1.

Table 3.8.1 Regional Category of each Province

Province Name																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Item	Regional Category	Northern Region							Central Region							Southern Region			
		Phongsaly	Luangnamtha	Oudomxay	Bokeo	Luangprabang	Huaphanh	Xayaboury	Vientiane Capital	Xiengkhuang	Vientiane	Borikhanxay	Khammuane	Savannakhet	Xaysomboun	Saravane	Sekong	Champasak	Attapeu
1. Vientiane Plain																			
2. Area along northern Mekong river																			
3. Northern basin																			
4. Plain of Jar																			
5. Middle and southern mountainous area																			
6. Area along southern Mekong river																			
7. Bolaven plateau																			
8. Southeast highland																			

Source: JICA project team

3.8.2 Provincial Status of Agriculture Sector in 3 Target Provinces

Based on the provincial statistical data and the regional categories abovementioned, the current status of agriculture sector in 3 target provinces is summarized as follows. The statistical data and summary of the other provinces are shown in Annex B.

(1) Vientiane Capital

Vientiane Capital is located in the central region of Lao PDR. It has 9 districts, covering 3,920 km² with a population of 948,000. Vientiane Capital is categorized in “Vientiane plain”. The population density is the highest in the country. Suburban agriculture and commercial crop production have been mainly conducted, since the capital has the major consuming area and one of the largest fresh markets. The major crops in Vientiane Capital are leafy stem vegetables, fruit bearing and leguminous. The feature of agriculture is that the land size of agriculture is small, but there are many input and machinery shops. This is why production efficiency is relatively high.

(2) Champasak Province

Champasak is a province in the south part of the country. It has 10 districts, covering 15,415 km² with a population of 753,000. Champasak province can be categorized in “Area along southern Mekong River” and “Bolaven Plateau”. Its capital, Pakse, is the main trade and travel link with Thailand, Cambodia and

Vietnam. In this province, the economic output primarily consists of agriculture products, especially coffee, tea and vegetables, produced in Bolaven plateau. In Champasak, production efficiency is high, since machinery use is relatively high compared with other provinces and also this province has many permanent markets.

(3) Sekong Province

Sekong is a province of Laos in the southeast of the country and borders Vietnam to the east. Sekong province is the second smallest province in Laos and one of the poorest provinces. It has 4 districts, covering 7,665 km² with a population of 129,000. Sekong province can be categorized in “Middle and southern mountainous area”, “Bolaven Plateau” and “Southeast highland”. Infrastructure is still underdeveloped, with few having access to clean water and sanitation, and the literacy rate is extremely low. As the feature of agriculture, Sekong province is one of the most important coffee-producing areas of Laos along with Saravan province and Champasak province. Not only coffee, cassava, vegetables and rice are the major products in Sekong. The percentage of agriculture households which were affected by pest damage is high. Therefore, the agriculture in this region has a high risk of pest damage.

CHAPTER 4

RESULT OF FVC SURVEY FOR TARGET COMMODITIES

CHAPTER4 RESULT OF FVC SURVEY FOR TARGET COMMODITIES

4.1 Overview of Target Commodities

The target commodities for FVC survey were selected as Table 4.1.1 in 3 target provinces.

Table 4.1.1 Target Commodities for FVC Survey

No.	Vientiane Capital	Champasak Province	Sekong Province
Survey throughout FVC process			
1	Maize	Sweet corn	Ginseng
2	Spring onion	Cabbage	Cabbage
3	Banana (Export)	Avocado	Banana (Traditional)
Survey focusing on distribution and retail process			
4	Pig & Cattle	Cattle	Cattle
5	Fishery (tilapia)	Fishery (natural fish)	Fishery (tilapia)

Source: JICA project team

The selected commodities can be categorized into 5 groups.

- Vegetables including Maize: Maize, Spring onion, Sweet corn, Cabbage
- Fruits: Banana, Avocado
- Medicinal Crops: Ginseng
- Livestock: Cattle, Pig
- Fishery

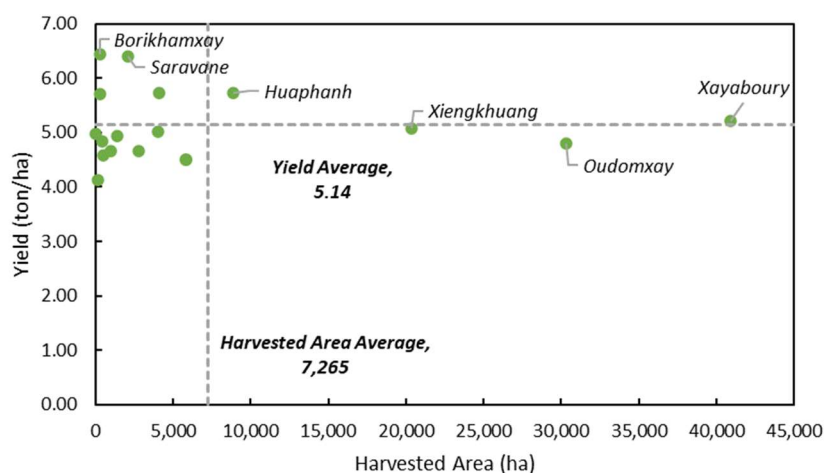
The statistical overview of the target commodities is summarized as follows.

4.1.1 Vegetables including Maize

(1) Maize -Vientiane Capital

FVC Category: *Traditional / Modern / Export*

Next to rice, maize is the second most widely harvested crop in Lao PDR and it is selected as “Plants (crops) as the national priority goods” in the Agriculture Development Strategy 2025 and Vision 2030. The major harvested provinces are Xayaboury, Oudomxay, Xiengkhuang and Huaphanh. The average yield is 5.14 ton/ha. The harvested area and yield of maize by each province is shown in Figure 4.1.1



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.1 Harvested Area and Yield of Maize by Province

The total production of maize in Lao PDR was 615,375 tons in 2019. Figure 4.1.2 shows the production chart and data map of maize by province. Maize is mainly produced in the northern region. The production of top 4 provinces accounts for more than 75%.

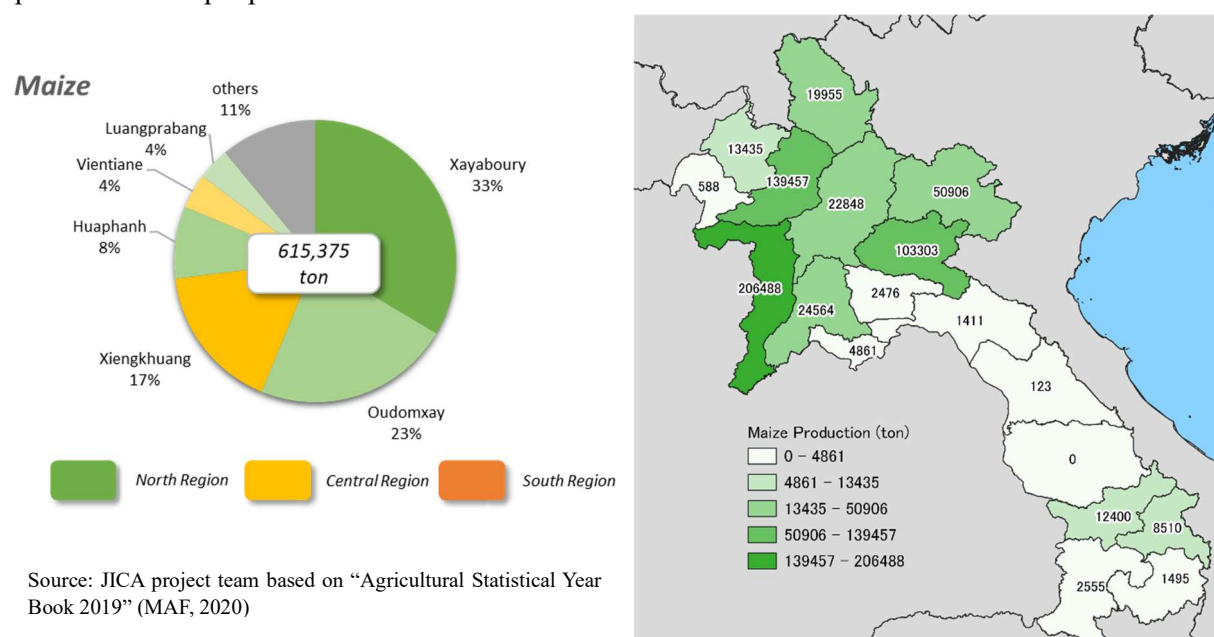
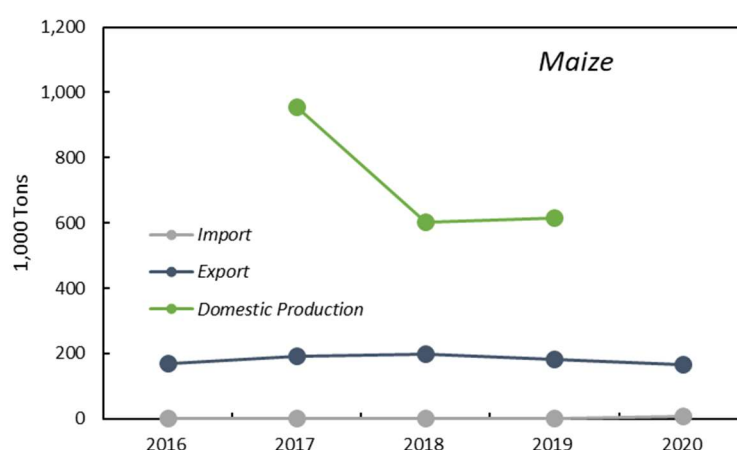


Figure 4.1.2 Production Chart and Data Map of Maize by Province

Figure 4.1.3 shows the production, import and export amount of maize in Lao PDR. The export amount has been around 200 tons/year, not relying on domestic production, while the import amount is almost zero.



Note: the data of domestic production in 2016 and 2020 is missing.

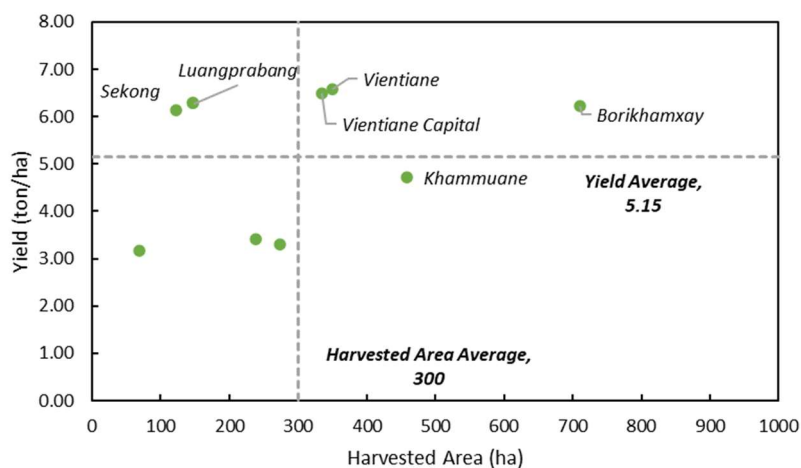
Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.3 Production, Import and Export Amount of Maize in Lao PDR

(2) Spring Onion -Vientiane Capital

FVC Category: *Traditional / Modern*

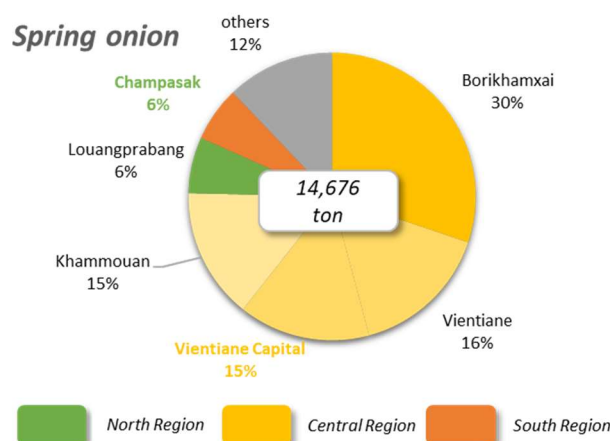
Spring onion is harvested mainly in the central region of Lao PDR, in Borikhamxay, Khammuane, Vientiane, and Vientiane Capital. The average yield is 5.15 ton/ha. Figure 4.1.4 shows the harvested area and yield of spring onion by each province.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

Figure 4.1.4 Harvested Area and Yield of Spring Onion by Province

The total production of spring onion in Lao PDR was 14,676 tons in 2020. Figure 4.1.5 shows the production chart and data map of spring onion by province. More than 75% of spring onion is produced in the central region of Lao PDR.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

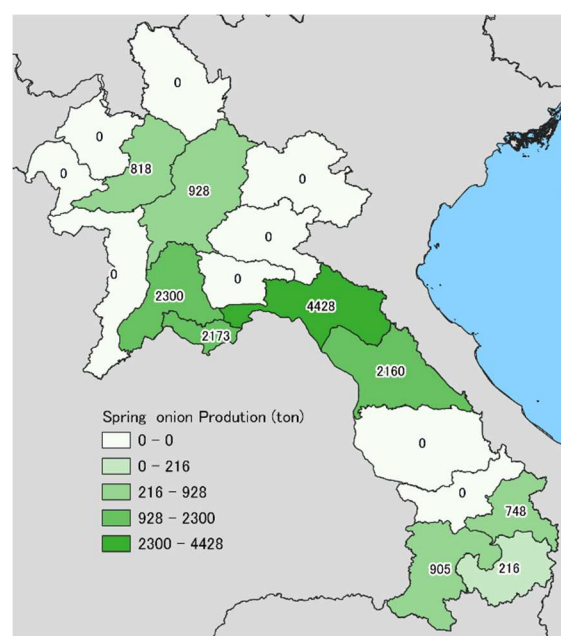
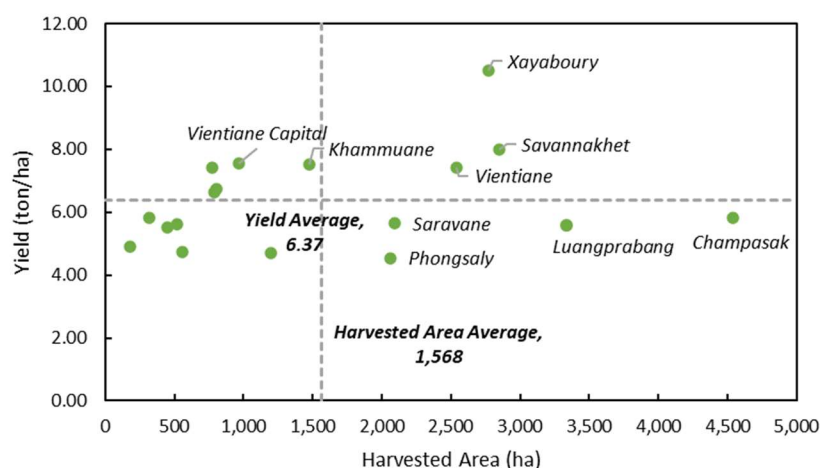


Figure 4.1.5 Production Chart and Data Map of Spring Onion by Province

(3) Sweet Corn -Champasak Province

FVC Category: *Traditional / Modern*

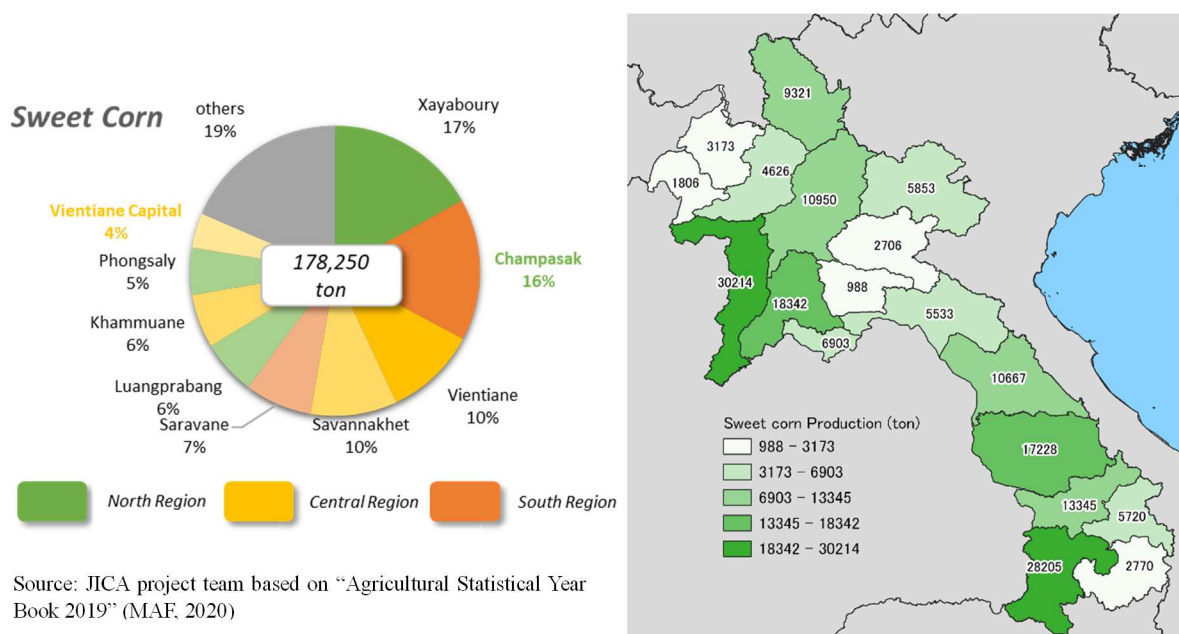
Sweet corn is one of the major harvested crops in Lao PDR, which accounts for ninth largest harvested area. Sweet corn is widely harvested in the whole country, compared with maize. The major harvested provinces are Champasak, Luangprabang, Savannakhet and Xayaboury. The average yield of sweet corn is 6.34 ton/ha. The harvested area and yield by province is shown in Figure 4.1.6.



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.6 Harvested Area and Yield of Sweet Corn by Province

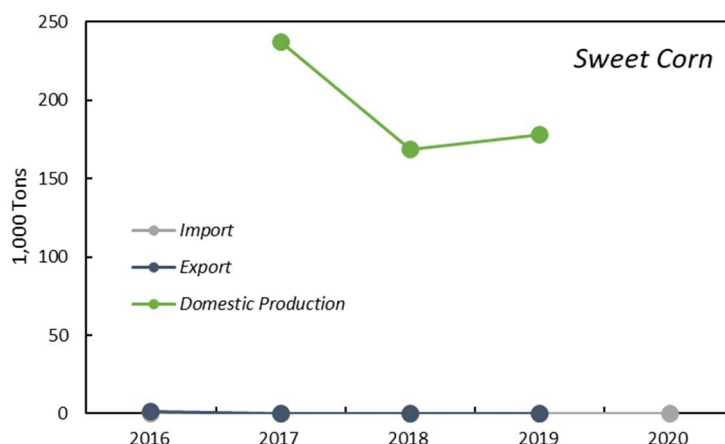
The total production of maize in Lao PDR was 178,250 tons in 2019. Figure 4.1.7 shows the production chart and data map of maize by province. Sweet corn is widely produced in the country. The production in Champasak province is the second most in the country, which accounts for around 16% of the total production.



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.7 Production Chart and Data Map of Sweet Corn by Province

The production, import and export of sweet corn in Lao PDR are shown in Figure 4.1.8. Sweet corn has not been imported and exported in Lao PDR. Therefore, sweetcorn, produced in Lao PDR, is overall consumed inside the country or traded after processed in Lao PDR. (The amount in the figure does not include the processing products.)

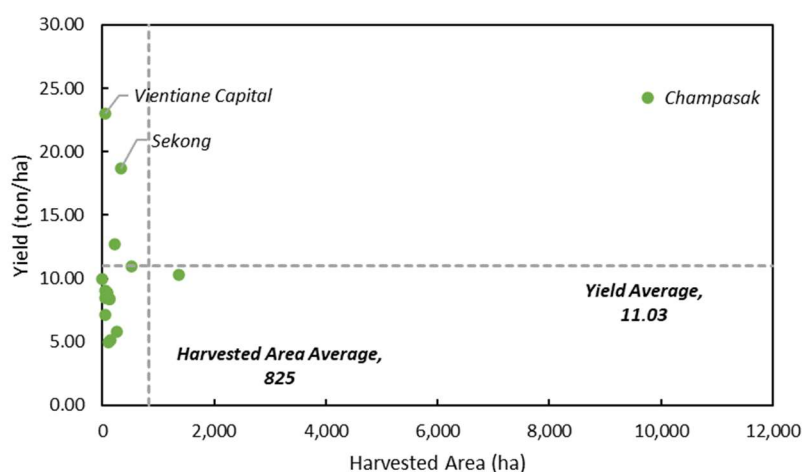


Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.8 Production, Import and Export Amount of Sweet Corn in Lao PDR

(4) Cabbage -Champasak/ Sekong Province FVC Category: *Traditional / Modern / Export*

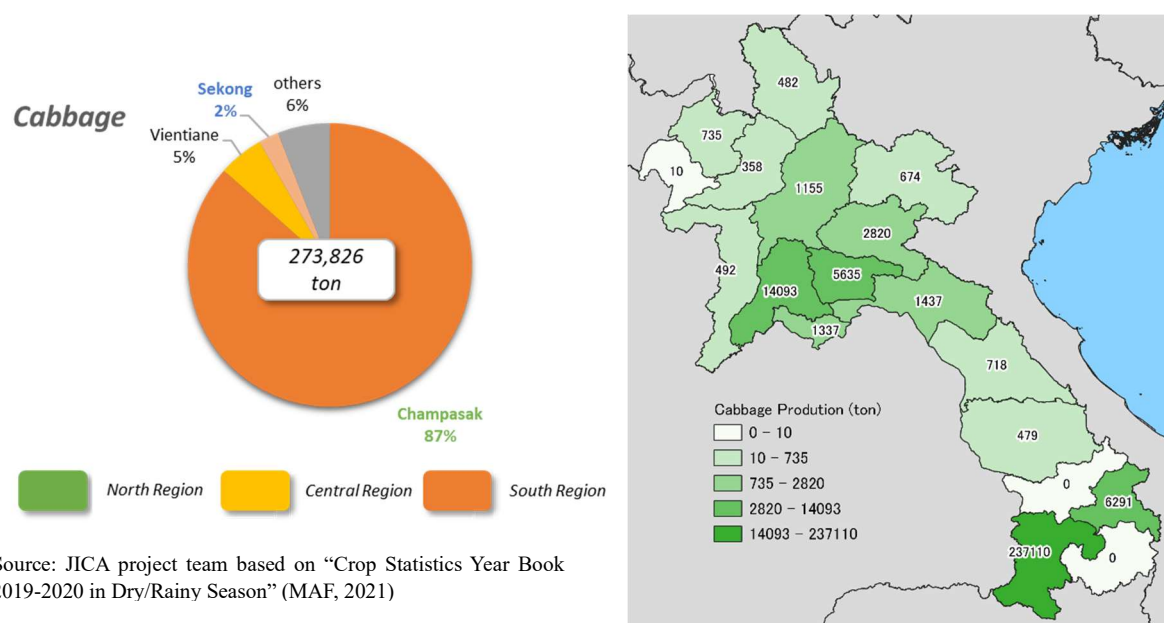
Cabbage is widely harvested in Lao PDR. However, the harvested area in Chamapsak is much larger than the other provinces, which accounts for around 95,000 ha as the average harvested area is 825 ha. The average yield is 11.03 ton/ha. Figure 4.1.9 shows the harvested area and yield of cabbage by each province.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

Figure 4.1.9 Harvested Area and Yield of Cabbage by Province

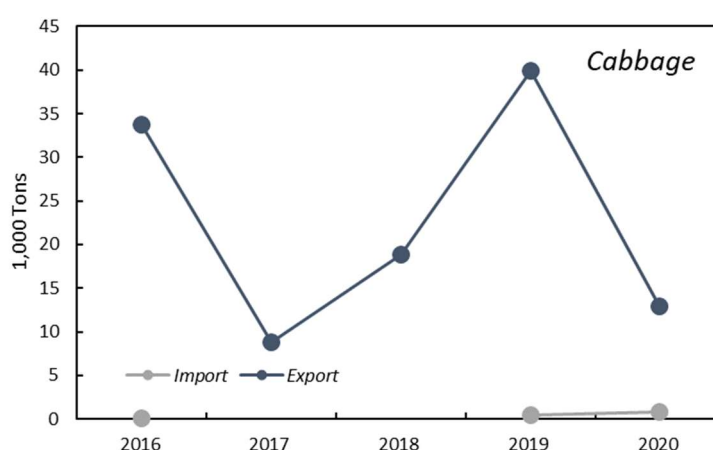
The total production of cabbage in Lao PDR was 273,826 tons in 2020. Figure 4.1.10 shows the production chart and data map of cabbage by province. Around 87 % of cabbage is produced in Chmpasak province.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

Figure 4.1.10 Production Chart and Data Map of Cabbage by Province

The import and export of cabbage in Lao PDR are shown in Figure 4.1.11. According to the statistics, only 5% of cabbage was exported in 2020, while the import amount was almost 0. Therefore, cabbage, produced in Lao PDR, is mainly consumed in domestic market and the excess is exported to foreign countries.



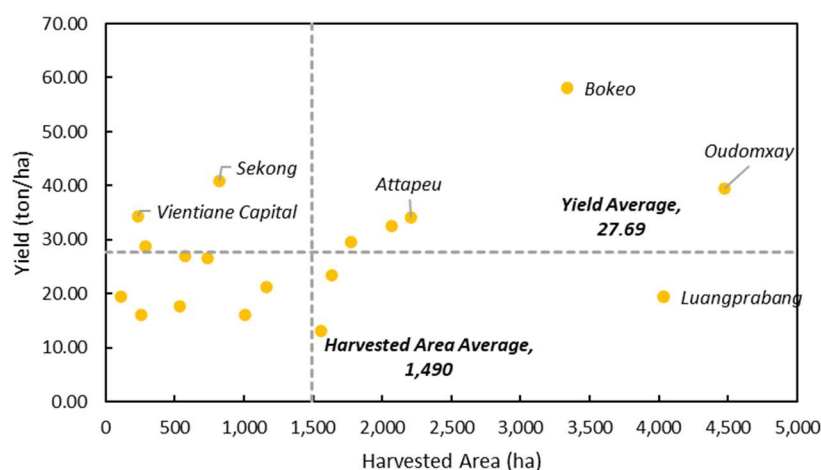
Source: JICA project team based on FAOSTAT

Figure 4.1.11 Production, Import and Export Amount of Cabbage in Lao PDR

4.1.2 Fruits

(1) Banana -Vientiane Capital/ Sekong Province FVC Category: *Traditional / Modern / Export*

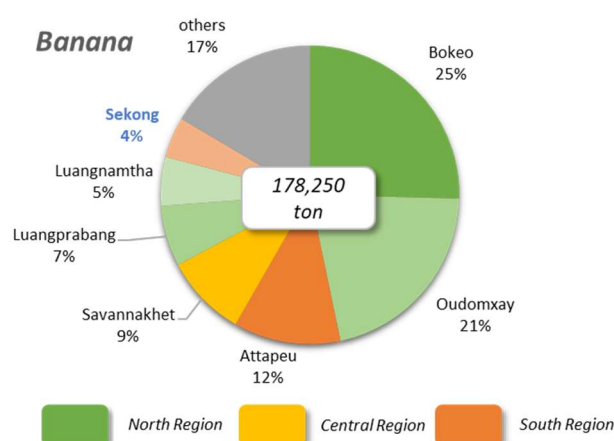
Banana is the most widely harvested fruit in Lao PDR, which accounts for 26,828 ha. Fruits tree including banana is selected as “Other potential plants (crops) as the national priority goods” in the Agriculture Development Strategy 2025 and Vision 2030. The major harvested provinces of Lao are Oudomxay, Luangprabang and Bokeo. The average yield of the whole country is 27.78 ton/ha. The harvested area and yield of banana by each province is shown in Figure 4.1.12.



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.12 Harvested Area and Yield of Banana by Province

The total production of banana in Lao PDR was 178,250 tons in 2019. Figure 4.1.13 shows the production chart and data map of banana by province. Banana is mainly produced in the northern and southern regions of the country. The productions of Bokeo, Oudomxay and Attapeu cover more than 50% of all the production in Lao PDR.



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

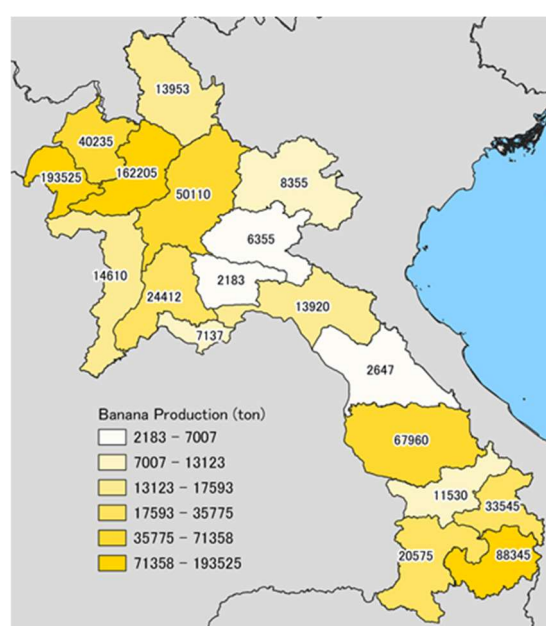
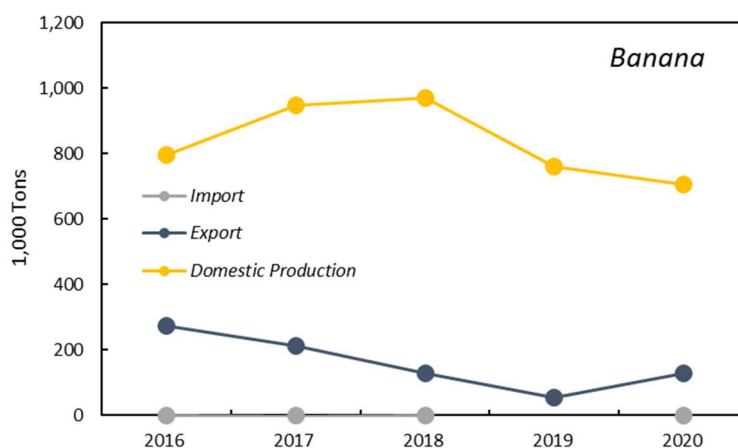


Figure 4.1.13 Production Chart and Data Map of Banana by Province

Figure 4.1.14 shows the production, import and export amount of banana in Lao PDR. In 2020, the export of banana is about 18% of the domestic production, while the import amount is almost 0. Therefore, banana, produced in Lao PDR, is mainly consumed in domestic market and the excess is exported to foreign countries.



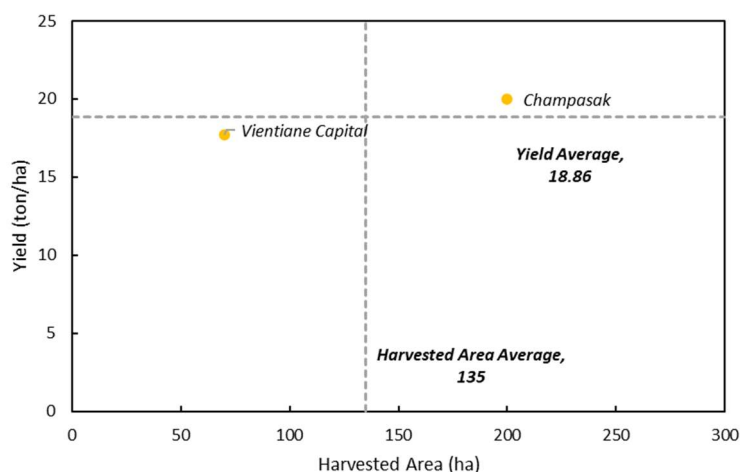
Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020) and FAOSTAT

Figure 4.1.14 Production, Import and Export Amount of Banana in Lao PDR

(2) Avocado -Champasak Province

FVC Category: *Traditional / Modern*

As Figure 4.1.15 shows, avocado is only harvested in Champasak province and Vientiane Capital, which accounts for 270 ha in total. The average yield is 18.86 ton/ha.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

Figure 4.1.15 Harvested Area and Yield of Avocado by Province

The total production of avocado in Lao PDR was 5,260 tons in 2020. Figure 4.1.16 shows the production chart and data map of avocado by province. Around 76% of avocado is produced in Champasak province and the rest is in Vientiane Capital.

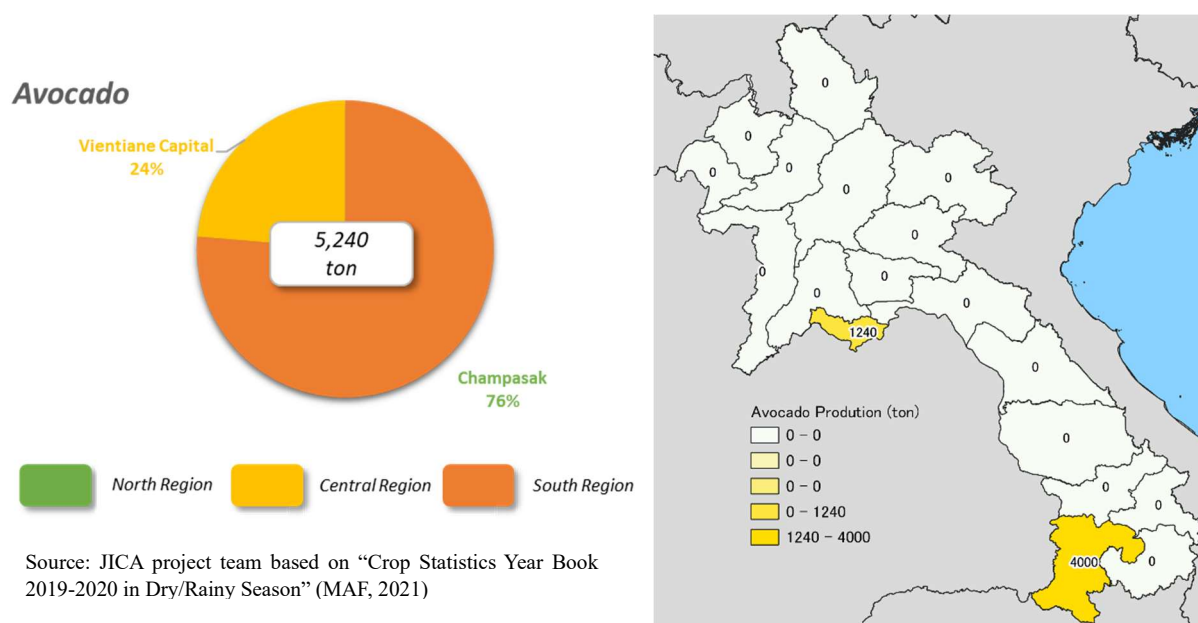
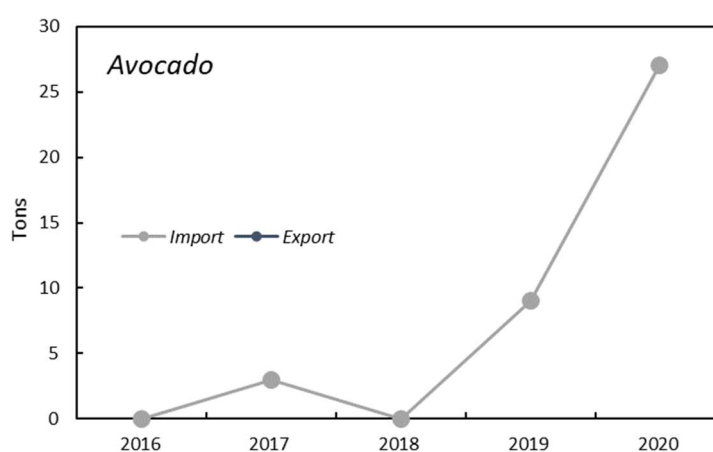


Figure 4.1.16 Production Chart and Data Map of Avocado by Province

The import and export of avocado in Lao PDR are shown in Figure 4.1.17. Recently, the amount of imports has been increasing, though it reached only 0.5% of the domestic production.



Source: JICA project team based on "Agricultural Statistical Year Book 2019" (MAF, 2020)

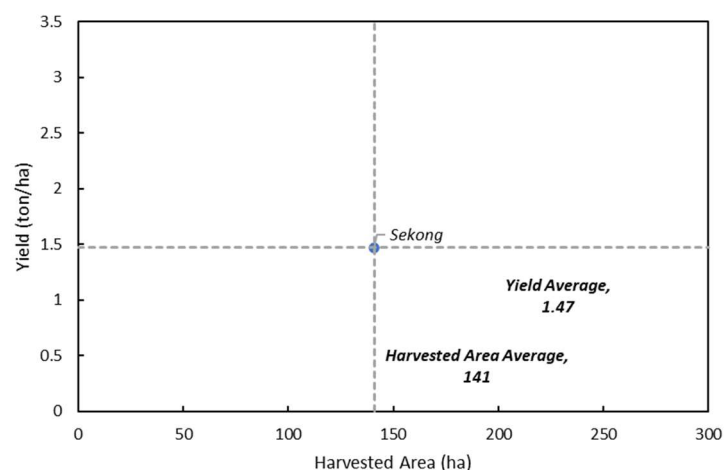
Figure 4.1.17 Production, Import and Export Amount of Avocado in Lao PDR

4.1.3 Medicinal Plants

(1) Ginseng -Sekong Province

FVC Category: *Traditional / Modern / Export*

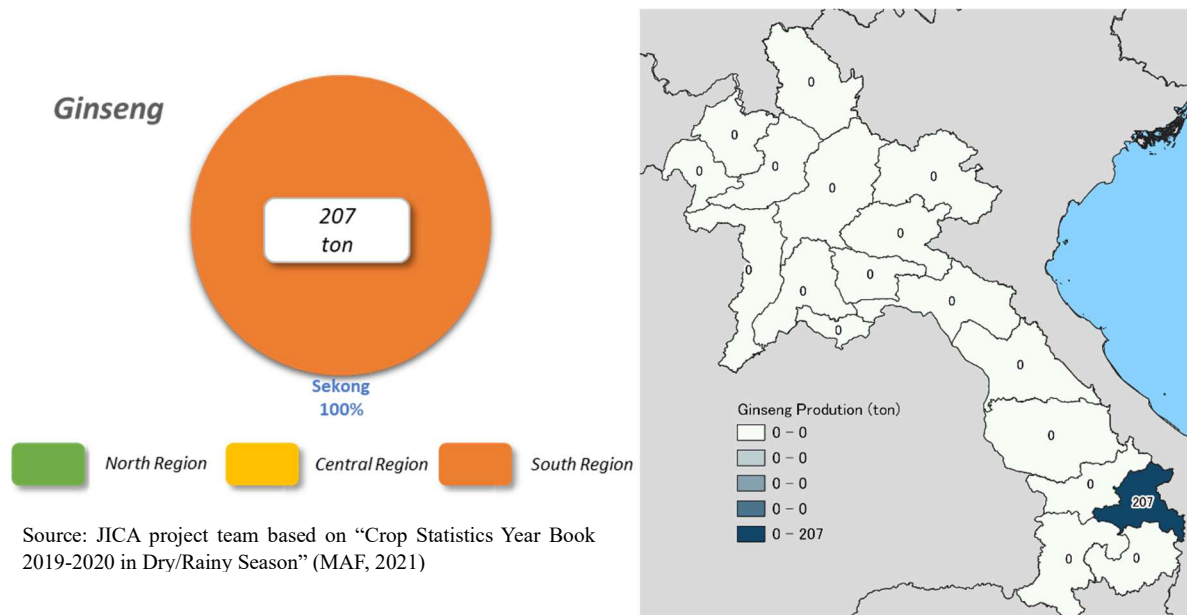
As Figure 4.1.18 shows, ginseng is only harvested in Sekong province, which accounts for 141 ha. The yield is 1.47 ton/ha.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

Figure 4.1.18 Harvested Area and Yield of Ginseng by Province

The total production of ginseng in Lao PDR was 207 tons in 2020. Figure 4.1.10 shows the production chart and data map of ginseng by province.



Source: JICA project team based on “Crop Statistics Year Book 2019-2020 in Dry/Rainy Season” (MAF, 2021)

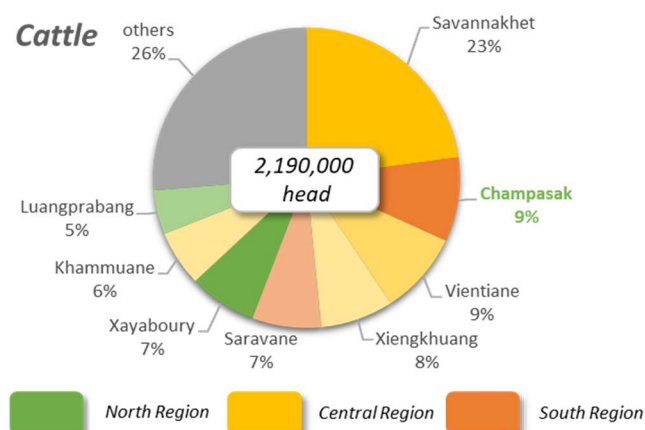
Figure 4.1.19 Production Chart and Data Map of Ginseng by Province

4.1.4 Livestock

(1) Cattle – Vientiane Capital/ Champasak province/ Sekong province

FVC Category: *Traditional / Modern / Export*

In Lao PDR, cattle have been widely raised. Figure 4.1.20 shows the population chart and data map of cattle by province. The population of cattle is the most in Savannakhet, as Champasak, Vientiane and Xiengkhuang province follow it.



Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

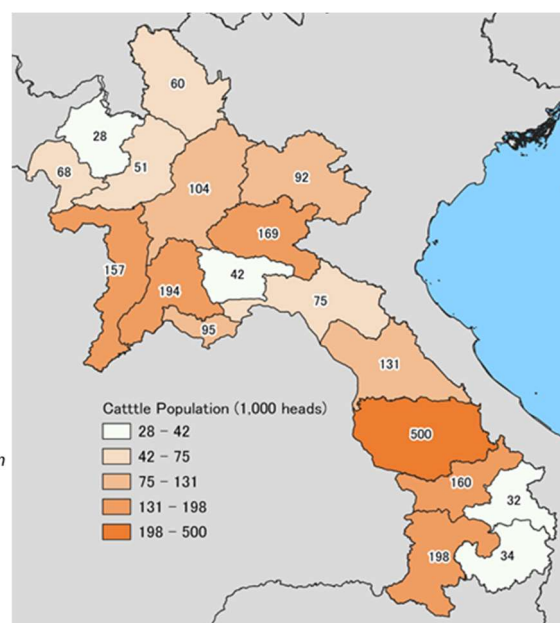
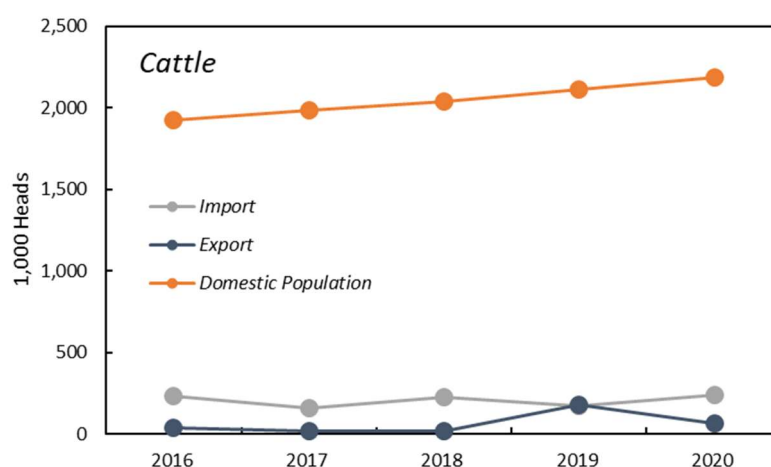


Figure 4.1.20 Population Chart and Data Map of Cattle by Province

Figure 4.1.21 shows the domestic population, import and export heads of cattle in Lao PDR. While the domestic population has been increasing, the import and export heads are almost unchanged. It is assumed that the domestic consumption is increasing based on the statistical data and interview survey from the producers and distributors through the joint field survey.



Note: the data of import and export does not include processed products

Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.21 Domestic Population, Import and Export Heads of Cattle in Lao PDR

(2) Pig – Vientiane Capital

FVC Category: *Traditional / Modern / Export*

Pig has been also widely raised in Lao PDR. Figure 4.1.22 shows the population chart and data map of pig by province. The population of pig is the most in Saravane, as Savanakheth, Champasak and Luangprabang province follow it.

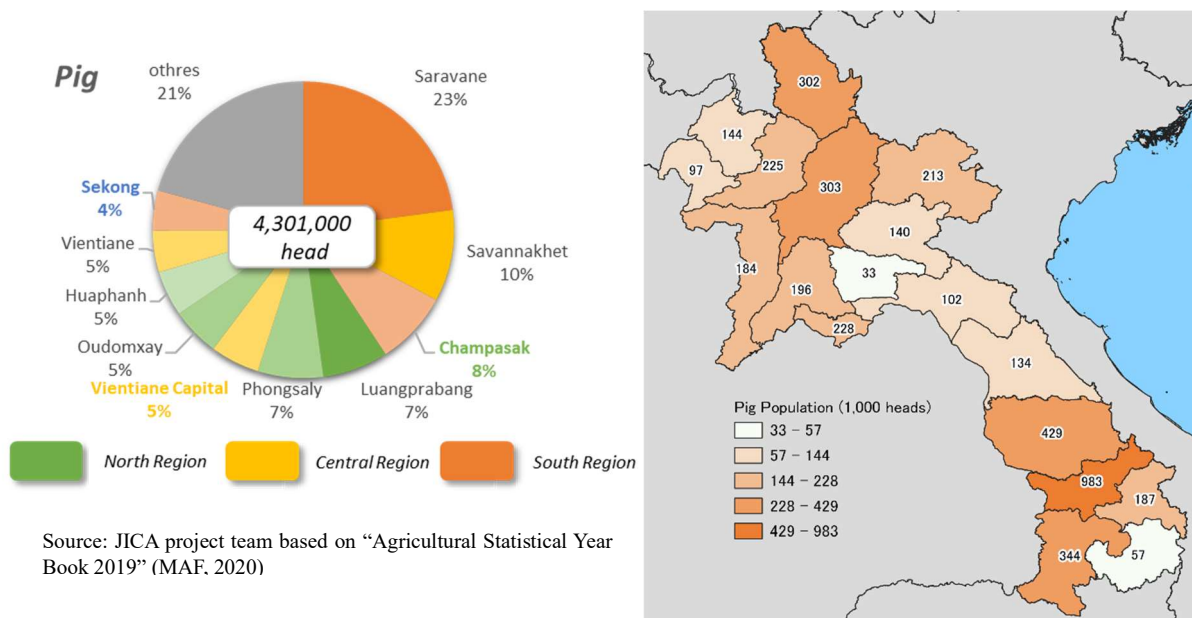
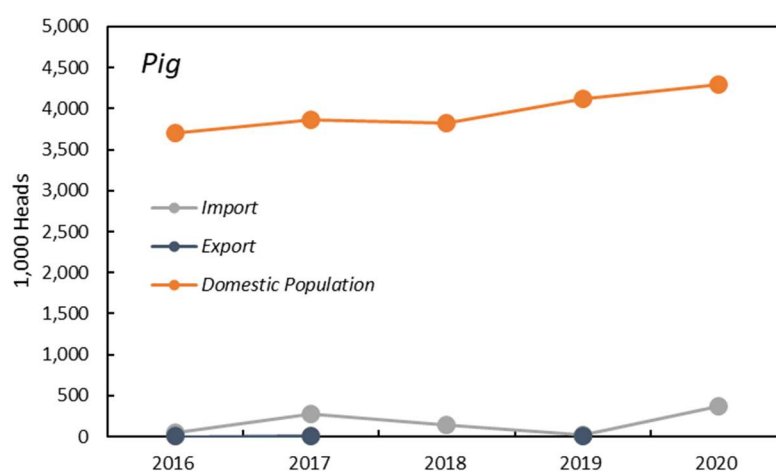


Figure 4.1.22 Population Chart and Data Map of Pig by Province

Figure 4.1.23 shows the domestic population, import and export heads of pig in Lao PDR. While the domestic population has been increasing, the import and export heads are almost unchanged. It is assumed that the domestic consumption is increasing based on the statistical data and interview survey from the producers and distributors through the joint field survey.



Note: the data of import and export does not include processed products
Source: JICA project team based on “Agricultural Statistical Year Book 2019” (MAF, 2020)

Figure 4.1.23 Production, Import and Export Amount of Pig in Lao PDR

4.1.5 Fishery

(1) Captured Fish – Champasak province

FVC Category: *Traditional / Modern / Export*

Figure 4.1.24 shows the production chart and data map of captured fish in Lao PDR. Natural fish is widely captured in Lao PDR, mainly in the central and southern region. The production is the most in Savannakhet province, as Vientiane, Champasak and Khammuane province follows.

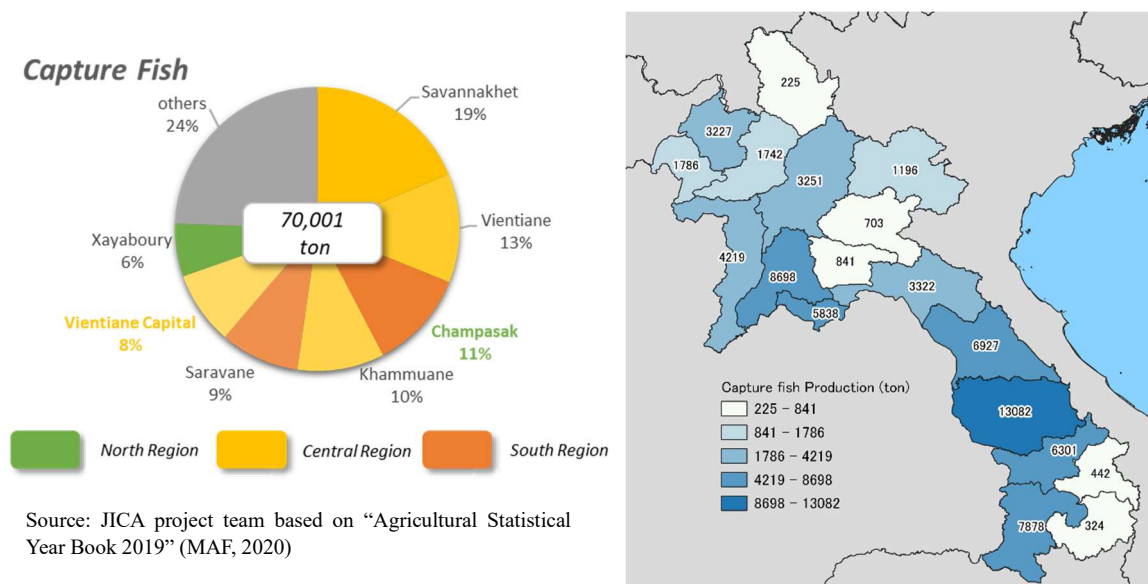


Figure 4.1.24 Production Chart and Data Map of Captured Fish by Province

(2) Cultured Fish – Vientiane Capital/ Sekong province

FVC Category: *Traditional / Modern / Export*

Figure 4.1.25 shows the production chart and data map of cultured fish in Lao PDR. The production of cultured fish is the most in Savannakhet province, which reached around 63% in 2019. Vientiane Capital and Champasak province are also the major production areas, accounting for 18% and 7%, respectively.

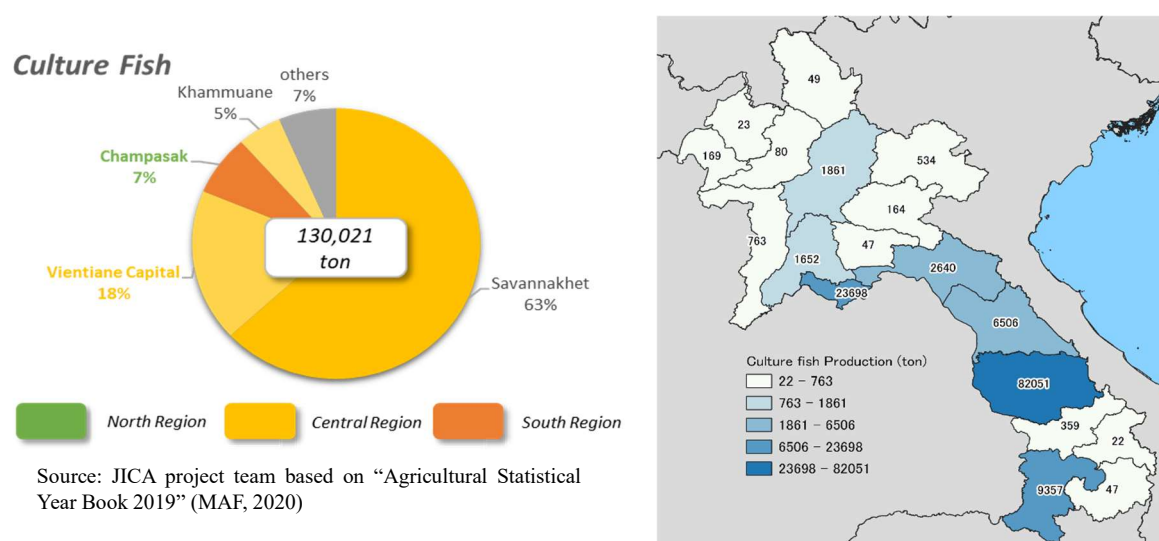


Figure 4.1.25 Production Chart and Data Map of Cultured Fish by Province

4.2 Agricultural Production/Processing

4.2.1 Introduction

(1) Agricultural production in Lao PDR

Until recently, agriculture in Lao PDR was self-sufficient¹. Rice grown in rain-fed fields was the staple food, and side dishes consisted of vegetables grown in the garden (or that grew naturally), and wild grasses, tree leaves, small animals, and fish collected from the fields and mountains.

The major vegetables consumed at home in those days were lemongrass, mint, basil, coriander, spring onion, garlic, ginger, galangal, hot pepper, eggplant, pea eggplant, tomato, pumpkin, sponge gourd and gourd². It is imagined that these were cultivated without care in the garden.

It is considered that advanced vegetable cultivation techniques in the fields were not required in those days, because there was no need to be particular about improving yields and quality. In fact, manure-making method and a winnowing apparatus, which are traditional in Japan, are not known in Lao PDR.

Based on the above considerations, it is important for understanding the FVC-related problems to know what kind of farming methodologies the current producers are using in Lao PDR. Thus, in the interviews with producers, we highlighted some of basic cultivation methodologies as listed in Table 4.2.1, and asked producers about them.

Table 4.2.1 Basic Cultivation Methodologies Asked of Producers in This Survey

Methodology	Remarks
Crop rotation	Cultivation control against diseases and insects
Appropriate chemical fertilizer	Cultivation control against diseases and insects
Lime application	Cultivation control against diseases
Compost application	Soil Improvement Biological control against diseases
Organic fertilizer	Biological control against diseases
Intercropping/Mixed cropping	Cultivation control against insects
Chemical herbicides	Chemical control against weeds

Source: JICA project team

(2) Food processing process in Lao PDR

Food processing in Lao PDR consists of (1) primary processing (primary processing of agricultural products such as polished rice), (2) traditional processing (traditional preserved food processing such as fermented fish seasoning), and (3) modern processing (seasonings and heat-treated foods processed for long-term storage and long-distance transportation, such as bottled and canned foods)³. In this survey, processors were classified according to this classification.

1 Yasuyuki Kono & Kouich Fujita (2008): Chapter 11 Introduction of Commercial Crops and Transformation of Rural Villages. (In Japanese); In Studies of Rural Area in Laos (ISBN978-4-8396-0213-0). Mekong Publishing., co., Ltd. Tokyo. p395-429

2 Naoto Nitta (2021): Vegetable Production in Laos (in Japanese). International Cooperation of Agriculture and Forestry. Vol. 44 (1), 20-29.

3 JICA (2012): Data Collection Survey on Selecting the Processed Food to Be Focused and Promoting Foreign Direct Investment in Food Business in Laos (Final report)

4.2.2 Current Status of Producers

(1) Outlines of Surveyed Producers

Field survey results

A total of 18 producers were interviewed (Table 4.2.2). Except one private company possessing 124 ha of farming land, 17 producers were smallholders with 7.6 ha lands in average ranging from 0.64 ha to 30 ha. The farming area of the target crops of the smallholders were 2.8 ha in average ranging from 0.16 ha to 25 ha. The total number of agricultural machines owned by the 17 smallholder farmers were small; 4 tractors, 4 tiller machines, 4 brush cutters, and 1 small truck. Average annual sale of target crops are 79,000,000 LAK ranging from 5,000,000 to 450,000,000 LAK.

All the 17 smallholders are individual farmers, not a member of a farmer group and an agricultural cooperative member.

Sales direction was, in most cases, middleman. Producers did not raise any issues with selling to middleman.

Annual sales of target crops was further analyzed. The sales per farming area (ha) of those target crops are summarized in Table 4.2.3. The crop with the highest average annual turnover per unit area (ha) was spring onion. It was 240,000,000 LAK/ha. However, this crop may not be necessarily highly profitable as it requires many labors for sowing and harvesting. The crop with the second highest average annual turnover per unit area is cabbage (90,000,000 LAK/ha), followed by sweet corn and maize (28,000,000 LAK/ha), ginseng (24,000,000 LAK/ha), and banana (22,000,000 LAK/ha).

Issues identified through field surveys

All the 17 smallholder producers were individual farmers. This suggests that the organization rate of agricultural cooperatives in Lao PDR is low. In fact, there are very few of them⁴. The low unionization rate of agricultural cooperatives has various effects on FVC, one of which is inadequate opportunities for producers to learn new technologies and farming management systems.

Table 4.2.2 Outline of Interviewed Farmers

Target Products	Total Farming Area (ha)	Area of Target Product (ha)	Rate of Target Product (%)	Agricultural machinery	Annual Sale of Target Crop (LAK)	Sales Destination	Business other than agriculture
Maize	2.5	0.64	26	Tractor Tiller	10,200,000	Contractor Middleman	no
Maize	2.1	1	48	Tractor	17,500,000	Contractor Middleman	no
Spring onion	2.5	0.16	6	no machine	44,000,000	Market Middleman	no
Spring onion	0.64	0.16	25	Tractor	30,000,000	Market Middleman	no
Banana	27	5	19	Grass cutting machines	72,000,000	Middleman	no

⁴ JICA (2018): ASEAN Economic Community and Lao PDR (in Japanese)

Target Products	Total Farming Area (ha)	Area of Target Product (ha)	Rate of Target Product (%)	Agricultural machinery	Annual Sale of Target Crop (LAK)	Sales Destination	Business other than agriculture
Banana	7.5	0.48	6	Grass cutting machine Tiller	16,800,000	Middleman	no
Sweet corn	2	1	50	Tiller	33,000,000	Market Middleman	Teacher
Sweet corn	1.5	0.32	21	Tiller	15,000,000	Market Middleman	Fisherman
Cabbage	2	1	50	no machine	78,000,000	Middleman at Lao-Thai borders	no
Cabbage	1.5	1	67	Tractors	156,000,000	Middleman at Lao-Thai borders	no
Avocado	124	124	100	Tractors & others	-	for export	Consultant
Avocado	7	4-5 trees in coffee farm (3 ha)	0.1	no machine	5,000,000	In front of the one's house Middleman	Head of village
Ginseng	5	0.32	6	no machine	9,000,000	Market, Middleman	DAFO staff
Ginseng	3.5	0.32	9	no machine	6,000,000	Market, Middleman	Head of village
Cabbage	-	3	-	no machine	148,000,000	Middleman at Lao-Thai borders	Head of village
Cabbage	-	1	-	no machine	74,850,000	Middleman from different provinces	no
Banana	30	25	83	Small truck Grass cutting machine	450,000,000	Middleman in Sekong, in Pakse, at the Thai-Lao Border	no
Banana	20	5	25	Grass cutting machine	100,000,000	Middleman in Sekong, in Pakse, at the Thai-Lao Border	no
Average	7.6 ha	2.8 ha	37 %		79,000,000 LAK		

Source: JICA project team

Table 4.2.3 Sale/ha of Producers Team A interviewed

Province	Producer	Sale/ha	Average Sale/ha
Vientiane Municipality	Spring onion farmer1	280,000,000 LAK	240,000,000 LAK
Vientiane Municipality	Spring onion farmer2	190,000,000 LAK	
Champasak	Cabbage farmer2	156,000,000 LAK	90,000,000 LAK
Champasak	Cabbage farmer1	78,000,000 LAK	
Sekong	Cabbage farmer2	75,000,000 LAK	
Sekong	Cabbage farmer1	49,000,000 LAK	
Champasak	Sweet corn farmer2	47,000,000 LAK	28,000,000 LAK
Champasak	Sweet corn farmer1	33,000,000 LAK	
Vientiane Municipality	Maize farmer2	17,000,000 LAK	
Vientiane	Maize farmer1	16,000,000 LAK	
Sekong	Ginseng farmer1	28,000,000 LAK	24,000,000 LAK
Sekong	Ginseng farmer2	19,000,000 LAK	
Vientiane Municipality	Banana farmer2	35,000,000 LAK	22,000,000 LAK
Sekong	Banana farmer2	20,000,000 LAK	
Sekong	Banana farmer1	18,000,000 LAK	
Vientiane Municipality	Banana farmer1	14,000,000 LAK	

Note) If the farmer's response was two or more, the average value was used.

Source: JICA project team

(2) Overviews of Producers' Crop Farming

Crop producers were sub-classified into 3 categories in this report: vegetable producers, fruit producers, and medicinal herb producers. Their cultivation techniques, field observation, yield and provided technical support are reviewed in Table 4.2.4.

1) Vegetable Producers; cabbage, sweet corn and spring onion including maize (as fodder)

Field survey results

These vegetable producers cultivate their target crops in various ways. Sweet corn is grown in year-round cultivation combined with livestock farming, or with crop rotation with other crops. Maize is cultivated in the rainy season, and a secondary crop is grown in the dry season. Spring onion is mainly cultivated twice a year from October to January (cultivation duration is about 45 days) by the method of single cultivation or intercropping with eggplant or chili. After the single cultivation, some crops are grown as secondary crops. Or eggplant or chili is continuously cultivated. Cabbage was cultivated by farmers in the manner of continuous cropping, crop rotation, or intercropping.

Yields were calculated, and those of sweet corn and cabbages were compared with Japanese data. The yields were roughly 70% of the yield in Japan.

Agricultural products of these crops are often sold to middleman (Table 4.2.2). Spring onion and sweet corn may be also sold on the market by their producers. Cabbage is transported to the Lao-Thai border where it is sold to middleman. Major issues are found not in marketing, but in production.

Issues identified through field surveys

There were found many issues since many cultivation techniques that are quite popular in Japan, were hardly observed.

- Crop rotation is not conducted in many cases. In other cases, it is insufficient rotation with one secondary crop. There is concern that yields have declined. Generally, this production reduction is called “continuous cropping disorder”. To avoid this disorder, crop rotation is highly recommended. Several types of crops chosen from different plant families are combined for the rotation. Sometimes, intercropping or mixed cropping is conducted instead of rotation. It is better than nothing.
- No lime was applied before planting. Without lime, soil may be acidified and become unsuitable for cropping.
- No compost application. Without compost application, soil becomes hard containing less water and air. Crops do not grow well. Of course, the organic matter content also decreases. With compost applications, conversely, soil becomes fluffy contain water and air in it, because aggregate structure of soil is formed by humus which is contained in compost.
- Organic fertilizer is not used often, though it works similarly to compost. Representative organic fertilizer is livestock manure and bokashi fertilizer. No compost application and rare organic fertilizer application imply soil degradation.
- Inappropriate use of chemical pesticides. Chemical pesticides are used by all the 10 producers. However, there is considerable evidence to suggest that pesticide use is inadequate. For example, 1) some of the pesticide bottle did not indicate its Preharvest Interval (PHI), 2) protective equipment for pesticide applicators was never seen in visiting farmers’ houses, 3) one farmer said that he sprayed mixture of pesticides including insecticide to diseased spring onion.
- Diseases are not successfully controlled. Some disease was found on 8 farms out of 10 farms. Especially rotten roots of cabbage farms in Champasak and Sekong Provinces are terrible because of severe symptoms and high incidence rates. The rotten roots of cabbage were not controlled at all.
- Insect damage is not controlled, too. All 10 farmers suffered from insect damage. In one farm, feeding damage by lepidopteran larvae was severe, clearly exceeding the required control level, but no countermeasures were taken.
- Producers have likely difficulties to obtain technical supports, because There are no agricultural experts among acquaintances. Producers answered that PAFO and DAFO extension staff come them, but the staff seems to be giving no advice.

JICA (2012)³ mentioned “The biggest issues surrounding processed vegetables are how to spread vegetable cultivation, which requires advanced management techniques, to a large number of farmers, and how to stably achieve the production scale and quality standards required by the processing business. (Original text in Japanese)”

Ten years have passed since JICA (2012). However, the situation surrounding vegetable production does not appear to have been improved.

2) Fruit Producers; banana and avocado

Field survey results

Banana trees can produce fruit for 8-10 year, and avocado tree can longer than that. So, fruit tree management is different from the ones of vegetables. Nevertheless, common problems with vegetable cultivation were recognized below.

Issues identified through field surveys

- Producers are unlikely to have enough knowledge for fruit tree management. There are some cases. Banana producers and avocado producers, except one avocado producer 1, answered that they did not fertilize. Avocado trees of Avocado farmer 2 in Champasak did not seem to be pruning. A banana farmer in Vientiane Municipality asked us for the optimal number of tillers.
- There is no information on accurate pest diagnosis and appropriate countermeasures. Banana producers were suffering from diseases. Banana producers in Vientiane Municipality and DAFO reported that the disease is prevalent in the target banana variety, Kuwai nam, but the name of the disease and its countermeasure are not known. According to farmers, the symptoms are like the one of Banana bacterial wilt disease. In addition, banana farmers in Sekong Province said to have a disease like Panama disease in about 10% of banana strains. They are waiting for diagnosis and how to control it. According to the manager of a large-scale avocado farm, the disease is quickly diagnosed and measures taken through an international network. It shows how important it is to create a system for diagnosis and countermeasures.

3) Medicinal Herb Producers; ginseng

Field survey results

How Lao ginseng had been cultivated in Dakjueng District are unknown, but according to interviews with farmers, it happened that Vietnamese people recently (10-20 years ago, depending on interviewees) told "This plant is medicinal." So, it has not been a traditional folk medicine in Dakjueng.

Lao ginsengs are cultivated in mountainous area. Its seedlings are prepared in the first year. The vines are laid on the ground and covered here and there with soil, from which roots form, and then young taproots grow. These are transplanted as seedlings in the next year.

Issues identified through field surveys

Ginseng growers have a unique problem.

- Lao ginseng plant has not been identified. This plant is a vine, but neither Korean ginseng (*Panax ginseng*) nor Chinese ginseng (*Panax notoginseng*) are vines. Therefore, Lao ginseng is not Korean or Chinese ginseng. The scientific name of the plant is unknown at present. The information on its active ingredient, if any, is also unknown.

Table 4.2.4 Issues-related to Soil Preparation and Cultivation of 9 Target Crops

Producer	Province	Crop rotation	Intercropping/ Mixed cropping	Lime application	Compost application	Organic fertilizer	Chemical Fertilizer	Chemical Pesticides	Chemical herbicide	Cultivation-related Issues observed by Project Team	Disease observed	Insects observed	Yield	Reference*** of yield in Japan	Expert around famer	Frequency of PAFO/DAFO coming
Vegetables including Maize																
Maize Farmer1	Vientiane Municipality	Yam bean	No	No	No	No	sometimes no	yes	yes	more than 2 seeds per point	No	army worm corn borer	6.3 t/ha	-	No	Some times
Maize Farmer2	Vientiane Municipality	Yam bean or Soybean	No	No	No	No	Yes	Yes	Yes	more than 2 seeds per point	No	army worm corn borer	7.0 t/ha	-	No	Some times
Spring onion Farmer1	Vientiane Municipality	No	Eggplant or Chili	No	No	Yes	Yes	Yes	No	-	Yes, yellow leave. Similar to damping-off	armyworm, Aphids	9t/ha	-	No	Some time
Spring onion Farmer2	Vientiane Municipality	Eggplant or Chili	Coriander	No	No	Yes	Yes	Yes	No	-	Yes, yellow leave. Similar to damping-off	armyworm, Aphids	9t/ha	-	No	Some time
Sweet corn famer1	Champasak	No	No	No	No	Yes	Yes	Yes	No	-	Yes, yellow leave Similar to corn rust.	corn borer	7.2t/ha	10.5 t/ha	No	Once a week
Sweetcorn farmer2	Champasak	No	Yam bean and Cucumber	No	No	No	Yes	Yes	No	more than 2 seeds per point	Yes, yellow leave Similar to corn rust.	corn borer	7.5 t/ha	10.5 t/ha	No	Once a week
Cabbage farmer1	Champasak	No	coffee	No	No	No	Yes	Yes	Yes	Uneven soil surface	Yes, root rotten	butterfly worms	30t/ha	42.20 t/ha	No	Not very often
Cabbage farmer2	Champasak	No	No	No	No	No	Yes	Yes	No*	Continuous cropping	Yes, root rotten	butterfly worms	35-40t/ha**	42.20 t/ha	No	Not very often
Cabbage farmer1	Sekong	Eggplant	No	-	No	No	Yes	Yes	No	-	Yes, root rotten.	butterfly worms	41.6t/ha**	42.20 t/ha	No	2-3 times a month
Cabbage farmer2	Sekong	Chinese cabbage	No	No	No	No	Yes	Yes	No	-	Yes, root rotten.	butterfly worms	36-42t/ha**	42.20 t/ha	No	2-3 times a month
Fruits																
Banana farmer1	Vientiane Municipality	-	Rubber	-	No	No	No	No	No	-	Yes, similar to Banana bacterial wilt	butterfly worms	21t/ha	-	No	Some time
Banana farmer2	Vientiane Municipality	-	No	-	No	No	No	No	No	No weeding. How to remove buds from the base of a banana tree is not known.	Yes, similar to Banana bacterial wilt	butterfly worms	20t/ha	-	No	Some time
Banana farmer1	Sekong	-	No	No	No	No	No	No	No	-	Yes. Similar to Panama disease	butterfly worms	12 t/ha	-	No	Once a month
Banana farmer2	Sekong	-	No	-	No	No	No	No	No	-	Yes. Similar to Panama disease	butterfly worms	12 t/ha	-	No	Once a month
Avocado farmer1	Champasak	-	No	-	No	-	-	-	-	-	Yes, Died by phytophthora infestans. Spots by cercospora spp.		-	-	Yes, International network	
Avocado farmer2	Champasak	-	coffee	-	No	No	No	No	No	Pruning seems necessary.	Yes, leaves spots	worm	200kg/plant	-	No	Never
Medicinal Crop																
Ginseng farmer1	Sekong	No	Coffee, Brassica, Chile, Cucumber, Sweet corn	No	No	No	No	No	No	Vine plant	Yes, root rotten.	No	1 t/ha	-	No	Some times
Ginseng farmer2	Sekong	No	Coffee	-	No	No	No	No	No	Vine plant	Yes, root rotten.	No	0.8 t/ha	-	No	Some times

*: Farmer said that he would not show pesticide bottles to JICA Experts., **: Judging from the growing conditions in the field and the damage caused by diseases, the yield is considered to be lower., ***: Cited from Statistics of Cabbage Production in 2020, compiled by MAFF in Japan
Source: JICA project team

4.2.3 Current Status of Processors

There were 9 processors interviewed below in Table 4.2.5.

Field survey results

All of them, except Inochio K.P Lao, were classified into primary processing since their major processing techniques are packaging, polishing, chopping, and drying. Sweet potato processing by Inochio is classified as modern technique.

All processors which have vegetable production sections or are closely related to vegetable growers have issues on vegetable production.

Most of the processors, especially the ones focusing on export, such as, Lao Farmers Products Co., Ltd, XP Trading Lao-Chine Co., Ltd. and Mekong Joint Venture Co., Ltd., are recently affected by COVID-19 pandemic and weaker LAK currency.

Two Lao ginseng processors in Sekong Province have recently started business, and still trying to develop customers by distributing free samples.

Table 4.2.5 Processors Interviewed

Name	Province	Processing type*	Main Activities of the Group
DMX Lao PDR Organics	Vientiane Municipality	Primary processing	Purchases organic crops, packages them in small quantities, and sells them at retail stores such as convenience stores.
Lao Farmers Products Co., Ltd	Vientiane Municipality	Primary processing	Processes and sells organic products with organic certifications; organic rice, organic black tea, Oolong tea, green tea
XP Trading Lao-Chine Co., Ltd	Vientiane Municipality	Primary processing	Livestock fattening, and meat processing.
Dao Fruit Processing	Champasak	Primary processing	Grows Jack fruit and purchases other fruits to produce dried fruit product.
First Foods Sole Co. Ltd.	Champasak	Primary processing	Products and exports dried vegetables for instant noodle and instant soup. Some dried fruits and tea are for domestic market.
Ginseng Processor 1	Sekong	Primary processing	Processing of Ginseng.
Ginseng Processor 2	Sekong	Primary processing	Processing of Ginseng.
Inochio K.P Lao	Sekong	Mordam processing	Cultivation of sweet potato, butterfly pea and black ginger, and processing of those crops.
Mekong Joint Venture Co., Ltd	Sekong	Primary processing	Cultivation of sugarcane and production of organic sugar.

*: Definition by JICA (2012)

(1) primary processing (primary processing of agricultural products such as polished rice),

(2) traditional processing (traditional preserved food processing such as fermented fish seasoning),

(3) modern processing (seasonings and heat-treated foods processed for long-term storage and long-distance transportation, such as bottled and canned foods)

Source: JICA project team

Issues identified and lessons through field surveys

- **Farmers do not know how to grow new unknown vegetables and how to grow high-quality vegetables.** DMX Lao PDR Organics, an organic vegetable retailer, said. The company needs a wide variety of high-quality vegetables, but farmers do not pay attention to variety and quality. This is understandable because Lao agriculture has been self-sufficient until recently. However, it suggests that the problem is deep and big.
- **Lesson: diagnosis is the starting point in pest management.** First Foods Sole Co., Ltd was in the midst of many problems in cultivation. They did not understand the nature of the problem. We FVC project pointed out a few possible causes, such as acidic soil, which promoted the company to make its own diagnosis and countermeasures. Inochio K.P Lao has already identified causative pests and developed countermeasures. These cases tell a lesson that appropriate countermeasures can only be taken after daily observation of the farm and accurate diagnosis of abnormalities.
- **Labels on processed ginseng products look mislabeled.** The product bottles of the two Sekong processor companies have pictures of a plant. It is not a vine plant, but very similar to Korean or Chinese ginsengs. Those pictures are labels that mislead consumers.

4.2.4 Survey results on additional Producers and Processors

FVC Project also surveyed additional producers and processors aside from the target crops. Issues are briefly listed.

Table 4.2.6 Issues-related to Raw Material Production, Mentioned by the Processors

Producer/Processor	Actor	Location
Producer	Cattle Breeding	Paksong Dist., Champasak Province
	Fish Farming	Mr. Khamphoun, Pakse Dist. Champasak Province
Processor	Slaughterhouse	Phonthong Dist. Champasak Province
	Slaughterhouse	Lamam Dist. Sekong Province
	Padek Producer	Pakse Dist. Champasak Province
	Sisouphan Maize Processing Factory	Saendin Village, Naxaythong Dist. Vientiane Capital

Source: JICA project team

Major issues identified through field surveys

- Despite market needs, the number of cattle raised in Lao PDR has been declining due to low levels of breeding and fattening technology.
- Number of pigs slaughtered by local slaughterhouse is decreasing due to monopolized livestock market by large scale company.
- Price of raw materials for fish processing is increasing.

4.2.5 Key Findings on Producers

The basics of cultivation of crops including vegetables, fruits and medicinal herbs is simple and composed of sowing, watering, fertilizing and harvesting. Also, crops are always at high risk of damages caused by diseases, insects, weeds, and environment (such as, soil, temperature, rain and others). Producers must monitor spread and degree of the damages, and take measures to minimize them by combining various countermeasures. Various techniques are used for the integrated control. So, the

integrated control consists of 3 parts; 1) Basic cultivation, 2) Monitoring to survey any risks, and 3) Various measures to get rid of those risks.

Basic crop cultivation skill: Most of producers looked having the skill in our survey of producers. One exception was a banana producer in Vientiane Municipality, who asked how to transplant a young banana bud. However, another issue was revealed through survey of processors. The interview with on DMX Lao PDR Organics, vegetable processor, revealed that farmers do not know how to grow new unknown vegetables and how to grow high-quality vegetables. Crop producers need cultivation guidance, and also, we would like to expect that farmers will voluntarily come up with new cultivation methods.

Monitoring skill: None of producers have enough skill to diagnose diseases, insects, weeds and others as well as monitoring tools such as loupe, pH meter, and EC meter. Sometimes they noticed a disease but no idea of its control.

Skills of various measures: None of producers have enough knowledge of each measure and also how to integrate them.

Major findings on production are summarized below.

Table 4.2.7 Findings on Production

	Findings
Techniques	✓ Lack of knowledge and techniques for basic crop cultivation on; - how to grow new unknown vegetables - how to grow high-quality vegetables. ✓ Lack of knowledge for crop monitoring on; - Disease diagnosis and control - Insect diagnosis and control - Weed control - Nutrient deficiency - Others ✓ Lack of knowledge for measures for crop protection on; - Soil preparation for soil aggregate structure and soil neutralization - Nutrient deficiency symptoms - Imbalance of fertilizer components - Diseases control - Insects control - Weeds control - Correct use of pesticides (type, timing and amount) ✓ Low level of cattle breeding and fattening technology.
Human Resources	-
Infrastructure/Material	-
Finance	-
Information	✓ Insufficient knowledge for farm management (accounting, cropping pattern arrangement, group management etc.)
Linkage with FVC	✓ PAFO/DAFO extension staff do not guide farmers properly, especially on crop cultivation, and pest and disease control ✓ Quality and quantity of agricultural products is not meet the market demand ✓ Low negotiation power to middlemen

Source: JICA project team

4.2.6 Key Finding on Processors

Key findings on processing are summarized below.

Table 4.2.8 Findings on Processing

	Findings
Techniques	✓ Instructing farmers to follow cultivation methods for matching demanded quality of processors is challenging.
Human Resources	✓ Capacity is limited for pesticide residual testing of soil or crops that meets GAP standards
Infrastructure/Material	✓ Number of swine slaughtered by local slaughterhouse is decreasing due to monopolized livestock market by large scale company. ✓ Sudden electricity failure of processing factory occurs. ✓ Raw fish for processing is facing shortage.
Finance	✓ Price of raw materials for processing is increasing.
Information	✓ Medicinal effect and ingredients of Ginseng are not confirmed ✓ Labelling of ingredients in processed Lao ginseng products is incorrect.
Linkage with FVC	✓ Crop production for processing has many issues on quality and quantity caused by pest and diseases etc.

Source: JICA project team

4.3 Agricultural Cooperative and Farmers' Group

4.3.1 Current Status of Agricultural Cooperative and Farmers' Group in Lao PDR

(1) Differences between Agricultural Cooperative and Farmers' Group

As of October 2022, 'Decree on Groups and Cooperative (MAF, 2020)', updated by MAF and supported by the German Cooperative and Raiffeisen Confederation (DGRV), is basically applied for farmers' group and agricultural cooperative establishment system in Lao PDR. Based on this decree, the PAFOs, DAFOs and various projects of development partners have been making efforts to form an agricultural organization.

The main differences between farmers' groups and agricultural cooperatives are listed below. Agricultural cooperatives have more privileges compared to farmers' groups.

Table 4.3.1 Main Differences between Farmers' Group and Agricultural Cooperative

Item	Farmers' group	Agricultural cooperative
Minimum Constituent Unit	5 households	7 households
Registration	Simple application is required to submit (detailed information described later).	Required to submit the business plan and the certification of the location of cooperative offices.
Borrowing money from bank	Harder to borrow than agricultural cooperative	Available
Land Tax Exemptions	Not available	Available
Use of government-owned land	Not available	Available

Source: JICA project team

The process of establishment of agricultural cooperative and farmers' group is as follows. There is not so many differences in the process between farmers' group and agricultural cooperative.

Step1: Farmers discuss group/cooperative formulation

- 5 households are needed for group formulation, and 7 for the cooperative. Among these, 2-3

people are selected as representatives / coordinators to further procedure with DAFO staff.

Step2: Farmers prepare necessary documents

- The required documents, such as Workplans (Five-year plans), Business plans (For cooperatives only) and Rules etc., are prepared with the support of DAFO.

Step3 Meeting is held for electing the management committee and preparing the group/cooperative formulation application

- The meeting needs to be held, which all members are required to attend. This meeting passes group/cooperative rules, responsibility demarcation, Workplan, and Business Plan. Also, the management committee and inspection committee are elected.

Step4: DAFO examines and issue an approval letter

- The application is finalized and submitted to DAFO for examination.

Step5: DICO examines the registration of the group/cooperative

- Within 15 days after DAFO's approval, selected representatives submit the application to District industry and commerce office (DICO) for registration of cooperative. In the case of farmers' group, representatives apply for approval only.
- If the cooperative involves more than one district, the application should be submitted to Provincial industry and commerce office (PICO) instead.

Although the process of establishment is almost the same, the content of the application is different. The items required to apply for registration to establish farmers' group and agricultural cooperative are listed below.

Table 4.3.2 Application for Establishment of Farmers' Group and Agricultural Cooperative

No	Farmers' group	Agricultural cooperative
1	Application for establishing a group according to the standard form issued by the relevant authority	Application for establishing a cooperative according to the standard form issued by the relevant authority
2	List of group members and curriculum vitae of group executive committee	List of members and signature of each member, number of shares and registered capital of the cooperative
3	Minutes of the group establishment meeting	Cooperative's business plan
4	Group's organizational chart	Certificate of the location of cooperative's office
5	Group's articles of association	Cooperative's articles of association
6	Group's operational plan	-

Source: Decree on Groups and Cooperatives (DGRV, 2020)

Agricultural cooperative is required to prepare business plan for registration. As an example, the simple business plan submitted by Thongmang organic farming cooperative is shown in next table.

Table 4.3.3 Simple Business Plan of Thongmang Organic Farming Cooperative (2020)

No	Activity	2020			2021	2022	Estimate Budget (Million LAK)
		10	11	12			
1	Extension more 100 green houses						500
2	Rehabilitate AC office						20
3	Improve AC shop						20
4	Improve production packing unit and cool store						30
5	Create credit business						200
6	Create business service shop						61
7	Create mechanical service business						7.2
8	Create business collecting products from member						180
9	Conduct training for AC management						
10	Conduct training for financial and accounting						
11	Conduct the training on production technique						
12	Training on marketing						
13	Create credit business						110
14	Study tour and exchange experience						

Note: AC (Agricultural Cooperative)

Source: JICA project team based on the interview with Thongmang agricultural cooperatives through the joint field survey

Preparation of funds for each activity and development of reasonable business plan are difficulties for farmers to establish an agricultural cooperative. As for the activities No. 9-12 and 14, where estimate budget is left blank (ex. Conduct training for AC management), it is assumed that individual farmers will cover the costs.

(2) Current Status of Agricultural Cooperative & Farmers' Group

The number of agricultural cooperative and farmers' group in Lao PDR approved by government based on abovementioned procedure is shown in Table 4.3.4.

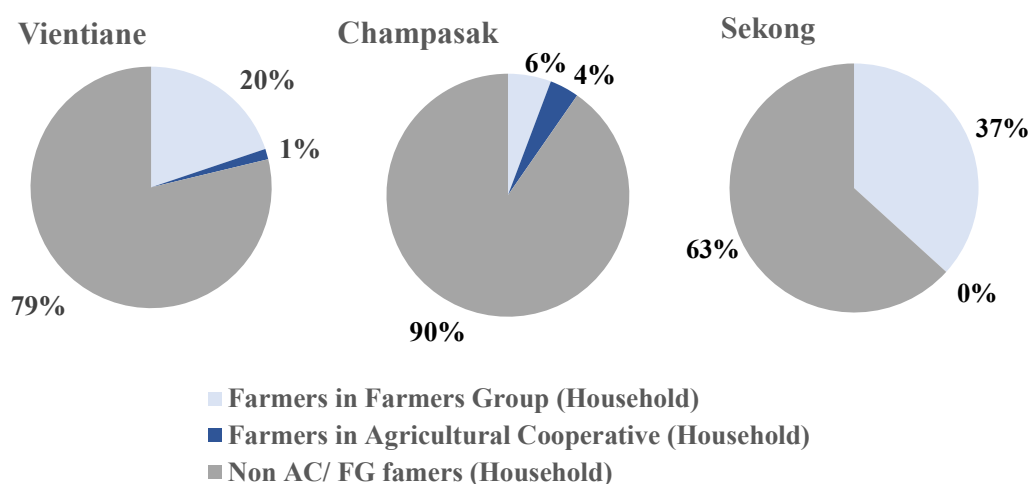
The number of farmers comprising the agricultural organization differs, depending on each agricultural cooperative and farmers' group. Agricultural cooperatives (50~150 households) generally have more members per organization than farmers' group (10~30 households), though there is a fish raising cooperative (Vientiane Capital) made up of minimum constituent number of member (7 households) or large farmers' groups with more than 100 households.

Table 4.3.4 Number of Agricultural Cooperative and Farmers' Group in 2020

District	Agricultural cooperative		Farmers' group	
	Number	Household	Number	Household
Vientiane Capital	4	281	131	4,052
Champasak Province	12	2,288	113	3,347
Sekong Province	0	0	278	5,258

Source: JICA project team based on "Stakeholder analysis of agricultural cooperative in Laos: Current status and ways forwards" (NAFRI, 2022)

The percentage of farmers belonging to farmers' groups and agricultural cooperatives in the target area is summarized in the chart below.



Note: AC (Agricultural cooperative), FG (Farmers' Group)

Source: JICA project team based on "Stakeholder analysis of agricultural cooperative in Laos: Current status and ways forwards" (NAFRI, 2022)

Figure 4.3.1 Percentage of Agricultural Cooperatives and Farmers' Group in 2020

The percentage of farmers belonging to farmers' groups and agricultural cooperatives are about 10-40% in the target area. The largest percentage of farmer belonging to farmers' groups is in Sekong (37%). This is because farmers in this province are targeted by the projects funded by various development partners (ADB, USDA, WB, JICA etc.).

On the other hand, the percentage of agricultural cooperatives is low in all the provinces (0-4%). One factor is the difficulty for farmers to prepare funds and develop a reasonable business plan.

4.3.2 Results of the Joint Field Survey on Farmers' Group and Agricultural Cooperative

The joint field survey on farmers' group and agricultural cooperative was conducted to gather information on the current situation, in particular the benefits to be obtained from organising.

(1) Key Results of the Joint Field Survey on Farmers' Group

Key results of the joint field survey on farmers' group are listed in next table.

Table 4.3.5 Survey Results of Vegetable Production Farmers' Group in Vientiane Capital

Item	Results
Joint Purchase	✓ There is no joint purchase system for seed, fertilizer, machinery.
Joint Sales	✓ There is no joint sales system for crops.
Machinery and Facility Sharing	✓ Basically, farmers use their own machinery and facility. ✓ Farmers pay a fee (100,000 LAK/Rai (0.16 ha)) and rent small tractor from one of the members.
Technical Sharing	✓ Farmers are sharing the techniques and information through monthly meeting. The techniques and information shared in groups include crop cultivation techniques, application of fertilizer, land preparation for improving soil condition.
Finance	✓ There is no financial system. ✓ Preparation funds is not included in the requirements for establishment of farmers' group. However, the position/organizational structure must incorporate a treasurer, with a view to collecting money in the future.

Source: JICA project team

Table 4.3.6 Survey Results of Vegetable Production Farmers' Group in Champasak Province

Item	Results
Joint Purchase	✓ There is no joint purchase system for seed, fertilizer, machinery.
Joint Sales	✓ There is no joint sales system for crops.
Machinery and Facility Sharing	✓ Basically, farmers use their own machinery and facility. They are sharing the small machinery supported by donors such as grass cutter, two wheels tractor. ✓ Farmers pay a fee (3,000,000 LAK/ha) and rent tractor from one of the members.
Technical Sharing	✓ Farmers are sharing the techniques and information through monthly meeting. The techniques and information shared in groups include seedling, planting, utilizing fertilizer, crop rotation, marketing. ✓ Farmers provide training when new member join. ✓ The original source of techniques and information come from DAFO and donors ✓ Farmers have been growing 4 varieties crops in 2 families (ex. cabbage (Brassicaceae crops), Chinese cabbage (Brassicaceae crops), chili (Solanaceae crops), eggplant (Solanaceae crops)) for crop rotation, resulting in disease outbreaks in their field.
Finance	✓ Farmers collect joining fees (100,000 LAK) and monthly fees (10,000 LAK) and use them as funds ✓ Funds are mainly used to borrow money to purchase agricultural inputs by members. The interest rate is 2%/month.

Source: JICA project team

Among the farmers' groups interviewed in the survey, farmers don't receive the benefits come with being organized (Joint Purchase/Sales). And the sharing of machinery and facility is limited.

Establishment of farmers' group has been based on the support of development partners and government official. It would be ideal if farmers themselves are aware of the benefits and form farmers' group on their own initiative.

(2) Key Results of the Joint Field Survey on Agricultural Cooperative

Key results of the joint field survey on agricultural cooperative are listed below.

Table 4.3.7 Survey Results of Organic Vegetable Production Cooperative in Vientiane Capital

Item	Results
Joint Purchase	✓ They are adopting joint purchase system for agricultural inputs such as seed and fertilizer etc. Cooperative sells these materials at lower price to members.
Joint Sales	✓ They are adopting joint sales system. Cooperative decide the buying price from farmers based on the production cost including marketing, staff salary and transportation. ✓ The profit is distributed to member appropriately based on the amount of the collected products.
Machinery and Facility Sharing	✓ Basically, farmers use their own machinery and facility. ✓ Farmers are sharing irrigation facility, and electricity fee for irrigation is paid by members appropriately based on each members' cultivated areas.
Technical Sharing	✓ Farmers are sharing the techniques and information through monthly meeting (especially crop cultivation and marketing).
Finance	✓ This cooperative is not financed by commercial bank due to high interest rate (12%/year). Farmers borrow money individually from Lao Fran Bank (12%/year). ✓ Other cooperative in Vientiane Capital is financed by Banque Franco Lao (6%/year)

Source: JICA project team

Table 4.3.8 Survey Results of Vegetable Production Cooperative in Champasak Province

Item	Results
Joint Purchase	✓ There is no joint purchase system for seed, fertilizer, machinery.
Joint Sales	✓ The head of the cooperative collects the crops and transports them to the market. ✓ Joint sales reduce transportation costs and ensures stable crop supplying.
Machinery and Facility Sharing	✓ Basically, farmers use their own machinery and facility. ✓ Farmer are sharing the small machinery supported by donors such as grass cutter. ✓ Farmers pay a fee (6,000,000 LAK/ha (first time), 3,500,000 LAK/ha (second time)) and rent tractor from another group's farmer.
Technical Sharing	✓ Farmers are sharing the techniques and information through monthly meeting. ✓ The techniques and information shared in groups include seedling, planting, utilizing fertilizer, marketing.
Finance	✓ Farmers collect joining fees (100,000LAK) and monthly fees (10,000 LAK) and use them as funds ✓ Funds are mainly used to borrow money and to purchase agricultural inputs by members. The interest rate is 3%/month

Source: JICA project team

Compared with farmers' group, agricultural cooperative has some advantages: (i) cooperative can borrow money from banks more easily than farmers' group since their social reputation is higher, (ii) cooperative can be entitled to land tax exemptions, (iii) cooperative can cultivate on government-owned land, and (iv) joint purchase/sales are more common practice than in farmers group.

However, in order to establish cooperative and get certificate from government, a lot of funds are required, and it is still challenging for farmers in Lao PDR. Therefore, cooperatives are basically established with support from development partners or state agencies. At present, the main benefits are the sharing of equipment from development partners/government (agricultural houses, machinery) and joint sales system for reducing transportation costs.

4.3.3 Findings on Agricultural Cooperative and Farmers' Group

The findings on agricultural cooperative and farmers' group on the FVC of Lao PDR based on the current situation described above are summarized in the table below.

Table 4.3.9 Findings on Agricultural Cooperative and Farmers' Group

	Findings
Techniques	✓ Farmers are sharing the agricultural techniques through meeting. ✓ The technical knowledge of crop rotation and marketing etc. are limited.
Human Resources	✓ Human resources for management of farmers' groups and agricultural cooperatives are limited.
Infrastructure/Material	✓ Agricultural cooperatives require the establishment and certification of a cooperative office.
Finance	✓ Borrowing money from banks is limited for farmers' groups. ✓ Financial capacity and usage of funds in operations are limited.
Information	✓ There are references such as handbook for establishment of farmers' organization. ✓ Those materials are not published online.
Linkage with FVC	✓ Farmers are responsible for the stable supply and adequate distribution of crops. ✓ However, the planned distribution of crops through joint sales is limited.

Source: JICA project team

4.4 Distribution and Retail

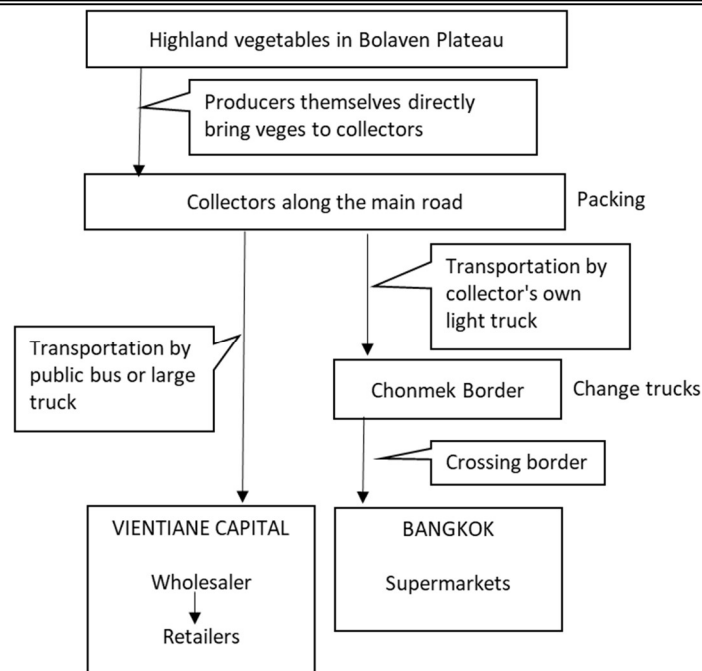
4.4.1 Middleman and Collector

(1) Development of Commercial Agricultural Production and Distribution Channel

Until recently, Laos had been basically practicing self-sufficient agricultural production with a few exceptions. However, for the past 20 years, there has been a major shift from subsistence agriculture to commercial agricultural production. Along with commercial agricultural production, the number of distributors such as middlemen and collectors increased, and a system for distributing harvested agricultural products has been gradually shaped and established.

Development of highland vegetable distribution channel in Bolaven Plateau:

Highland vegetables such as cabbage and Chinese cabbage on the Bolaven Plateau are mass-produced and engaged by relatively stable stakeholders such as producers, collectors, and distributors to transport fixed routes over a relatively long period of time.



Source: JICA project team

Figure 4.4.1 Bolaven Highland Vegetable Distribution Channel

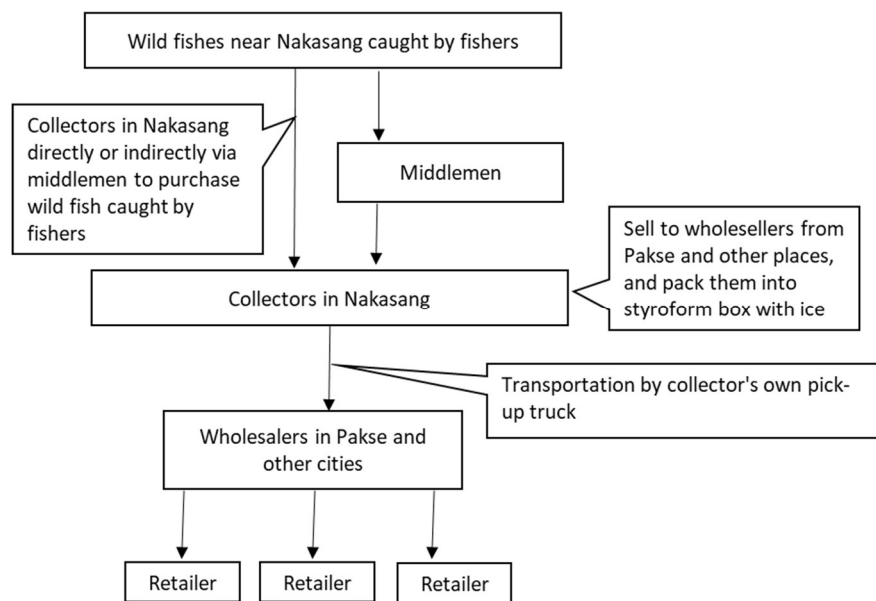
Therefore, efficiently functioning distribution channels have been established and maintained. Harvested vegetables are put on light trucks owned by farmers and transported to collectors along the main road. The collectors pack it into plastic bags of a certain weight for each crop. For markets in Vientiane Capital and cities along the National Road No.13, it is transported on trucks and public buses. For export, the highland crops are transported to Chonmek on the border with Thailand by small trucks owned by collectors. The vegetables for export are transshipped to large trucks near the Chonmek border to cross the border, and transported to big cities in Thailand such as Bangkok.

No pesticide residue testing is conducted. In the figure above, vegetables from Bolaven are exported to Thailand, but not through completely official channels. These vegetables are shipped to Thailand with only an export quarantine certificate from the Lao government and are limited to traditional markets in Thailand. They are not shipped to formal markets such as supermarkets. To ship to formal markets, Thailand requires that the production sources be farms that have acquired Global GAP certification. The sweet potatoes produced by Inochio K.P. Lao Co., Ltd. on the Bolaven Plateau are exported to Thailand with a certificate indicating they are from Global GAP certified farms.

Development of wild fish distribution channel in Champasak Province:

Nakasang (Khong District, Champasak Province) is located near the lowest point of the Mekong River in Lao PDR and the base town for Sipandon or the Four Thousand Islands. The Mekong River around Nakasang has long been home to a wide variety of wild fish, and the fishing industry has flourished. The caught wild fish are purchased from fisherman and middlemen in and around Nakasang by collectors. Collectors sell to the wholesalers of wild fish from the cities such as Pakse and Vientiane. The fishes purchased by the wholesalers are packed in styrofoam boxes with ice, and transported by

trucks and public buses. Surplus of the caught fish is processed into dried fish for a long period.



Source: JICA project team

Figure 4.4.2 Nakasang Wild Fish Distribution Channel

(2) Price Control on Agricultural Products by Middlemen and Collectors

The main problem regarding middlemen and collectors in Laos is that the consumer price of agricultural products tends to be high due to the large number of middlemen and collectors involved is complex between producers and consumers. In addition, middlemen and collectors have a strong connection with each other, so that they can closely communicate to determine prices, that is, to buy low prices from producers, and to sell high prices to consumers.

Price control on highland vegetable purchase in Bolaven Plateau:

The distribution of highland vegetables from the Bolaven Plateau is a typical example. Collectors engaging in the Bolaven highland vegetables in the same area constantly communicate one another and adjust the purchase price from farmers in order to maximize their own profits. Many producers know the wholesale and selling prices in Pakse through relatives and other friends living there by mobile phone. However, even if the producers know collectors' suggested price is disadvantageous, they need to sell the harvested vegetables, or the fresh vegetables will soon get rotten.

Farmers should counter the middlemen's price control by strengthening their voice through organization such as Agricultural Cooperatives (AC) and Farmers Production Groups (FPG). The government should also conduct monitoring and price guidance so that middlemen would not take excessive profits, give appropriate profits to producers, and provide consumers with cheap agricultural products.

Price control on meats sales:

Large consumers such as restaurant chains also face similar price issues forced by middlemen and collectors. Some middlemen with large refrigerating facility purchase meat from all sources including

CP Laos, a subsidiary of the Thai agribusiness conglomerate. The middlemen store the purchased pork and chicken in the refrigerating facility, and sell them at high price. Even if a large meat consumer tries to procure meat from another smaller middleman, the smaller middleman will not sell it for fear of trouble with the large middlemen. In this way, some middlemen control the supply of meat, and even large restaurant chains are forced to buy meat at high price.

Market operator's intervention in price control:

In order to solve the problem of price control by middlemen, a large market operator in Vientiane Capital provides low-interest loans through microfinance to middlemen who purchase agricultural products at high prices from producers and sell them at low prices to consumers in order to encourage such conscientious middlemen to buy necessary equipment and vehicles.

(3) Temperature Control of Agricultural Products during Transportation

Losses during transportation are relatively large in Laos because of the insufficient cold storage and refrigerator car for distribution and inadequate temperature control during transportation, as well as poor management of some road conditions. The field survey reveals that many of the national and provincial roads are relatively well developed and managed while market access via the other rural roads is not so good.

Reduction of transportation cost and its impact on temperature control:

In Laos, it is necessary to reduce the distribution cost of vegetables, so there is no choice but to transport at outside temperature by using public buses and normal trucks. Thus, the period that products can be sold on market shelves in Laos is considerably shorter than in neighboring countries. DMX, the largest vegetable consignment company in Laos, claims that average saleable period of vegetables on supermarket shelves is normally for 7 – 14 days but reduces in Laos for 5 – 7 days. According to DMX, exposure to hot temperatures during transportation and packing processes is the main reason for reducing the saleable period in Laos.

Adoption of temperature control with low cost and moderate effect:

Highland vegetables harvested in the Bolaven Plateau are transported to Vientiane and many other cities in the central and southern provinces by public buses in order to reduce the transportation costs. In order to reduce loss during transportation, Japanese seeds that can withstand long-distance transportation under high temperature have been introduced for some vegetables such as cabbage. Some vegetables sold in the markets in Vientiane Capital are transported in a styrofoam box in order to control temperature to some extent at low cost. Laotian consumers are sensitive to vegetable prices and low-cost technologies with moderate heat countermeasures are required.

(4) Quantitative Issue in Handling of Agricultural Products

Small and unstable production for some crops in Laos:

Middlemen and collectors often face the problem of low and unstable availability of crops they are

handling in Laos. One of the reasons is due to low population density and relatively small production scale for many crops. Other reasons include the reduction of production area due to conversion to other profitable crops and the spread of diseases and pests. In recent years, the planted area has decreased due to soaring input prices such as gasoline and fertilizer. In addition, deterioration of the natural environment is reducing the number of wild animals.

Fruits production in Champasak and Sekong:

Avocado and durian in Champasak Province and banana in Sekong Province, which are target FVC survey fruits in each province, are produced in small quantities in the gardens and corners of their fields, except for a few large plantations. The harvested amount of these fruits does not meet even local demand. The value chain is very short, with such a small number of products being collected and sold in small quantities on the roadside from Pakse to Paksong and in small markets within the district. Banana in Sekong Province and Sangthong District of Vientiane Capital were previously produced in large quantities, but the banana plantations have been converted to cassava fields due to the spread of banana disease and the recent cassava boom.

Regarding the problem of the spread of banana disease, PAFO and DAFO have not yet correctly diagnosed the disease to provide guidance to farmers. It is hoped that the problem in terms of dissemination activities related to production will be resolved. PAFO and DAFO need to be strengthened in their capacity to diagnose pests of vegetables and fruits within their jurisdiction and advise farmers.

Wild Fish in Champasack:

The collectors of wild fish along the Mekong River near Nakasang are also facing the similar problem. Wild fish populations in the area have plummeted due to widely using electric fishing methods and unnatural water level fluctuations after the construction of a hydroelectric dam on the lower Mekong River near Nakasang. Compared with several years ago, the volume of caught fishes around Nakasang is reported to have decreased to about one-third of the previous level. At present, catchment of wild fish cannot meet demand even from the local market. Wholesale prices of wild fish have risen significantly due to lower catches and soaring prices for gasoline used in fishing vessels and transportation of the caught fishes.

Recent inflation and its impact on agricultural production:

Recently, the production and handling volume of highland vegetables such as cabbage and Chinese cabbage in Bolaven Plateau is decreasing due to the recent surge in gasoline, seed and fertilizer prices. Collectors of these vegetables in Bolaven plateau consider this recent tendency as a major issue in their business.

4.4.2 Traditional Markets

(1) Economic Development and Traditional Fresh Markets

Transition of traditional markets in Vientiane Capital:

In Vientiane Capital, Khuadin and Sikhai markets used to be the two major fresh markets, where vegetables were gathered from the north and south through National Road No. 13. However, these two markets were located at city-center with heavy traffics and had been gradually getting unsuitable for many trucks with a lot of agricultural products to unload beside these markets. The government had been trying to encourage wholesalers and retailers in these markets to relocate to other new markets at a little farther from the city center.

Relocation of wholesalers and retailers in the city center to new markets in the surrounding areas:

At present, there are three large fresh markets, Aussie, and Beung Thatluang, Talad Lao, with wholesale and retail stores in Vientiane Capital. Among these three markets, Aussie market is the oldest one with officially opened in February 2010. When the Aussie market opened, Khuadin market had been getting too small due to the development of the surrounding area, so the wholesalers and retailers of Khuadin market were relocated to Aussie Market. At the opening period of the market, about half of the wholesalers and retailers in the Aussie market were the shops moved from the Khuadin market.

Competition for wholesalers and retailers among newly opened traditional markets:

Beung Thatluang and Talad Lao are relatively new markets. Beung Thatluang market was currently managed by 3DS, a Lao company and officially opened in April 2021. The management company of Beung Thatluang market encouraged wholesalers and retailers to relocate from other markets by incentives such as free parking, electricity, water charges. Since Khuadin market closed in June 2021, many wholesalers and retailers moved to Bun Thatluang market. In January 2022, Talaad Lao market was opened and promoted the wholesalers and retailers to relocate from other markets by various similar incentives. To counter this, the Beung Thatluang market handed out consumers coupons worth 2-3 million kip which can be used for shopping at the market at the company's own expense. These promotions of competing for obtaining wholesalers and retailers are heavy burden for both market operators and may not be sustainable.

Transition of traditional markets in Pakse City:

Pakse city is the largest town in southern Laos alongside with Savannakhet city. In the past, the market located near the wharf for boats at the mouth of Xe Don River was the center of fresh food trade in the city. In 2000, the Lao-Nippon Bridge was completed at about 2 kilometers downstream along Mekong River from old quarter of the city. Dao Heuang Market was built near the bridge and soon became the city's largest fresh food market. 20 years after then, the area around Dao Heuang Market have been urbanized and became one of the busiest areas in the city. Vehicles related to the market such as trucks carrying agricultural products to the market and passenger cars of shoppers are causing traffic congestion in the surrounding area.

New demand for high-quality products in rural areas of Sekong Province:

In Sekong Province, Thataeng Market in Thataeng District, and the Sekong Market in Sekong City are located at the starting points of other provinces and districts, and although the sizes of these markets are

small, there are shops that wholesale agricultural products from Pakse City and Paksong. These shops also sell vegetables, meat and fish at wholesale prices to mining companies and hydroelectric power plants in Kaleum and Dakcheung districts near the Vietnam border. The agricultural products required by these mining companies and hydroelectric power plants are high-quality meat and vegetables imported or produced domestically by foreign companies. In recent years, these high-quality agricultural products have also been distributed at high prices to some small-scale rural traditional markets according to the newly emerging demands.

(2) Expansion of Traditional Markets and Insufficient Attached Facilities

In the major cities of Laos, the demand for agricultural products sold in traditional markets are rapidly increasing due to urbanization and increased purchasing power as the country's economy has been developing in recent years. Traditional market management are correspondently expanding the number of wholesale and retail stores. However, necessary market facilities and equipment have not been additionally installed in response to the increasing sales space mainly due to limited area of the market.

Expansion of sales space and insufficient attached facilities:

Aussie market, which has the oldest history of the three largest markets (Aussie, Beung Thatluang, Talaad Lao), has limited parking facilities for trucks that bring in and unload agricultural products.

Urbanization around the market and its impact on product delivery:

In Pakse City, the Dao Heuang market is the only large market, with wholesale-only stores and wholesale and retail stores. However, the Dao Heuang market is becoming too small with the economic development of Pakse City. It takes a long time to bring in and unload agricultural products, and the distance traveled within the market is long. Therefore, a small wholesale market called Sidthisay Market located about 300 meters away from the Dao Heuang Market is used by some light trucks to bring and unload their agricultural products, where parking fees are low and waiting time is short. Soon after the agricultural products are brought into Sidthisay Market, most of them are transferred to the Dao Heuang market by motorbike.

Increasing demand for refrigeration facilities and slow response by market operators:

Refrigeration facilities for agricultural products are also insufficient in all major markets. Talaad Lao is the newest of the three largest markets and claims that it has the best refrigeration equipment among them. The market currently has three refrigeration storages of more than 100 square meters with 2 temperatures of (1) frozen (-18 – -25°C) and (2) chiller (5 – -10°C). The turnover speed of stored agricultural products is fast, and they are only stored for 1-2 days. Usually, 5-10 tons of imported vegetables and fruits are stored for sales adjustment. However, the cold facilities of the market are not enough for demands of wholesalers. Thus, the Talaad Lao is planning to expand its cold facilities to 18 refrigeration storages of more than 1,000 square meters. Even Talaad Lao does not have enough refrigeration facilities, and those in other markets are much scarcer.

(3) Increasing Variety and Number of Agricultural Products Handled in the Traditional Markets

Changing market demand according to higher income and urbanization:

Traditional markets in major cities of Laos have long supplied and sold traditional crops from rural areas near cities and along main national roads. In recent years, various vegetables and fruits from all over the country have been supplied to Vientiane and other major cities as the transportation network has been improved, and also the people living in the cities require more diversified and high-quality foods due to higher incomes and urbanization caused by economic development.

Expanding production of commercial crops for export and influx of B-grade products enriches the variety of agricultural products at the traditional market:

As the economic growth and income increases in the neighboring countries such as China, Thailand, and Vietnam, those countries became seeking agricultural land and products in Laos. In response to the rapid increase in the production of commercial crops for export, a large number of B grade products, which do not meet export standards, are flowing into the domestic market. These B grade vegetables and fruits have made a great contribution to increasing the variety and number of agricultural products available in the country.

Growing presence of foreign companies in the meat market:

Regarding meat selling at the traditional markets, most of the meat sold at traditional markets was domestically produced until the year 2007, when CP Laos, a subsidiary of Thai giant agribusiness conglomerate, started operation in Laos. As CP Laos has introduced modern livestock farming in the country, domestic pig and poultry producers were not able to compete in terms of supply capacity, quality, price and hygiene. The shares of CP Laos and other foreign farms such as Betagro in meat market in both traditional and modern markets have gradually expanded until today. In most of the traditional markets in Vientiane, nearly all of the pork sold there is supplied by foreign meat producers.

Increasing imports of agricultural products:

Vegetables and fruits that are not produced domestically have become imported to sell not only in modern markets such as supermarkets but also in traditional markets. As for fish, domestically farmed tilapia and catfish are popular in traditional market. But imported sea fish also started to be sold in recent years.

Table 4.4.1 Conventional Handling Items at Traditional Market and the Recent Trends

	Vegetable and Fruits	Beef	Pork and Chicken	Fish
-Conventional handling items	Traditional short-growing leafy vegetables are the main items	Beef raised by small local farmers	Initially, small-scale pig and chicken production by small farmers shifted to small-scale broiler production by Lao people	Small-scale farmed fish (tilapia, cattle fish) by Lao people
-Recent trends	Inflow of fruit vegetables and root vegetable s produced by foreign owned farms, and B-grade commercial crops for export. Increasing imported vegetables and fruits	Falling share of beef in meat sales	Domestic production by foreign companies such as CP accounts for most of the market share	Low price offensive of farmed fish by foreigners such as Chinese area increasing. Imported sea fish begins to be sold

Source: JICA project team

(4) Growing Presence of Foreign Agribusiness in Traditional Markets

Foreign-affiliated farms responding to increasing demand for vegetables with high added value:

Farmers in the Bolaven Plateau has traditionally grown vegetables that can be harvested in a relatively short period of time, mainly leafy vegetables such as cabbage, Chinese cabbage, long beans, chayote, and green onions. However, demand for a wider variety of vegetables is increasing in urban areas as incomes rise and urbanization due to economic development. New demand for vegetables includes carrots, radishes, tomatoes, green peppers, and long eggplants. Compared to traditional vegetables, these vegetables are fruit and root vegetables, which can be harvested after a relatively long period of cultivation. These new vegetables have a large margin but require higher technology and capital. Therefore, most of them are produced by foreign owned farms such as China, Malaysia, Thailand, and Japan. These vegetables produced by foreign farms are distributed not only to the modern domestic retailers in the large cities but also through the traditional domestic markets.

Increasing shares of foreign companies in meat, egg and fish production in Laos:

As mentioned in the previous section, significant portion of the pork and chicken sold in the markets surveyed are produced by farmers who have contracted with CP Laos. In addition, fish farming which was used to conduct by Lao are rapidly switching to do by Chinese in Vientiane Capital and in Champasak Province. Most of the feed used for the fish farming is imported from CP Thailand.

Weak regulations on foreign agricultural production and imported agricultural products:

In neighboring countries such as Thailand and Vietnam, the activities of foreign capital in the agricultural sector are severely restricted. In Thailand, a wide range of regulations are stipulated based on the Foreign Business Act 1999. Rice farming, plantations, crop cultivation, livestock farming and fishing are among the businesses that foreigners are not allowed to operate, and these regulations are strictly enforced.

If the activities of foreign investors in key agricultural products are not properly regulated, it is expected

that foreign investors may enter and drive out local production. Imported agricultural products are also supposed to be regulated to encourage domestic agricultural production. Ineffective regulation implementation of imported agricultural products may weaken demand for domestic ones.

(5) Traditional Markets as Information Hub

Measures to over/under production by traditional market operators:

Some of the large traditional markets in Vientiane Capital promote sales of agricultural products that are in excess supply, or encourage the production of agricultural products that are expected to be in short supply.

At Aussie Market, when over-production of a certain agricultural product is predicted, they use their Facebook page to promote sales of the crop. Conversely, when a supply shortage and price hike of a certain agricultural product are expected, the market operator ask the producers through middlemen to increase production of the crop.

Encouraging production in specific regions by traditional market operators:

Aussie market also works with PAFO Saysomboun Province to encourage the production of pineapples and other agricultural products in the province. Specifically, parking fees for trucks that bring produce to the Aussie Market from farmers who have received production encouragement documents issued by PAFO Saysomboun Province are free of charge for three months.

Extension of agricultural production techniques by traditional market operators:

Some of the large traditional markets also provide agricultural production guidance to farmers. Talaad Lao Market actually tests all fertilizers on the market in order to select the best quality and encourage farmers to use.

Traditional markets as an information hub:

Large fresh wholesale markets receive information about the growth status of crops in production areas and supply prospects through middlemen and collectors. On the other hand, wholesalers bring information about consumer demand, especially crops that are going to surplus and prices are expected to drop, and crops that are in short supply and prices are rising.

Therefore, it is desirable to strengthen the wholesale markets with the function to collect and disseminate information and adjust supply and demand of agricultural products.

(6) Price Intervention by Traditional Market Operators

Encourage of conscientious middlemen by traditional market operator:

A large traditional market manager considers that many middlemen mediate between agricultural products producers and consumers. As a result, producers are pushed to sell their harvests at low prices, and consumers are forced to buy expensive agricultural products. To solve this problem, the market encourages conscientious middlemen who buy agricultural products from producers at high price and

sell them to consumers at low price.

Direct intervention into middlemen's purchase price by traditional market operator:

The market sometimes applies direct regulations on the middlemen's purchase price of agricultural products at farms. The purpose of the direct price regulation is to guarantee the lowest purchase price for ensuring the farmgate price that prevent farmers from running a deficit. There is no farmgate price regulation when the price rises.

Restriction on the number of agricultural products brought into the market:

At a traditional market in Vientiane, many distributors sometimes bring the same vegetables to the market at the same time without contacting each other. For example, the arrival of Bolaven cabbage was sometimes far exceeded the market demand in some traditional markets in Vientiane and wholesalers were in the red with fierce price competition. Therefore, the market established a new system in which only one vendor can deliver with a truck carrying 8 tons of Bolaven cabbage to the market each day, and 15 vendors can bring the crop twice a month. As a result, the price of cabbage in the market stabilized.

In this way, some market operators are making efforts to prevent farmers and other stakeholders from running into the red and to limit price fluctuations. However, it is difficult to control such price fluctuations with market operators' initiatives alone.

Government agencies such as the Ministry of Agriculture and Forestry are required to strengthen instruction on production adjustment reflecting to the market supply and demand as well as sales promotion in cooperation with the Ministry of Commerce and Industry.

4.4.3 Modern Retailers

(1) Supermarkets and Vegetable Consignment Companies

Roles of vegetable consignment companies in modern retailers:

Many supermarkets, mainly by foreign capital have been opened in the large cities, and fresh vegetables and fruits are sold there. However, only a small number of supermarkets buy and sell vegetables and fruits by themselves. Many supermarkets including Limping, J-Mart, Parkson, Friendship entrust vegetable consignment companies with vegetable delivery and quality control and collect a fixed rate of consignment fees from 17% to 25% depending on the supermarkets.

Major vegetable consignment companies and their activities:

Local companies such as DMX, SKP, KDM, and Chekpouy sell vegetables and fruits on consignment at supermarkets in Laos. Of these companies, DMX has the oldest history with the largest market share and has high management capabilities. DMX buys the best quality and appearance from agricultural cooperatives and farmers' production groups that produce organic vegetables in Vientiane. In addition, the highest quality vegetables and fruits are carefully selected and purchased from foreign farms such as Malaysia-owned Agro Vege Farm in the Bolaven Plateau. Vegetables and fruits that cannot be

procured domestically depend mainly on imports from Thailand. The purchased vegetables are packaged for the small families targeted by DMX, affixed with their own brand logo, and placed on the shelves of supermarkets. In-house products placed in supermarkets are checked daily, discolored parts are removed, repacked and returned to the shelves by each vegetable consignment company.

(2) Procurement of Domestic and Imported Vegetables

Vegetable consignment companies' efforts for import substitution of vegetables:

Recently, the price of imported vegetables has risen due to the depreciation of Lao kip against U.S. Dollars and Thai Baht, DMX wants to handle wider kinds of domestically produced vegetables if possible. The company has already handed in a list of the types and quantities of vegetables the company needed to farmers' groups and agricultural cooperatives which they work with. However, the farmers have not been able to produce the necessary crops. They just continue to produce only the crops that they have traditionally produced. Vegetables and fruits that cannot be procured domestically must be imported from Thailand at a higher price. Farmers usually hesitate to challenge growing new crops for fear of risk.

It is hoped to establish a system that government extension agencies and public universities will conduct trial cultivation of new crops, become familiar with the cultivation methods, and disseminate the newly acquired knowledge to farmers.

(3) Vegetable Shelf Management at Supermarkets

Loss risk transfer from supermarket to consignment companies:

Vegetable consignment companies manage daily quality control of their own vegetables in the vegetable section of supermarkets. Vegetable consignment companies supply vegetables, remove the slightest discoloration of the vegetables and repackage them back on the shelves. DMX, the oldest and largest company in Laos, has the best on-the-shelf vegetable management know-how in Laos in terms of number of the handling products and quality control with minimum loss rates at around 10 – 15 %.

Supermarkets' support to vegetable consignment companies:

A manager of Friendship Supermarket claims that the number of vegetable contractors has been increasing in recent years, and some of the new companies have poor on-the-shelf vegetable management. The manager advises vegetable consignment companies that have problems with the management and packaging of the vegetables in his supermarket. The supermarket is also providing marketing information such as the sales forecasts to vegetable consignment companies, as sales fluctuate greatly on weekends and holidays.

(4) Differentiation from Traditional Markets in Range of Agricultural Products Handled

Procurement of vegetables by the consignment companies:

As explained above, it is common for modern retailers in Laos to use multiple consignment companies

for the supply and shelf-management of vegetables and fruits in order to avoid high costs due to loss. Consignment companies select and buy the safe, best size and quality vegetables at high prices from organic vegetable agricultural cooperatives in Vientiane Capital and foreign-owned farms in the Bolaven Plateau. Then the vegetables are neatly divided into small packages and sold at high prices. High-end European vegetables such as rosemary and Italian basil are imported from Thai vendors and Japanese and South Korean vegetables are also procured through Thai vendors which purchase as a bulk directly from these countries as Lao consignment companies require only limited volume of these vegetables.

Procurement of meats and fish by the supermarkets:

At modern retailers, pork and chicken sold are domestically produced by foreign companies or imported ones. Beef for steak is from Australia and imported from a farm famous for its premium beef in Sakon Nakhon Province of Thailand. The supermarkets in large cities usually does not sell locally produced beef because Laos produce only small amount of beef, and the meat quality of local beef is tough and not suitable for steaks.

The fish sold in the supermarkets in Vientiane Capital are mostly imported marine fish. In Laos, tilapia and cattle fish are the main freshwater farmed fish, and they are widely sold in traditional markets. Wild fish caught in Laos is not only produced in small quantities but also poses hygiene problems as they are transported over long distances from remote locations.

Wide variety of processed foods in modern markets:

Supermarkets sell a wide variety of precooked processed foods such as frozen foods and retort foods, reflecting the increase in income and urbanization accompanying economic development in recent years. Most of these processed foods are also imported.

Table 4.4.2 Conventional Handling Items at Modern Retailer and the Recent Trends

	Vegetables and Fruits	Beef	Pork and Chicken	Fish
- Conventional handling items	Vegetables carefully selected from organic agricultural cooperatives and foreign farms are neatly packaged and sold. Wide variety of imported vegetables and fruits	100% import beef and its processed products	Domestically produced by foreign farms or imported pork, chicken and wide variety of proceed products using pork and chicken	Imported sea fish
- Recent trends	Price of imported vegetables is soaring due to the depreciation of Lao currency, so they want to switch to domestic production. But they are not able to do it due to the lack of technology of domestic producers.	(same as above)	(same as above)	(same as above)

Source: JICA project team

4.4.4 Findings on Distribution and Retail

The findings on distribution and retail of Lao PDR based on the current situation described above is summarized in the table below.

Table 4.4.3 Findings on Distribution and Retail

	Findings
Techniques	✓ Temperature control during the transportation is inadequate. ✓ Middlemen in Laos often face small and unstable production amount issue for some agricultural products. ✓ Agricultural technologies are unable to meet new demand according to urbanization and income increase in the major cities in Laos. ✓ Vegetable consignment companies want to increase procurement of domestically grown vegetables and fruits, but it is often difficult to do so.
Human Resources	✓ Some Agricultural Cooperatives (ACs) and Farmers Production Groups (FPGs) are lack of motivation as an organization. ✓ There are few extension workers who have adequate knowledge and experience to instruct farmers on new crops whose demands are increasing.
Infrastructure/Material	✓ Poor road management leads to increased transport losses and transport costs. ✓ The necessary facilities are not increased in accordance with the expansion of the market. ✓ Insufficient cold chain system is causing poor temperature control.
Finance	✓ Conscientious middlemen buying at a high price from producers and selling at a low price to consumers result in low profits and tight cash flow.
Information	✓ Attempts have been made to regulate the demand and supply of agricultural products by using information on distribution and retail of agricultural products collected through middlemen, wholesalers, retailers, etc.
Linkage with FVC	✓ Purchase and sales price on agricultural products are controlled by middlemen and collectors. ✓ Consumer price of agricultural products tends to be high due to large number of middlemen and collectors involved between producers and consumers. ✓ Presence of foreign investment in agricultural production is greatly increasing in Laos. ✓ Most supermarkets in Vientiane Capital entrust vegetable consignment companies with vegetable delivery and quality control on shelves.

Source: JICA project team

4.5 Agriculture Materials and Finance

4.5.1 Agricultural Materials

(1) Current Situation of input business operation and management by GOL

Most input shops have got renewed licenses to sell pesticide, seeds, animal & fish feed and animal medicine without attending trainings course, only by submitting application documents to PAFO.

Part 5, Business Management Agency, of Decree on Pesticide Management, No 0283 /MAF, Vientiane Capital, 14 Feb 2019, Article 34, Rights and duties of the agricultural sector provided that agricultural sector (PAFO) shall have a duty to conduct training, on pesticides for who is permitted, pesticide inspectors and related parties, as well as issuing certificates.

Part 2, Article 7 Conditions for applying for permission, have technical knowledge, with a diploma or training certificate, approved by the Ministry of Agriculture and Forestry, with knowledge and experience on pesticides. According to the Decree of Pesticide Management, the study of the survey team revealed that PAFO have violated Article 34 and Pesticide Business Operators have violated Article 7. Some of them did not have this certificate.

Article 29 of the Decree on Business Management of Pesticide Business Operators shall have a duty to attend the training and receive information on pesticide activities.

Many non-registered pesticides and others were identified in the shops except for SPC. These input shops and business operators have violated the Article 15 Registration of Pesticide of the Decree of Pesticide Management by selling non-registered pesticide.

“Withholding Period (Pre-Harvest Interval)” & “Expire Date” were not shown on the label of many pesticides. This is against Article 14 Contents of pesticide labels; determined that pesticide labels as defined, No.1) The trade name of the pesticide and the specific brand or trademark, No.2) Common name and percentage of poisonous, No.3) The level of danger of pesticides must be dark color letter, and the technical registration number of the pesticide, No.4) Material characteristics and compound formula types, No.5) The target of pesticide application, No.6) Guidelines and precautions for use including rate of use, method, time and location of pesticide application, No.7) Date, month, year of production and expiration date, production package and shelf life, if kept in the original container must be within the specified conditions, No.8) Name and address of manufacturer and importer, No.9) The volume or net weight of the containing, No.10) The words "poisonous", "keep out of reach of children" and "read instructions before use" make in dark letter, No.11) Clothing and equipment for body protection, No.12) Insects or pest diseases to be controlled, No.13) Plants, animals or other items that will be used for pesticides, No.14) A group of pesticide products, No.15) The period of stopping the use of pesticides, before harvesting the crops, No.16) Warnings prohibit re-use of containers and instructions for safe disposal or cleaning after use, No.17) Basic first aid methods, No.18) Any warning color bar, printed on the bottom of the label, to indicate the level of toxicity of pesticide products as defined by the World Health Organization as follows:

- The red band in the standard system of colors, code No.199, is used for pesticide products of very high and severe hazard.
- The yellow bar in the standard color system is used for pesticide products of moderate hazard.
- The blue band in the standard system of color code No.293 is used for low-hazard pesticide products.
- The green bar in the standard system of color code No.374 is used for non-toxic pesticide products.

DAFO also overlooked the above points even if conducting inspection once a year. Some shops and farmers did not know “Withholding Period (Pre-Harvest Interval)” of pesticide. DOA organized trainings for business operators in major regions such as Luan Namtha, Champassak, Vientiane Municipality every year, but these are too limited for many operators nationwide to understand how to use pesticide, what are banned pesticide, degree of hazardous, etc.

DOA has a duty to check efficacy on imported pesticide, but they use the data of efficacy test results by foreign pesticide makers instead of conducting efficacy test by themselves. Foreign country efficacy test data could not be always applied to Laos, because the conditions of Laos and foreign counties are different in terms of occurrence of pest and disease. It is unlikely that pesticide quality could be checked appropriately. DOA registers pesticide and other inputs based on the data submitted by suppliers, importers according to Article 5 of Decree of Pesticide Management. In most cases efficacy tests of imported pesticide are replaced with examination of the data submitted by the suppliers.

Animal medicine business is in similar situation nationwide in Lao PDR. Some input-shop operators sell animal medicine only by hearing farmers' explanation without seeing the ill animal. But they are not qualified veterinarians.

Seed (Non-Rice) Quality (Germination Rate, Contamination) is not checked by GOL.

(2) Some Progress of Input Management by GOL

Relevant agencies such as Plant Protection Center (PPC) located in Hadxaiphong District, Vientiane have been developing their capacity to analyze various kinds of input quality such as Pesticide, Pesticide Residue, Components of Fertilizer, Organic Matter, Mineral, Seed Quality etc. PPC has two main functions; 1st is research on plant pathology, entomology, seed multiplication. 2nd is to analyze the above chemical components.

Improved SPS in Greater-Mekong Subregion Project by ADB funded to install relevant equipment such as GC-MS, HPLC, LC-MS-MS, AAS. But their analysis capacity is still limited. They analyze pesticide residue by GT-Test Kit developed by Thai Government that could cover only carbamate group pesticide and organophosphorus compounds, not cover organochlorine compounds. They can analyze specific kinds of pesticide such as methyl parathion, aldrin, BHC by using the above equipment, but they cannot analyze unknown pesticide in plants and food. So, their analysis capacity need to be developed as soon as possible to ensure food safety and appropriate pesticide use by farmers, because PPC is only one laboratory in agriculture sector analysis. Seed Test Laboratory (For Rice) will be established soon later supported by World Bank Agriculture Competitiveness Enhancement Project.

At the same time PPC has a plan to develop pest and disease database to disseminate diagnosis information to extension level. DOA also has a plan to improve pesticide registration system by their own efficacy test.

4.5.2 Agricultural Finance

(1) Financial System in Lao PDR

According to the Annual Report 2020 of BOL, Financial System in Lao PDR is as follows;

The BOL aims to strengthen the performance of state-owned banks. It has restructured two state-owned banks, namely the Lao Development Bank and the Agricultural Promotion Bank (APB), by allowing the private sector to hold 70 percent of the shares and the public sector to hold 30 percent of the shares. Another state-owned bank – Policy Bank – would also experience the structural reform to better serve the purpose of rural development in the country.

The credit measures to the economic recovery from the pandemic have also continued to be implemented. These include the Decision on Credit Policy to Mitigate the Impact of COVID-19 Pandemic (No. 238/BOL, dated 26 March 2020) and the Decision on Credit Project for Supporting Production and Mitigating the COVID-19 Impact (No. 318/BOL, dated 19 May 2020).

The Decision No. 238/BOL includes four key measures, namely deferring the payment of principals and

interests; encouraging commercial banks and their clients to reduce interest rates and fees; encouraging commercial banks to provide new loans to their clients for supporting economic recovery; and loan restructuring. The Decision No.318/BOL aims to provide loans with a low interest rate of 5.5 percent per annum and maturity of up to six years. Furthermore, the BOL has implemented a credit support scheme for SMEs, for better and faster access to finance. As of October 2021, the amount of credits provided by commercial banks recorded at LAK 16,000.94 billion, and by non-bank financial institutions at LAK 20.11 billion.

By the end of 2021, there were 44 commercial banks with 114 branches of commercial banks, 541 service units, 1,416 ATMs, 4,578 EDC and 1,629,448 ATM cards. There were 217 units of non-bank financial institutions with total assets of LAK 8,447.96 billion. These institutions mobilized LAK 1,788.26 billion of savings (17.28% lower than that in 2020), while providing LAK 6,389.25 billion of loans to society (23.17% higher than that in 2020).

The national payment system has gradually improved. The retail payment system was developed and used to transfer funds among commercial banks via mobile phone. The Government Financial Information System (GFIS) of the Ministry of Finance is connected with the retail payment system to support the public revenue collection. In addition, the BOL has collaborated with the Ministry of Technology and Communication of Laos to do research and draft regulation on the digital asset management such as the Decision on the Pilot Project for Conducting Digital Transactions (No. 888 /MOST, dated 09 November 2021).

The capital market has gradually expanded. The BOL issued government bonds through the Lao Securities Exchange. These bonds were dominated in 2 currencies, including LAK 1,278 billion and USD 7.75 million, which had a maturity of one year (01 /2021-12 / 2021). 11 companies were listed in the Lao Stock Exchange. These companies raised LAK 26,412.95 billion, accounting for 12.62 % of GDP in 2021. The volume of securities trading recorded at LAK 8,258.23 billion.

The support for agriculture sector by BOL is lower than other sectors, around 10% of the budget in the past, because other sectors such as energy and mining are prior to agriculture. The support for agriculture is only for APB and Nayoby Bank. But recently BOL has tried to increase the support for agriculture to 30% by providing SME fund for several qualified MFIs (DTMFI). The 1st batch support is around 300 billion kip that has been released. 2nd batch 100 billion kip will be approved soon.

In addition to the above change, Bank of Lao has been discussing “Action Plan for Agriculture Finance” to encourage exporting agriculture products internally, but so far, no outputs of this discussion. BOL has been discussing the details of the plan such as target of economic crops for export and the size of fund to support with other relevant organizations including MAF.

(2) Finance for Agriculture Sector

1) Agriculture Promotion Bank (APB)

Among 44 commercial banks, APB is lending for agriculture actively. According to APB Home Page,

their background and lending policy is as follows.

Background

Since 2007, APB adopted its new vision: to be leader in rural area financing, operating business under market mechanism with self-sufficient in term of financing and in long run contribute to poverty reduction, economic growth and prosperity of the Lao PDR. APB improved 360 degree of its operation such as: policy and regulations, good governance, investment on human resource management in area of accounting and risk management to encourage international support and cooperation. In terms of technical aspects, the Bank focused on modernize their system especially upgrade their information system, variety banking products and services to offer to their customer and to prepared for future development. By end of 2012, their financial statement complied with International Financial Reporting Standard (IFRS)

The banking services are now varied and at a competitive level such as improvement in local and international payment. As of today, APB has 1 head office and 17 branches with 92 service units countrywide.

Lending Policy Group Loan

To support farmers nationwide to able to access sources of fund. APB support and promote agricultural product accordance to Sustainability principle to contribute to the socio-economic development of the Lao PDR.

Target of Group Loan

A group of farmers who set up a group to produce agricultural products with equal responsibility over the loan on voluntary basis to borrow from APB. 3-7 members in a group.

Agricultural Cooperatives are also targets of APB loan. However so far, no proposals have come from any agricultural cooperatives to APB.

Types of Loans are Classified into 4 Categories

1. Short Term Loans:

Loan Payment Period; 12 months or one year. Interest from 9.10% to 11%

For agricultural production and animal feeding in accordance with season, such as rice farming, all types of vegetable farm, animal feeding and agricultural tools, land preparation, seeds, fertilizers and labor hiring.

Loan Size; Maximum credit line for this type of loan is 20 million LAK (US\$1500) for group member 1 people per family.

2. Medium Term Loans:

Loan Payment Period; Less than 60 months or 5 years. Interest; 9.5 to 11.5%

For investments in agricultural assets that can be used for more long term, for example loans for investment in agricultural like fishpond, fruit farming, big animal farming or livestock, investment in agricultural land reclamation or improvement

Loan Size; Maximum credit line of 30 million LAK (US\$2300) group member 1 people per family.

3. Long Term Loans:

Loan Payment Period; More than 60 months or 5 years. Interest; 10.5 to 12.5%

For long term investments such as Industrial plantation, livestock etc. with maximum credit line of 30 million LAK group member 1 people per family.

4. Loan for Agricultural Cooperatives

The amount of the loan is not limited according to the customer's needs.

The repayment period is 6 to 10 years (according to the bank's regulations)

The interest rate is 12.10% per year (for new customers).

For the collateral is land and building, the working capital is not related to collateral. The amount approved by the bank is 70% of the assets that are evaluated.

Loan Security Requirements

Farmer clients in the same group obligate themselves in joint liability agreement for their loan repayments which are verified by the head of the village.

Lending Policy; Small Loan SME

To promote production and small business nationwide to contribute to continuous growth in accordance with socio and economic development as set by the government in each period and to reduce poverty step by step.

APB support micro finance to the following target: General People and civil servant who have payroll account with APB to use as working capital for his/her business (not allowed for Bank employee).

Loan Size, Duration and Mode of Repayment

Maximum 50 LAK as loan for net working capital and purchase of equipment. Maximum loan duration is 36 months or less than 3 years, based on the actual utilization of the loan. Borrower must open current account with APB to repay loan principal and interest as agreed in the loan agreement

Lending Policy; Loan to Individual/Business

APB supports loans in various economic sectors such as agriculture and forestry, commercial, service, industrial, manufacturing and other. APB also provides funding for individual, entity or company who operate business that have been established and executed under the law of the Lao PDR. Providing this type of source of fund is also a contribution to socio-economic development of the country.

Performance of the Loan

APB showed the following performance in their lending activities.

Group Credit (Nationwide Information):

The number of groups borrowing are 28,172, accounts in 2018, 31,773 accounts in 2019, 34,472 in 2020, 32,768 in 2021.

Loan to Individual/Business (Nationwide Information):

12,999 accounts in 2018, 18,095 accounts in 2019, 21,060 in 2020, 23,192 in 2021 respectively.

Repayment rate: 90,13% in 2018, 96,67% in 2019, 97,38% in 2020, 96,37% in 2021.

The types of business of borrowers are as follows.

Table 4.5.1 Types of Business of Borrowers of APB

Type of business	2018	2019	2020	2021
Industry	0.47%	0.40%	0.64%	0.45%
Construction	10.59%	17.09%	18.23%	6.47%
Assemble technical materials	6.20%	3.62%	4.45%	9.81%
Agriculture & Forestry	65.60%	65.46%	61.85%	70.17%
Trade	9.09%	3.37%	9.45%	5.73%
Transportation-Postal	2.51%	1.27%	1.00%	0.90%
Service	3.64%	3.39%	3.38%	5.13%
Handicraft	0.86%	0.75%	0.64%	0.45%
Others	1.05%	0.64%	0.36%	0.90%

Source: JICA project team

Table 4.5.2 Rate of Non-Performing Loan of APB

	2018	2019	2020	2021
Rate	9.87%	4.33%	2.62%	3.63%

Source: JICA project team

They provide loans for farmers group by single commodity base, not by farm base. According to the Head Office of APB, they still provide loans for rice farmers. Example in Hatsyphone District, financed to 500 rice farmers groups, 30 rice millers last year. In the case of Champassak Branch of APB, they provided 70% loan for agriculture, 30% for others. Recently they have focused more on export-oriented corps such as coffee, cassava, cattle. They provide 5 years loans for cattle raising.

2) ACLEDA Bank

History of ACLEDA Bank

ACLEDA Bank was established in 2008, from 2008 to 2013 expanded its branch network to 38 branches, operating in 15 provinces and cities in Lao PDR. All over the country, except Phongsaly, Houaphanh and Xaysomboun provinces.

In 2010, ACLEDA Bank opened 15 ATMs to date, with a total of 57 units nationwide.

In 2018, ACLEDA Bank launched a mobile app called "ACLEDA Instant", now renamed "ACLEDA Mobile", as of May 2022, with more than 106,046 users.

In 2019, ACLEDA Bank became a member of LAP-Net, now the ATM cards of 15 banks can withdraw cash and check their account balance through ACLEDA Bank ATMs.

In 2021, ACLEDA Bank launches innovative logos that are in line with the vision, goals, strategies and advances in financial technology. ACLEDA Bank's new logos are white, gold and blue, and ACLEDA Bank has increased its registered capital to 380 billion kip.

In 2022, ACLEDA Bank increased its registered capital to 420 billion kip.

Lending Policy

Vision: To be the leading SME bank in the Lao PDR.

Mission: The Bank mission is to provide small and medium entrepreneurs with the wherewithal to manage their financial resources efficiently and by doing so to improve the quality of their lives. By achieving these goals, the Bank will ensure sustainable benefits to their shareholders, our staff and the community at large. The Bank will at all times observe the highest principles of ethical behavior, respect for society, the law and the environment.

Details of Loan Schemes

Credit, divided into 2 categories: Small loans 1 and Small loans 2.

There are 35,000 customers using the service all over the country.

Small Credit 1: Up to 15 million Kip, annual interest rate 15.0%, From 15 to 20 million Kip, interest rate 19.0%,

Small Business Credit 2:

- From 200 to 600 million kip, interest rate 7.99%, fee 1% of credit size, credit risk fee 1% of credit size, collateral assessment fee 2% of credit size, period up to 3 months,
- From 200 to 600 million kip, interest rate 8.99%, fee 1% of credit size, credit risk fee 1% of credit size, collateral evaluation fee 2% of credit size, period from 3 to 6 months, from 200 to 600 million kip, interest rate 9.99%, fee 1% of credit size, credit risk fee 1% of credit size, collateral evaluation fee 2% of credit size, period more than 6 to 12 months,
- From 200 to 600 million kip, interest rate 11.5%, fee 1% of credit size, credit risk fee 3% of credit size, collateral assessment fee 2% of credit size, period more than 12 to 24 months,
- From 200 to 600 million kip, interest rate 11.5%, fee 1% of credit size, credit risk fee 3% of credit size, collateral assessment fee 3% of credit size, period more than 24 to 36 months,
- From 200 to 600 million kip, interest rate 12.5%, fee 1% of credit size, credit risk fee 3% of credit size, collateral assessment fee 3% of credit size, period more than 36 to 48 months,
- More than 200 million kip to 600 million kip, interest rate 13.5%, fee 1% of credit size, credit risk fee 3% of credit size, collateral evaluation fee 3% of credit size, period more than 60 to 72 months.

Loan for Agricultural Cooperatives

ACLEDA Bank has not yet prepared a loan for agricultural cooperatives.

Performance of the Loan

Table 4.5.3 Performance of the Loan of ACLEDA Bank

	2018	2019	2020	2021
Borrowers	10,800	16,388	15,820	14,570
Repayment Rate	97.55%	97.78%	95.5%	95.8%
Non-Performing Loan Rate	2.45%	2.22%	4.5%	4.2%

Source: JICA project team

Classification of Borrowers' business

Table 4.5.4 Performance of the Loan of ACLEDA Bank

Business Type of Borrowers	Share
Agriculture Potential	30%
Livestock	12.7%
Crops	16.8%
Services	14%
Trading	38%
Industry	4%

Source: JICA project team

Capacity Building for Staff

ACLEDA Bank has a training center for new employees, one in Lao PDR and one at its head office in Cambodia.

Sekong Service Unit

ACLEDA Sekong Unit is active on agriculture finance as follows; They provide loan for the agriculture sector 70% in loan amount. 20% for construction. They provide only Small Business Loan for farmers (20% for Coffee, 40% for cassava, 10% for animal, other cabbage. No finance for rice.)

Repayment Period: 1 year from 5 to 15 million, 5 years from 16 to 100 million, more than 5 years over 100 million

Average loan size; Coffee for 30 to 200 million, Cassava for 100 to 300 million, Animal for 25 to 100 million, Cabbage for 30 to 300 million No Group lending, No Medium Business Loan for farmers

Table 4.5.5 Rate of Non-Performing Loan of ACLEDA Bank

	2018	2019	2020	2021
Rate	1.46%	1.64%	3.80%	0.54%

Source: JICA project team

Loan application period; big loan 1-week, small loan 2 or 3 days

Concerning Loan examination and monitoring (cabbage farmer case), their activities are as follows.

1. Before lending loans, bank analyze farmer management.

2. After lending loans, bank monitor planting time, harvesting time.
3. Check details of management at every cropping time. Once a month, Field staffs go to farmers fields.

In addition to general loan activities, Fields staff provide consultation service in terms of soil suitability, cultivation techniques, optimal farming plan. For new borrowers, Bank provide free consultation service to make loan documents.

This unit only has 9 field staff cover 2 districts in Sekong Province (Service Unit has 24 staff)

Concerning the loan failure case of farmers, they make the following countermeasures.

If farmers lose a lot of money due to market price drop, Bank provide more loan for recovery. Farmers could pay back next year. Or only extension of due date of loan.

Concerning collecting information from farmers, the following measures are made by the Bank staff.

1. More than 300 million loan require management record book.
2. Less than 300 million loan, Bank make management record book on behalf of farmers by hearing expenditure of each item and income of each selling value from farmers.

ACLEDA Bank (Sekong Unit) requested MAF (PAFO & DAFO) to do the following

1. Appropriate zoning for land allocation plan that means suitable crops for suitable areas.
2. Market Information to decide kinds of crops for next planting

3) Other Banks

Lao Development Bank (LDB) and Joint Development Bank (LDB) also provide loans for agriculture sector but very few (2% or 3%). LDB has provided loan for various kinds of cooperatives including agricultural cooperatives, depending on the valuation of the collateral, the amount is 50% of the assets evaluated by JDB, the repayment period is less than 5 years, interests rate is 14% a year. LDB also could provide loan for agricultural cooperatives. These commercial banks play a role for providing loan under SME Promotion Fund.

Nayoby bank and State Bank are financing for farmers and agriculture businesspersons, but their loan application and examination process is complicated and slow. In most cases, it takes one year for one finance case even if the loan is very small size such as 5 million kip. Several farmers received loan from Nayoby bank, but it seems not suitable for farming. All farmers cannot predict one year later cost for farming.

4) Loan for Agricultural Cooperatives

According to Article 27 (Rights and Cooperatives) of Decree on Groups and Cooperatives No.606/GOL 26 Nov 2020, Cooperatives have rights to borrow from commercial banks or other financial institutions to invest in their business. From commercial banks sides, agricultural cooperatives are not major borrowers, but there are a few cases to lend money to agriculture cooperatives such as coffee

cooperatives from commercial banks. In such cases, the banks assess the assets of the cooperatives carefully. If the cooperatives have enough assets as collaterals, the banks could lend money to them.

There are a few cases of actual lending to cooperatives. The loan amount is 50% to 70% of borrower's assets evaluated by banks. The loan period varies case by case, bank by bank, majors are from 5 to 10 years, some are less than 5 years. Interest rate also varies bank by bank, major range is from 12 to 14% annually. Loan purposes is working capital or fixed asset capital.

In the case of agricultural cooperatives, one case of Ching Chai Coffee Cooperative was reported by Sacom Bank, wholly owned subsidiary bank of Saigon Thuong Tin Commercial Joint Stock Bank. This case used the SME Promotion Fund set by MOIC with 3% interest rate. The other case is Thaxang Organic Agricultural Cooperative in Vientiane Municipality who received loan (800 million kip) from Banque Franco Lao (BFL) at 6% interest rate on 5 years repayment period without collateral. This is a very special case, because relevant PAFO and DAFO made special efforts to facilitate to introduce this loan from BFL.

5) Microfinance Institutes

Microfinance is still important for farmers to borrow credit for buying daily inputs such as seeds, fertilizer, pesticide but in these years their finance is not active for the agriculture sector. Concerning the loan for agriculture purposes in Village Fund, the share is less than 50% in 2021. In 2009, this share was more than 60% according to the Report "Microfinance in Lao PDR 2009" compiled by GIZ Project (Mr. Klaus Prochaska). The study team visited a few MFI, but they provide loan mostly for salary men. Their loan requires repayment every two weeks just after borrowing. Such a loan is not suitable for farmers. One DTMFI in Vientiane provided 3% of loan amount for commercial farmers such as vegetable, cattle raising. No finance for rice farmers. The selected 9 MFIs play a role to provide loan under SME Promotion Fund with annual interest rate 12%.

6) SME Finance related to agriculture sector

DOSMEP of MOIC established the SME Promotion Fund for promoting SME business according to the decree on the promotion and development of small SME, No. 123/PM, dated March 3, 2010, the government provided the initial capital, that allocated from the macro modified money basket under the support of the Asian Development Bank, in the amount of 32 billion kip, to SME Promotion Fund, in this, it provided credit to small and medium enterprises through the Lao Development Bank in the amount of 30 billion kip, from 2012 onwards.

In 2014, the government approved a project to cooperate with the World Bank, as a grant and loan, under the SME Access to Finance Project/SME A2F, amounting to 20 million dollars, of which 15 million dollars, or 111.68 billion kip is provided. As a fund to credit support through 4 commercial banks.

Since starting to provide credit, in 2012, the SME Promotion Fund has accumulated a certain amount of capital from the interest earned from commercial banks participating in the program of the SME Promotion Fund to provide credit to small and medium enterprises

After amending the Decree on SME Promotion and Development Fund, No. 123/PM, dated March 3, 2010, to the Decree on SME Promotion Fund, No. 299/G, dated September 4, 2019, the government has planned to provide capital for small and medium enterprises.

The amount of 200 billion kip (in which the fund for providing credit is not less than 91%, the technical project is not more than 8% and the management of the SME Promotion Fund is not more than 1%), Starting in 2020 to provide credit to the small and medium enterprises in 4 priority sectors (Agriculture sector, Agricultural products processing, Craft sector, Tourism sector), at an interest rate of 3% per year with 5 years repayment period. In 2020, the government approved a project to cooperate with the World Bank as an interest loan indulgence, under the MSME Access to Finance for Emergency and Recovery Support Project/MSME A2F-ESR), amounting to 40 million US dollars, of which 34 million US dollars are credit funds, through commercial banks and other financial institutions

Through SME Promotion Fund, SMEs can borrow money through commercial banks on the concessional conditions such as low interest rate after loan examination. The loan purposes are facilities and material investment and working capital. A special committee has been established for loan examination in order to implement this program effectively. This committee members consists of the representatives from MAF, the Chamber of Commerce, WB and the Chairman of this committee is the vice minister of MOIC.

From May 2020 to September 2022, this fund could provide the above several kinds of credit to micro-enterprises, small and medium in Vientiane capital and 16 provinces across the country, amounting to 201 units, 253 contracts, with a total value of 301.56 billion kip, including the 4 sectors: the agricultural sector has 154 contracts, the tourism sector has 29 contracts, the industrial sector has 28 contracts and the agricultural products processing cooperative sector 42 contracts.

4.5.3 Findings on Agricultural Materials

The findings on private agricultural materials & inputs sector on the FVC of Lao PDR based on the current situation described above is summarized in the next table.

Table 4.5.6 Findings on Agricultural Materials

	Findings
Techniques	✓ Trainings necessary for input suppliers provided by PAFO is not enough for quality and safety control of agricultural inputs.
Human Resources	✓ Technical knowledge of input suppliers is limited. ✓ Technical knowledge of Plant Protection Center, Soil Department of MAF is limited.
Infrastructure/Material	✓ Quality of seed and fertilizer sold in input shops is not assured and varies in quality.
Finance	✓ Budget of Plant Protection Center, Soil Department of MAF is limited.
Information	✓ Compliance to Pesticide Law, Animal Medicine Law and other relevant regulations is low by input suppliers.
Linkage with FVC	✓ There is no quality control system for animal medicine. ✓ High dependence on imported agricultural inputs ✓ Consumers are unable to know at the time of purchase the production area and safety of vegetables and other products. For this reason, differentiation by production area is not possible.

Source: JICA project team

4.5.4 Findings on Agricultural Finance

The findings on private agricultural finance sector on the FVC of Lao PDR based on the current situation described above is summarized in the table below.

Table 4.5.7 Findings on Agricultural Finance

	Findings
Techniques	-
Human Resources	-
Infrastructure/Material	-
Finance	✓ Finance service coverage and support for agriculture sector is limited.
Information	✓ A lot of efforts to get farmers' management information and market information is needed for financial institute.
Linkage with FVC	✓ Loan supply is not implemented at the necessary time for farmers and farmers groups. ✓ Group management by farmers is necessary to obtain a loan.

Source: JICA project team

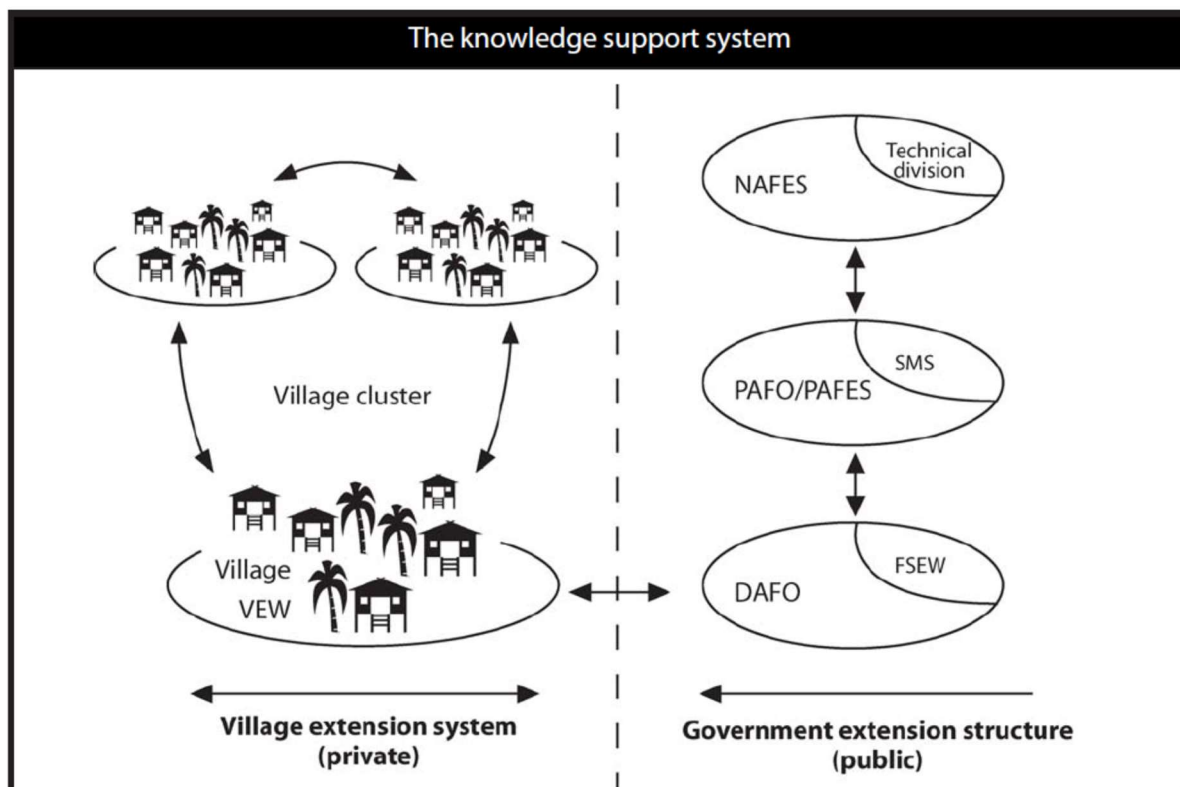
4.6 Agricultural Extension and Technical Support

4.6.1 Public Agricultural Extension System in Lao PDR

(1) Lao Extension Approach (LEA)

Currently, the Lao Extension Approach (LEA) developed by the Laos Extension for Agriculture Project (LEAP) funded by the Swiss Agency for Development and Cooperation (SDC) from 2001 to 2014 is usually applied for extension system in Lao PDR. A new agricultural extension system matching for reorganization of MAF is being prepared by Division of Extension Information and Linkage Market, Department of Agricultural Extension and Cooperative (DAEC), but the new system has not yet completed and published at the August 2022.

The structure of the LEA consists of two parts: the Government Extension Service and the Village Extension System (VES). The concept of LEA is illustrated in the figure below:



Abbreviation: NAFES/PAFES: National/Provincial Agriculture and Forestry Extension Service, SMS: Subject Matter Specialist, FSEW: Farming System Extension Worker, VEW: Village Extension Worker
Source: The Lao Extension System

Figure 4.6.1 Concept of Lao Extension Approach

Roles and responsibilities in extension of LEA consists of:

1. Department of Agricultural Extension and Cooperative (DAEC), formerly National Agriculture and Forestry Extension Service (NAFES)
 - Assists the Minister in organizing and encouraging extension in agriculture and forestry
 - Technical Division of DAEC coordinates and links with research, education and the technical departments at MAF, and manages extension implementation.
2. Division of Extension Information and linking to Market, DAEC, formerly Central Extension and Training Development Unit
 - Developed methods and curricula
 - Coaches staff in all provinces and districts
 - Trains provincial and district extension staff in pilot areas
 - Facilitates information flow between village and central levels
 - Supervises extension activities at the provincial level on a regular basis
 - Maintains a network with national and international institutions and a knowledge database.
3. Provincial Agriculture and Forestry Office
 - Manage provincial agricultural and forestry activities

- Technical sections of the PAFO provide advice on particular production systems.
4. Provincial Agriculture and Extension Service (now this section does not have in the PAFO, but in currently the agricultural extension activities are responsible by Plantation, Livestock and Rural development Sections.
 - Trains and coaches district extension generalists
 - Identifies training needs of DAFO staff and farmers
 - Monitors, reports and conducts impact assessments
 - Coordinates between DAFO and Technical Sections
 - Develops extension material for specific agro-ecological situations.
 5. District Agriculture and Forestry Office
 - Maintains regular contact with farmers
 - Reports on activities, problems and farmers' needs to the PAFO
 - Connects farmers with SMS, funding institutions and private sector (among others).
 6. DAFO extension generalists
 - Train and coach, the VEW
 - Set and follow up learning projects
 - Apply (recurrent) Training Needs Assessments
 - Facilitate (initially) farmers COPs and VEW COPs
 - Advice on basic agricultural and livestock problems

Remark: Community of practice (COPs).
 7. Village Extension Workers
 - Participate in VEW-COPs
 - Initiate and facilitate learning projects
 - Share knowledge and skills with production groups
 - Are compensated by the villagers in cash, kind or labor
 - Extend learning projects to non-learning project-members.

(2) Green Extension

According to the Issues Brief No. 01/2019, Ministry of Agriculture and Forestry, MAF applied Green Extension Concept for agricultural extension activities from 2019. Green Extension is a type of rural advisory service which supports the scaling up of sustainable agriculture by facilitating socio-ecological learning processes with farmers. Green Extension is not a single approach or blueprint for achieving sustainability; it includes a range of methods to promote various types of content such as Good Agricultural Practices (GAP), organic farming, Integrated Pest Management (IPM) etc.

4.6.2 Current Status of Public Agricultural Extension

(1) Extension Activities under DAFO

As described above, DAFO is a key player of agricultural extension activities in Lao PDR, which is directly related to farmers. Staff of DAFO are carrying out various activities related to agricultural extension as follows.

1. Conduct training to farmers on the field of use of fertilizer, pest and disease management, crop growth diagnosis, agricultural management, marketing,
2. Conducts field experiment and demonstration farm activities,
3. Conduct monitoring activities of farmers' activities after the training,
4. Prepare 6 months and annual plan for agricultural extension activities and capacity development of staff based on the PAFOs' extension plan

Although DAFOs are involved in various activities, according to farmers, there are weaknesses in terms of technical assistance in practical areas, such as guidance on how to deal with actual outbreaks of pests and diseases. Some DAFOs/extension staff can provide technical outlines but lack the capacity to provide individualized and specific guidance, e.g., diagnosis of pests and diseases and how to deal with them.

Basically, the trainings provided by DAFO is conducted in the village by using extension materials prepared by DAFO or provided by DAEC or PAFO. Many of the training materials are adapted from those prepared by PAFOs and MAFs and are not updated frequently to local conditions. In some cases, activities are compromised by the lack of equipment necessary for extension activities, such as pH meter, EC meter etc.

(2) Capacity Development and Technical Support for Extension Staff

The PAFOs and other departments of MAF provide technical training for DAFO staff for capacity development of extension activities. The Department of MAF prepares training materials and conducted/transferred knowledge to PAFO. The PAFO (Section of Provincial Agriculture and Extension Service) conducts/transfers knowledge to the DAFO. DAFO personnel are available for technical assistance from PAFO and MAF-related departments upon request. Although there is a system to receive agricultural technical advice from PAFO, related departments of MAF, universities, etc., it is not fully functioning.

(3) Number of Extension Staff

The table below shows the number of staff related to extension activities in the target districts.

Table 4.6.1 Number of Staff of DAFO Related to Extension Activities

No.	Sector	Number of all staffs		Number of staff for extension activities	
		Total	females	Total	Females
Vientiane Capital					
1	PAFO Vientiane Capital	218	55		
2	DAFO Xaythany District	50	19	12	6
Champasak Province					
1	PAFO CPS	318	85		
2	DAFO Paksong District	30	8	12	4
3	DAFO Bachieng District	29	5	2	1
Sekong Province					
1	PAFO Sekong	159	51		
2	DAFO Lamam District	41	15	15	5
3	DAFO Dardcheung District	40	9	3	1
4	DAFO Thataeng District	40	11	3	0

Source: JICA project team based on the interview with DAFOs through the joint field survey

Even in the Paksong district, which is one of the most famous areas for vegetable production in Lao PDR, number of staff for extension is 12, who are covering 87 villages. The number of staff of DAFO related to extension activities are limited. It is one of the bottle necks for discrimination of agricultural techniques for FVC strengthening.

(4) Linkage with Private, Academic Sectors

Some of the DAFO have linkage with private agricultural inputs or agricultural machinery to share information of farmers/demand of farmers, and also request them to provide technical training. The DAFO together with agricultural machinery retail companies conducts training on machinery use, training and experiments of transplanting rice and crop plantation to farmers groups and conducts training and demonstration on agricultural machinery use to individual farmer and business unit.

The PAFO and DAFO in Champasak has linkage with Champasak Agriculture and Forestry College for technical aspects such as pest and disease management, but linkage with PAFO and DAFO are weak for technical support activities matching for farmers' needs.

4.6.3 Current Status of Private Technical Support

(1) Agricultural input suppliers

Agricultural input suppliers usually do not provide technical support activities to farmers such as usage of fertilizer or agro chemicals. They provide only some advice and explanations to farmers based on the information provided by the production or wholesale companies. Under the government law, agricultural input suppliers should attend technical training for obtaining licenses for operating shops. But the number of training courses provided by government is few and many of agricultural input suppliers do not participate in the trainings.

(2) Agricultural machinery retail companies

Agricultural machinery retail companies have some agricultural machinery retail companies conduct training on machinery use, training and experiment of transplanting rice and crop plantation to farmers groups. They also conduct training and demonstrations on agricultural machinery use to individual farmers and business unit. They use video materials for better understanding of farmers about the training. For technical support activities, they usually communicated with PAFO and DAFO for training and some of agricultural machinery retail can be supported by agricultural machinery makers for technical knowledges including cultivation techniques using agricultural machinery.

(3) Wholesale markets

Wholesale markets: part of wholesales market (Talad Lao and Talad Lao AUSI) provides incentives to farmers to promote specific agricultural products. For example, a wholesale market company organizes farmers' production groups and provides financial incentives such as free of charge of market parking areas for farmers to promote production.

4.6.4 Findings on Public Agricultural Extension

The findings on public agricultural extension on the FVC of Lao PDR based on the current situation described above is summarized in the table below.

Table 4.6.2 Findings on Public Agricultural Extension

	Findings
Techniques	✓ Some DAFOs lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ Although there is a system to receive agricultural technical advice from PAFO, related departments of MAF, universities, etc., it is not fully functioning. ✓ There is a bias in the technical areas in which we can provide guidance to farmers. ✓ Some DAFOs/extension staffs can provide technical outlines but lack the capacity to provide individualized and specific guidance, e.g., diagnosis of pests and diseases and how to deal with them.
Human Resources	✓ Number of staff are limited for extension activities to meet farmers' needs.
Infrastructure/Material	✓ Agricultural extension materials are not frequently updated to meet farmers' needs. ✓ Necessary equipment for extension activities such as for soil testing is not available
Finance	✓ Budgets for extension activities, monitoring activities and capacity development of DAFO staff is limited. It is difficult to increase budgets for extension in a short period of time.
Information	✓ DAFOs are not fully utilizing the agricultural technology possessed by the private sector.
Linkage with FVC	✓ DAFOs have limited information of FVCs actors and do not play coordination role of FVCs.

Source: JICA project team

4.6.5 Findings on Private Technical Support

The findings on private technical support on the FVC of Lao PDR based on the current situation described above is summarized in the table below.

Table 4.6.3 Findings on Private Technical Support

	Findings
Techniques	✓ Technical knowledge of input suppliers is limited for providing necessary agricultural knowledge to farmers. ✓ Very few companies are providing support necessary for farmers such as usage of pesticides, cultivation techniques etc. Most of the companies are providing only some advises and explanations to farmers.
Human Resources	✓ Human resources with technical knowledge of input suppliers etc. are very limited for providing support for farmers.
Infrastructure/Material	✓ There are no quick reference materials for input suppliers or farmers to understand easily how to use pesticides. ✓ Many of private companies, especially input suppliers are marginal or small, therefore they cannot afford to provide support to farmers.
Finance	✓ Most of private companies have negative effects by changing of the exchange rate of Kip in recent period.
Information	✓ Though production companies or pesticide, fertilizers etc. have technical knowledge, there is no mechanism transferring the knowledge to farmers through suppliers.
Linkage with FVC	✓ Linkage with PAFOs and DAFO are weak for technical support activities matching for farmers' needs.

Source: JICA project team

CHAPTER 5

FVC ANALYSIS FOR TARGET COMMODITIES

CHAPTER5 FVC ANALYSIS FOR TARGET COMMODITIES

5.1 Introduction

This chapter presents the result of FVC analysis for target commodities based on the FVC survey results described in Chapter 4. It summarizes the following topics: 1) actors and activities in FVC, 2) linkage of each FVC step, 3) value addition through FVC, and 4) key issues for each target commodity.

5.2 Main Actors and Linkage of FVCs for Target Commodities

This section shows the results of FVC analysis including 1) actors and activities in FVC, 2) linkage of each FVC step, and 3) value addition through FVC for each target commodity.

(1) Maize FVC (Vientiane Capital)

Main actors and activities of Maize FVC in Vientiane Capital are summarized in the table below:

Table 5.2.1 Actors and Activities of Maize FVC in Vientiane Capital

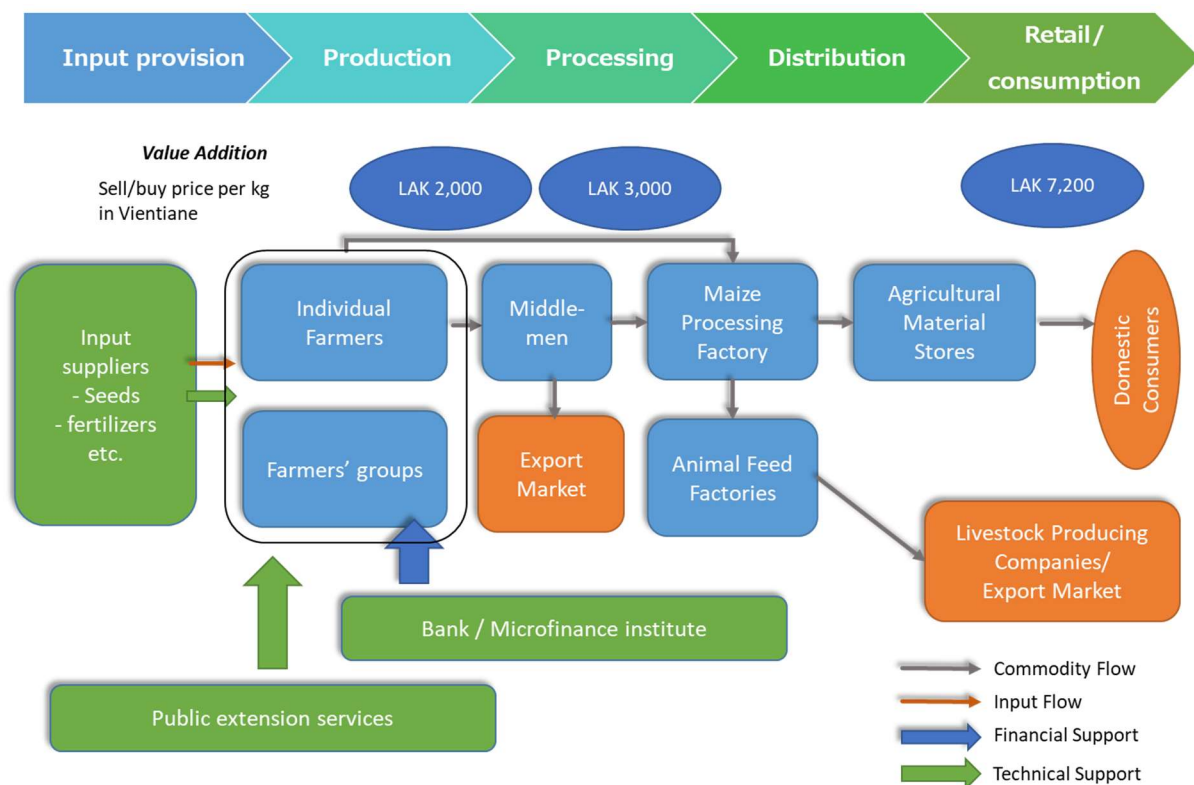
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	Maize milling factory, Animal feed factory, Livestock producing company	Middlemen, Export company	Agricultural material store
Activities	Growing, Harvesting, Transport	Collect, Storage, Processing, Transport, Packing	Collect, Transport, Export	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	Maize, Milled maize	Maize, Processed maize for animal feed	Milled maize
Output	Maize	Milled maize, Processed maize for animal feed	Maize, Processed maize for animal feed	Milled maize



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.1 Linkage and Value Addition of Maize FVC in Vientiane Capital

Current status of Maize FVC in Vientiane Capital is summarized below:

- Maize is cultivated in the rainy season, from middle of May, harvested about 120 days after sowing, and secondary crops are grown in the dry season.
- Farmers have issues on maize cultivation as below:
 - ✓ No application of compost.
 - ✓ No application of lime.
 - ✓ Sometimes there is no application of fertilizer.
 - ✓ Spacing is sometimes not even.
 - ✓ Army worm attacks cause yield reduction.
- Some farmers sow 1 seed per point, and others 2 or more. When more than 2 seeds are sown, yield of each plant is obviously lower especially when fertilizer is not enough.
- The damage by corn borers is obvious.
- Some farmers cultivate maize in contract farming. The contract stipulates the amount and price of crops delivered by the farmer. Surplus products can be sold to others. Middleman buys maize products from farmer when the farmer ships the amount determined by the contract.
- Farmers ship maize to processing factory (drying and milling) either through middlemen or directly.
- Before milling, raw maize are partly exported to China and other countries.

- Milled maize is generally sold as animal feed. In the case of CP, a major meat processing firm, 70% of the feed produced is consumed on its own farms and 30% is sold to the others.
- Due to the recent sharp drop of LAK, exports of Laotian maize and cassava to Thailand are increasing. So, it is difficult for the feed factories to procure these raw materials in Laos.
- Shortage of livestock feed such as maize in Laos is one of the issues. There is still room for improvement in maize cultivation to increase production.

(2) Spring Onion FVC (Vientiane Capital)

Main actors and activities of Spring Onion FVC in Vientiane Capital is summarized in the table below:

Table 5.2.2 Actors and Activities of Spring Onion FVC in Vientiane Capital

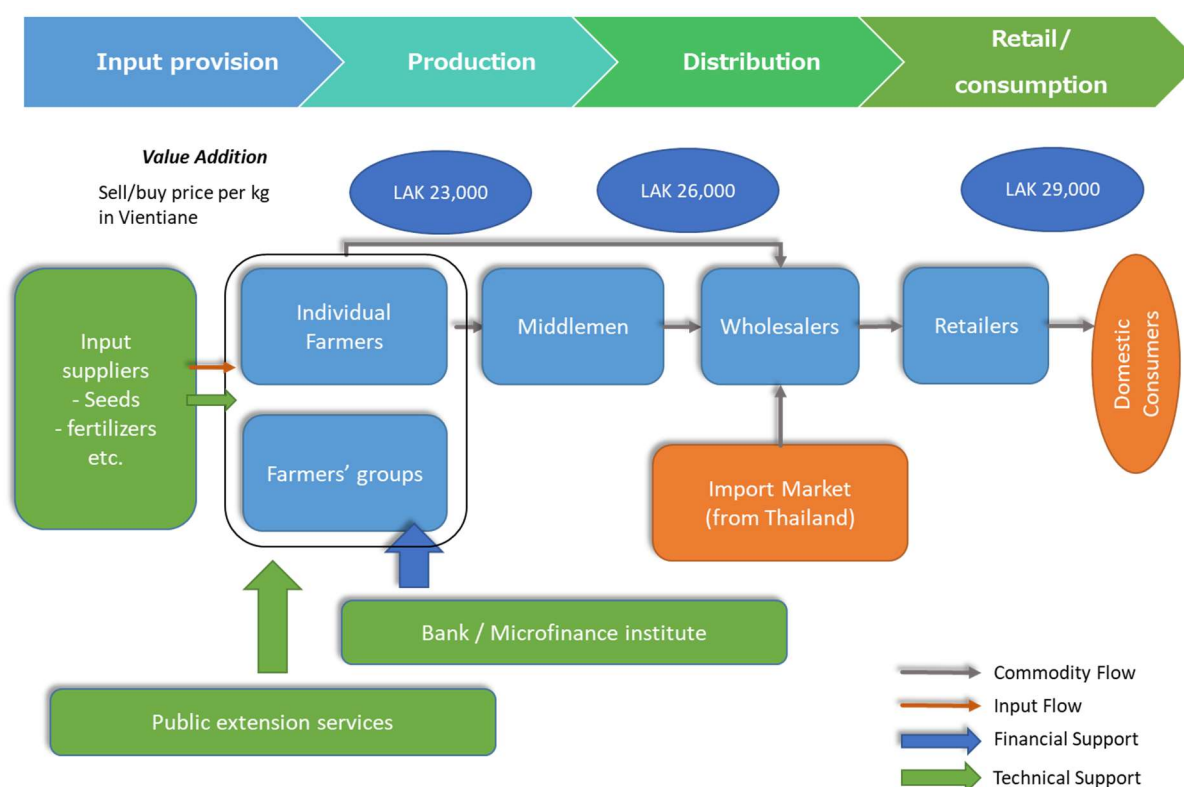
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	-	Middlemen, Import company, Wholesalers	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Wash, Transport	-	Collect, Transport, Sort, Pricing, Storage, Transaction, Import	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	-	Spring Onion	Spring Onion
Output	Spring Onion	-	Spring Onion	Spring Onion



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.2 Linkage and Value Addition of Spring Onion FVC in Vientiane Capital

Current status of Spring Onion FVC in Vientiane Capital is summarized below:

- Farmer produces spring onion twice in the season from Oct. to Jan. in single cropping followed by secondary crop cultivation or intercropping with chili or eggplant.
- Farmers have issues on spring onion cultivation as below:
 - ✓ No application of compost
 - ✓ No application of lime
 - ✓ Plants sometimes become yellowish and finally die with unknown reason
- Farmers sell washed spring onion to middlemen or directly to wholesalers in markets.
- Domestic spring onion sold in markets in Vientiane Capital are around 30% (from Vientiane capital and its surroundings) and those imported from Thailand are 60-70%, since season for supplying domestic spring onion is limited.
- Spring onion imported from Thailand is stored in the cold storage, since it is not supplied daily. But the cold storage facility is not enough in markets.

(3) Banana FVC (Vientiane Capital)

Main actors and activities of Banana FVC in Vientiane Capital is summarized in the table below:

Table 5.2.3 Actors and Activities of Banana FVC in Vientiane Capital

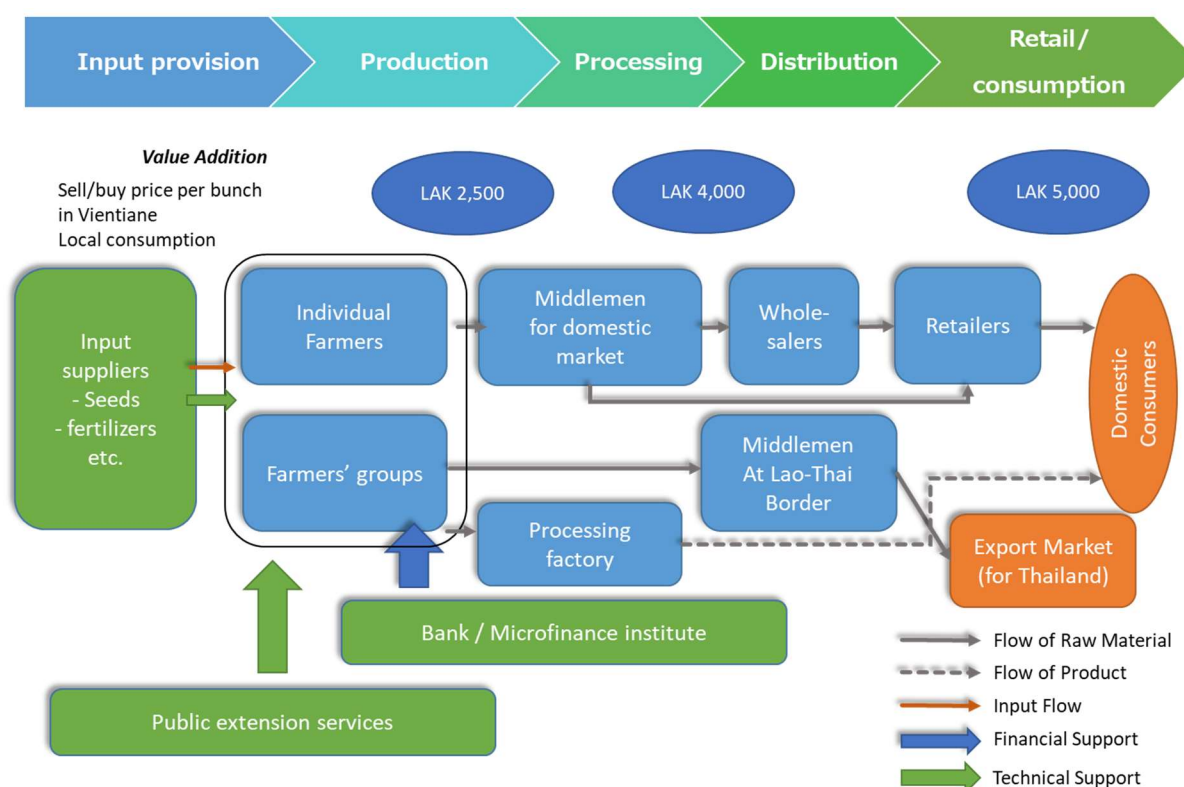
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	Banana processing factory	Middlemen for domestic market, Middlemen at Lao-Thai border, Wholesalers	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Transport	Collect, Process, Pack, Transport	Collect, Transport, Sort, Pricing, Transaction, Export	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	Banana in stem	Banana in stem	Banana in stem
Output	Banana in stem	Banana Chips	Banana in stem	Banana in bunch



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.3 Linkage and Value Addition of Banana FVC in Vientiane Capital

Current status of Banana FVC in Vientiane Capital is summarized below:

- Banana trees are usually transplanted in the end of April, and weed is controlled twice a year. It flowers 10-11 months after transplanting, followed by fruiting. The fruit is harvested 12 months after transplanting. The tree usually continues to produce fruit for 8-10 years.
- Farmers produce two local variety of banana ("kuway nam and Kuway home)
- Banana farmers are suffering banana disease whose symptom look like banana bacterial wilt. Farmers have no information and assistance on banana diseases and countermeasures.
- Banana farm gate price fluctuates, and recently it has been dropping due to COVID-19 and dropping of LAK.
- Bananas are shipped from farmers to local and export markets through middlemen.
- Some bananas are processed into dried banana chips and other processed foods by agro-processors.
- Banana plantations changed into cassava farms because of wide-spread of banana diseases and attractive cassava price.
- Generally, local bananas are grown by small scale producers and consumed locally within the same districts except few large banana plantations companies for export.
- The quality of bananas in markets in Vientiane Capital is deteriorated because of the long transportation distance.

(4) Sweet Corn FVC (Champasak)

Main actors and activities of Sweet Corn FVC in Champasak are summarized in the table below:

Table 5.2.4 Actors and Activities of Sweet Corn FVC in Champasak

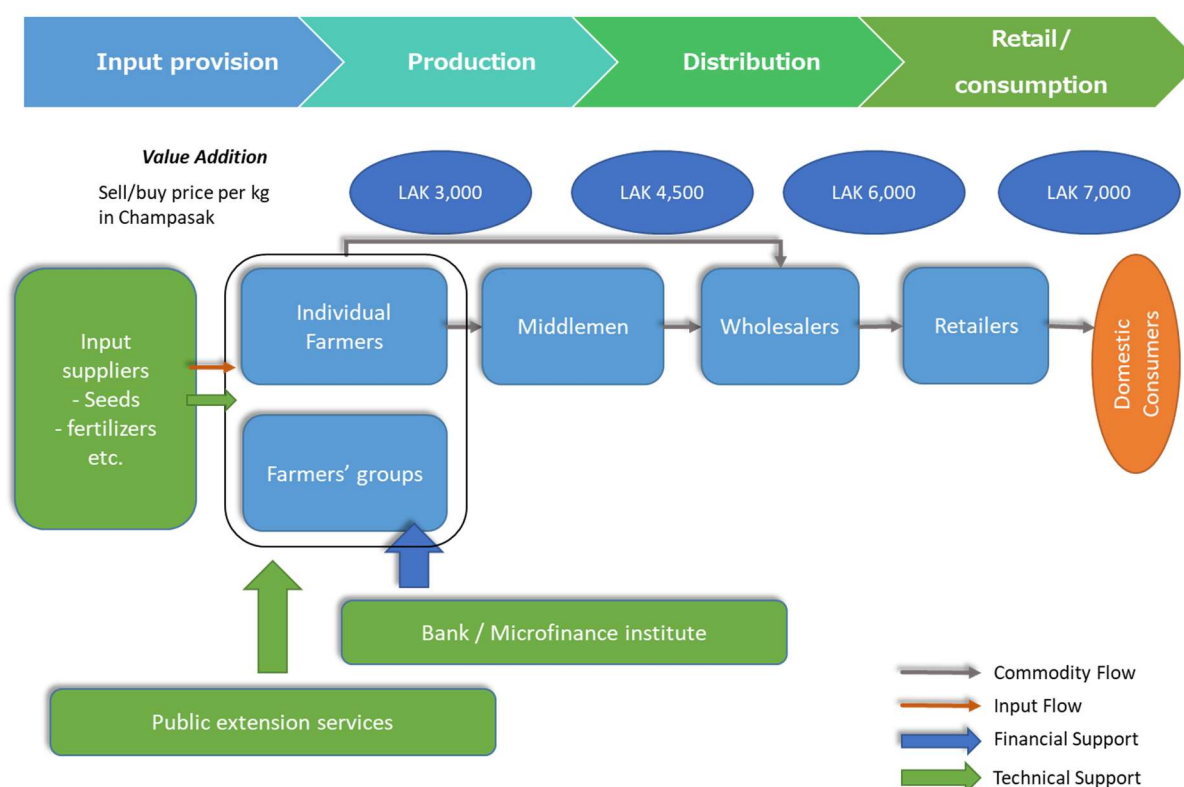
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	-	Middlemen, Wholesalers	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Transport	-	Collect, Transport, Sort, Pricing, Transaction, Export	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	-	Sweet Corn	Sweet Corn
Output	Sweet Corn	-	Sweet Corn	Sweet Corn



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.4 Linkage and Value Addition of Sweet Corn FVC in Champasak

Current status of Sweet Corn FVC in Champasak is summarized below:

- Sweet corn can be cultivated multiple times throughout the year (Harvest 90 days after sowing). Some farmers repeat cultivation 4 times/year, but continuous cropping disorder is not recognized by most farmers.
- Farmers generally sell sweet corn to middlemen at farm gate or wholesalers in local markets. Sometimes farmers boil sweet corn and sell it to customers directly.
- Compared to maize, prices of sweet corn are higher and less work such as drying etc. is required.
- Both import and export amount of sweet corn is negligible. Most sweet corn is produced and consumed domestically.

(5) Cabbage FVC (Champasak)

Main actors and activities of Cabbage FVC in Champasak are summarized in the table below:

Table 5.2.5 Actors and Activities of Cabbage FVC in Champasak

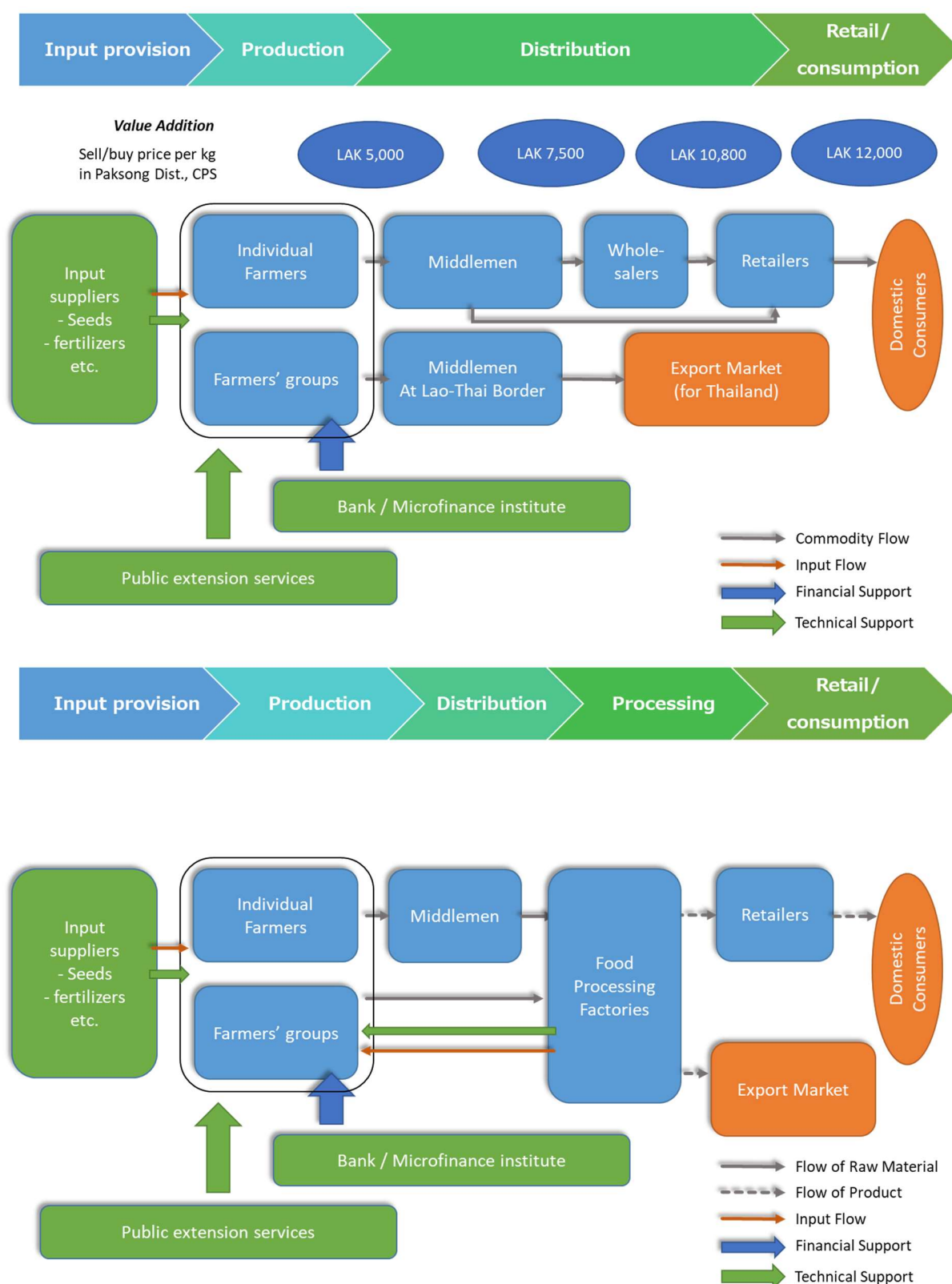
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	Food processing factories	Middlemen for domestic market, Middlemen at Lao-Thai border, Wholesalers	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Transport	Collect, Process, Pack, Transport, technical support	Collect, Transport, Sort, Pricing, Transaction, Export	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	Cabbage	Cabbage	Cabbage
Output	Cabbage	Dried cabbage etc.	Cabbage	Cabbage



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.5 Linkage and Value Addition of Cabbage FVC in Champasak

Current status of Cabbage FVC in Champasak is summarized below:

- Cabbage can be cultivated multiple times throughout the year. Some farmers repeat cultivation 4 times/year.
- Farmers have issues on cabbage cultivation as below:
 - ✓ The land preparation is not enough, and the field is not flat.
 - ✓ Tillage depth may be shallow.
 - ✓ Attached by many butterfly caterpillars.
 - ✓ Disadvantages of single cropping for many years are not known.
 - ✓ No application of compost
 - ✓ No application of lime
 - ✓ Cabbage roots become distorted, and the plant dies because of soil-borne disease
 - ✓ Countermeasures against soil-borne diseases are not known.
- When cabbage fields in Bolaven Plateau are polluted by the soil-borne disease, cabbage production would become very difficult, and farmers could not supply enough amount of cabbage constantly in the future.
- Some processing factories (ex. First Food Sole Co., Ltd), which has contract farming with farmers provides technical support to farmers such as 1) technical advises for cultivation, 2) demonstration farm, and 3) provision of seedling etc.
- Cabbage is purchased by middlemen and sold in domestic and export markets. In some cases, cabbage is transported to Vientiane Capital markets for trading. Middlemen at the Lao-Thai border export cabbage to Thailand.
- Damage due to high temperature during storage and transportation is a problem.
- Due to the fuel and fertilizer price escalation, vegetables grown in Bolaven Plateau has been decreasing.

(6) Avocado FVC (Champasak)

Main actors and activities of Avocado FVC in Champasak is summarized in the table below:

Table 5.2.6 Actors and Activities of Avocado FVC in Champasak

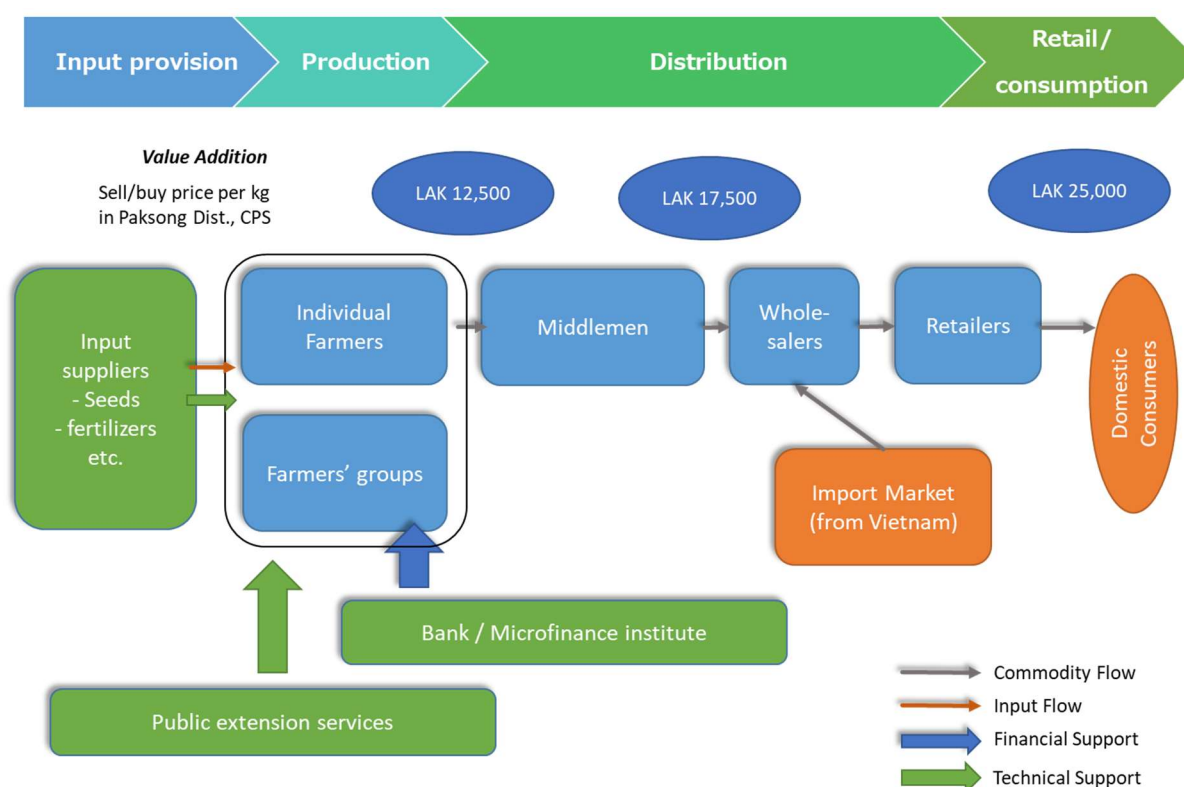
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	-	Middlemen, Export company Import company, Wholesalers	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Transport	-	Collect, Transport, Sort, Pricing, Transaction, Export, Import	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	-	Avocado	Avocado
Output	Avocado	-	Avocado	Avocado



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.6 Linkage and Value Addition of Avocado FVC in Champasak

Current status of Avocado FVC in Champasak is summarized below:

- Avocado producers are facing many problems for cultivation, such as grafting, soil improvement, irrigation system, fertilization, and pest control.
- A large-scale avocado producer has connections to international networks with avocado producers' groups. The producer can revive technical information and advice from the network.
- Locally grown avocado is smaller and less attractive for some customers than those fruits imported from Thailand and Vietnam. Harvested amounts of locally grown avocado are also too small to meet domestic market demand.
- Avocado fruits are imported mainly from Vietnam. Imports have been increasing in recent years.

(7) Ginseng FVC (Sekong)

Main actors and activities of Ginseng FVC in Sekong are summarized in the table below:

Table 5.2.7 Actors and Activities of Ginseng FVC in Sekong

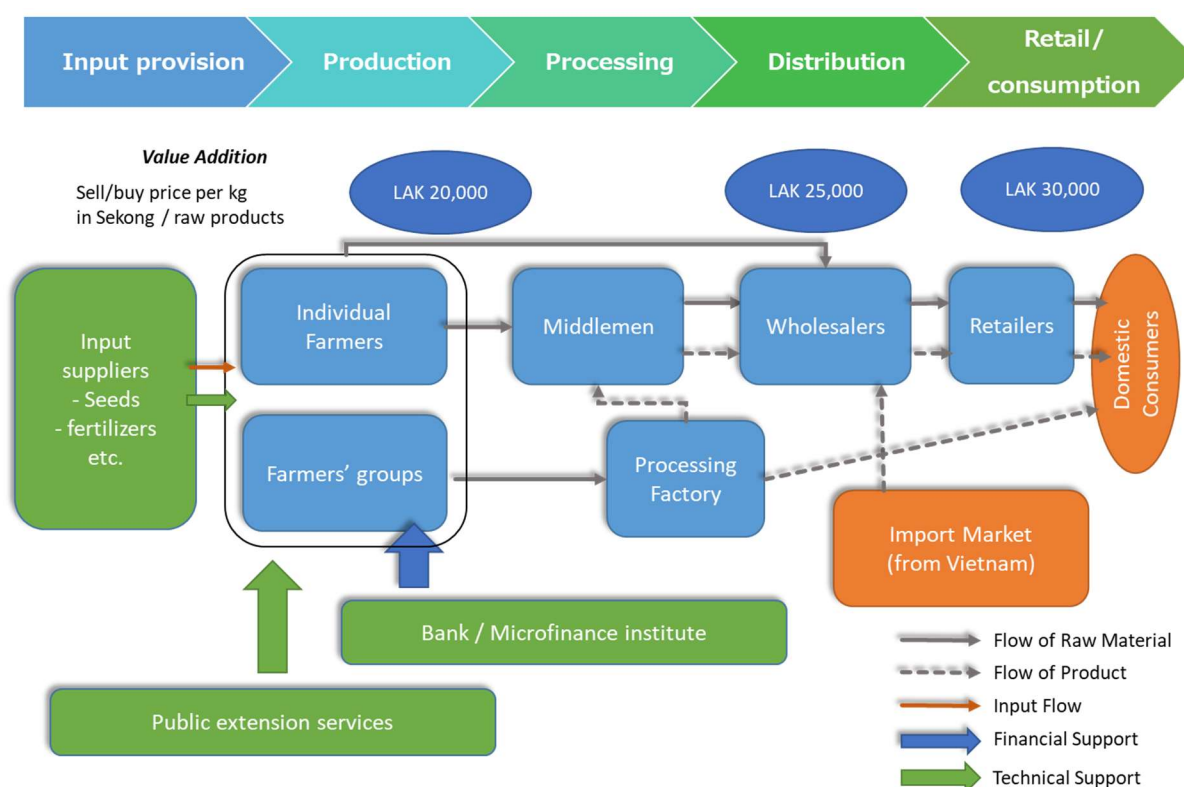
FVC Operation				
Input provision Production Processing Distribution Retail/ consumption				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	Processing factory	Middlemen, Wholesalers, Import company	Traditional retailers, Modern retailers
Activities	Growing, Harvesting, Washing, Drying, Transport	Collect, Storage, Processing, Transport, Packing	Collect, Transport, Import	Transport, Storage, Selling to final consumer
Inputs	Seed, fertilizer, land, water, technique etc.	Raw Ginseng	Raw Ginseng, Processed Ginseng (powder, tea, etc.)	Raw Ginseng, Processed Ginseng (powder, tea, etc.)
Output	Raw Ginseng	Processed Ginseng (powder, tea, etc.)	Raw Ginseng, Processed Ginseng (powder, tea, etc.)	Raw Ginseng, Processed Ginseng (powder, tea, etc.)



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.7 Linkage and Value Addition of Ginseng FVC in Sekong

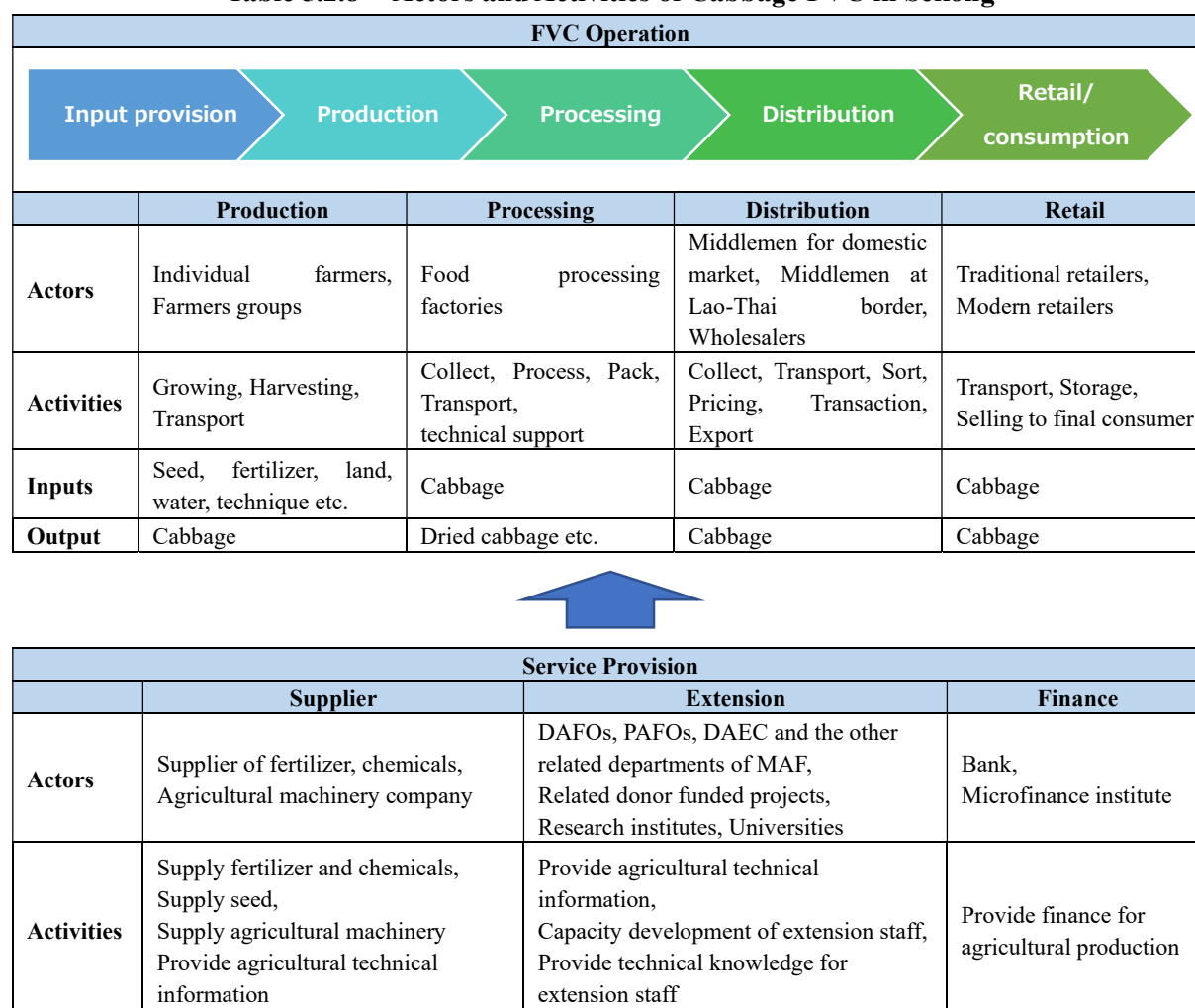
Current status of Ginseng FVC in Sekong is summarized below:

- Farmers grow ginseng in the manner of mixed cultivation such as with coffee, sweet corn, cucumber, pumpkin, Brassica crops (mustard and others), rice and others.
- This plant is a vine, but neither Korean ginseng (*Panax ginseng*) nor Chinese ginseng (*Panax notoginseng*) are vines. Lao ginseng plant has not been identified (ingredients, medicinal effects, safety etc.).
- Farmers sell ginseng by themselves in the market and sometimes to middleman coming to buy at farm gate. Middleman orders the number of ginsengs prior to their visit.
- Several ginseng processing factories with processing facility (drying, powdering, extracting/concentration, and packaging machines) produce ginseng powder, tea etc. They sell the products to middlemen or directly to consumers.
- Ginseng processed products from Vietnam is imported for domestic market.
- Ginseng is available all year round but not large amounts. Ginseng prices are not stable.
- In recent years, demand for the ginseng is increasing and processors in Sekong City face difficulty in procurement.

(8) Cabbage FVC (Sekong)

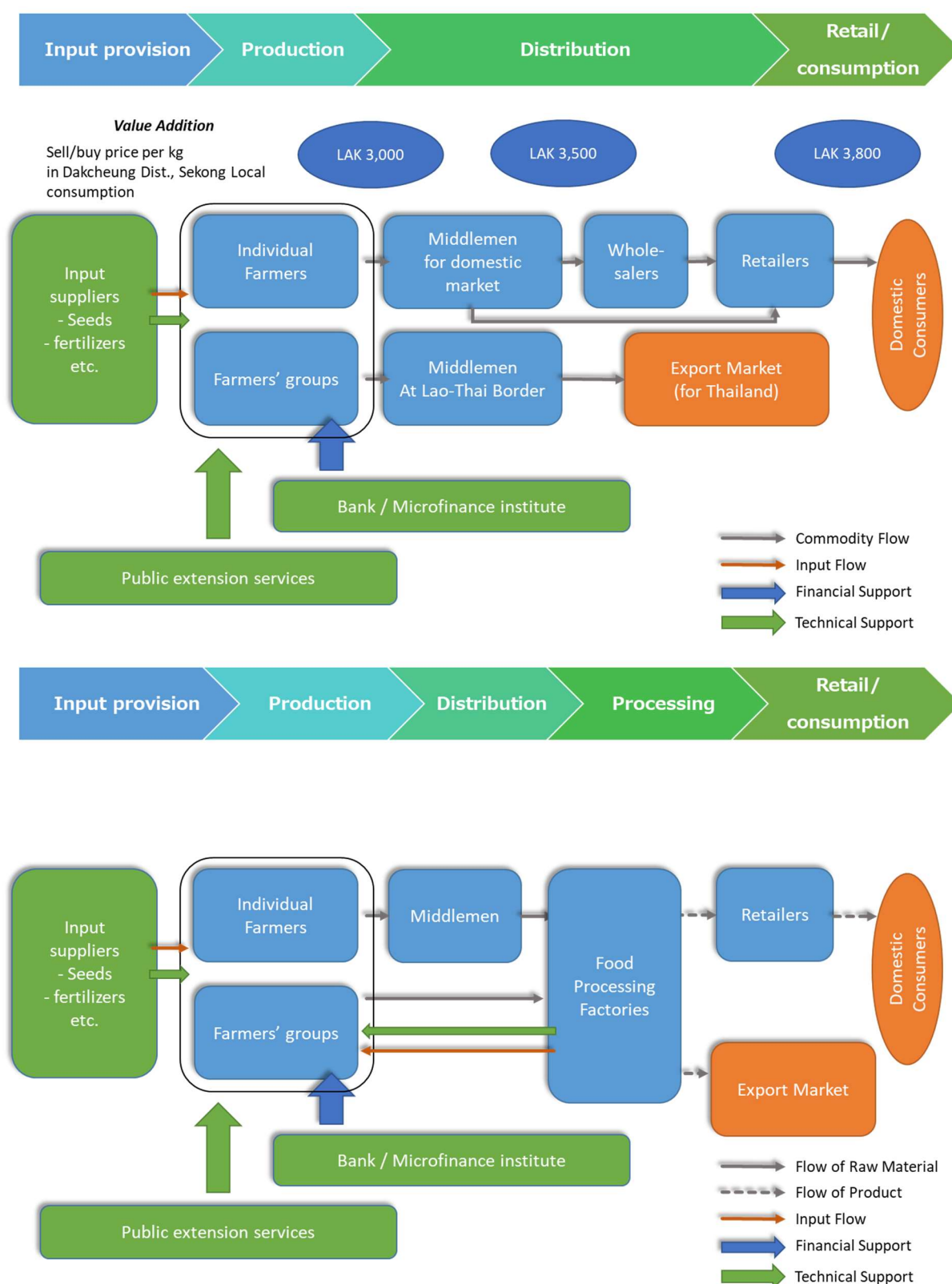
Main actors and activities of Cabbage FVC in Sekong are summarized in the table below:

Table 5.2.8 Actors and Activities of Cabbage FVC in Sekong



Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.8 Linkage and Value Addition of Cabbage FVC in Sekong

Current status of Cabbage FVC in Sekong is summarized below:

- According to the annual sales data of 9 target crops by producers surveyed, the annual sales of cabbage and banana are large. It can be said that cabbage and banana are important crops for producers.
- Cabbage can be cultivated multiple times throughout the year. Some farmers repeat cultivation 4 times/year.
- Farmers have issues on cabbage cultivation as below:
 - ✓ The land preparation is not enough, and the field is not flat.
 - ✓ Tillage depth may be shallow.
 - ✓ Attached by many butterfly caterpillars.
 - ✓ Disadvantages of single cropping for many years are not known.
 - ✓ No application of compost
 - ✓ No application of lime
 - ✓ Cabbage roots become distorted, and the plant dies because of soil-borne disease
 - ✓ Countermeasures against soil-borne diseases are not known.
- When cabbage fields in Bolaven Plateau are polluted by the soil-borne disease, cabbage production would become very difficult, and farmers could not supply enough amount of cabbage constantly in the future.
- Some processing factories (ex. First Food Sole Co., Ltd), which have contract farming with farmers provide technical support to farmers such as 1) technical advises for cultivation, 2) demonstration farm, 3) provision of seedling etc.
- Cabbage is purchased by middlemen and sold in domestic and export markets. In some cases, cabbage is transported to Vientiane Capital markets for trading. Middlemen at the Lao-Thai border export cabbage to Thailand.
- Damage due to high temperature during storage and transportation is a problem.
- Due to the fuel and fertilizer price escalation, vegetables grown in Bolaven Plateau has been decreasing.

(9) Banana FVC (Sekong)

Main actors and activities of Banana FVC in Sekong are summarized in the table below:

Table 5.2.9 Actors and Activities of Banana FVC in Sekong

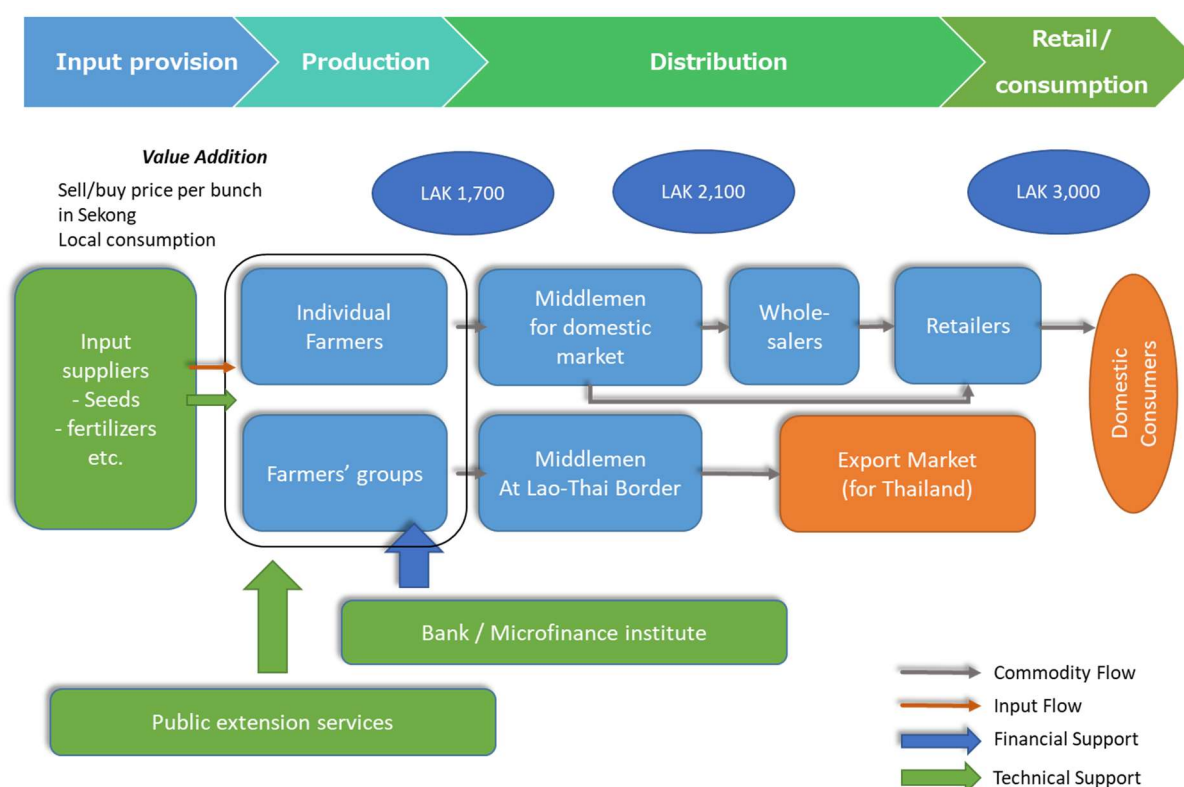
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Individual farmers, Farmers groups	Middlemen for domestic market, Middlemen at Lao-Thai border, Wholesalers	Traditional retailers, Modern retailers	Individual farmers, Farmers groups
Activities	Growing, Harvesting, Transport	Collect, Transport, Sort, Pricing, Transaction, Export	Transport, Storage, Selling to final consumer	Growing, Harvesting, Transport
Inputs	Seed, fertilizer, land, water, technique etc.	Banana in stem	Banana in stem	Seed, fertilizer, land, water, technique etc.
Output	Banana in stem	Banana in stem	Banana in bunch	Banana in stem



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of fertilizer, chemicals, Agricultural machinery company	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply fertilizer and chemicals, Supply seed, Supply agricultural machinery Provide agricultural technical information	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.9 Linkage and Value Addition of Banana FVC in Sekong

Current status of Banana FVC in Sekong is summarized below:

- According to the annual sales data of 9 target crops by producers surveyed, the annual sales of cabbage and banana are large. It can be said that cabbage and banana are important crops for producers.
- Banana trees are usually transplanted in the end of April, and weed is controlled twice a year. It flowers 10-11 months after transplanting, followed by fruiting. The fruit is harvested 12 months after transplanting. The tree usually continues to produce fruit for 8-10 years.
- Farmers produce two local variety of banana (kuway nam and kuway home)
- Banana farmers are suffering banana disease whose symptom look like banana bacterial wilt. Farmers have no information and assistance on banana diseases and countermeasures.
- Banana farm gate price fluctuates, and recently it has been dropping due to COVID-19 and dropping of LAK.
- Bananas are shipped from farmers to local and export markets through middlemen.
- Some bananas are processed into dried banana chips and other processed foods by agro-processors.
- Banana plantations changed into cassava farms because of wide-spread of banana diseases and attractive cassava prices.
- Generally, local bananas are grown by small scale producers and consumed locally within the same

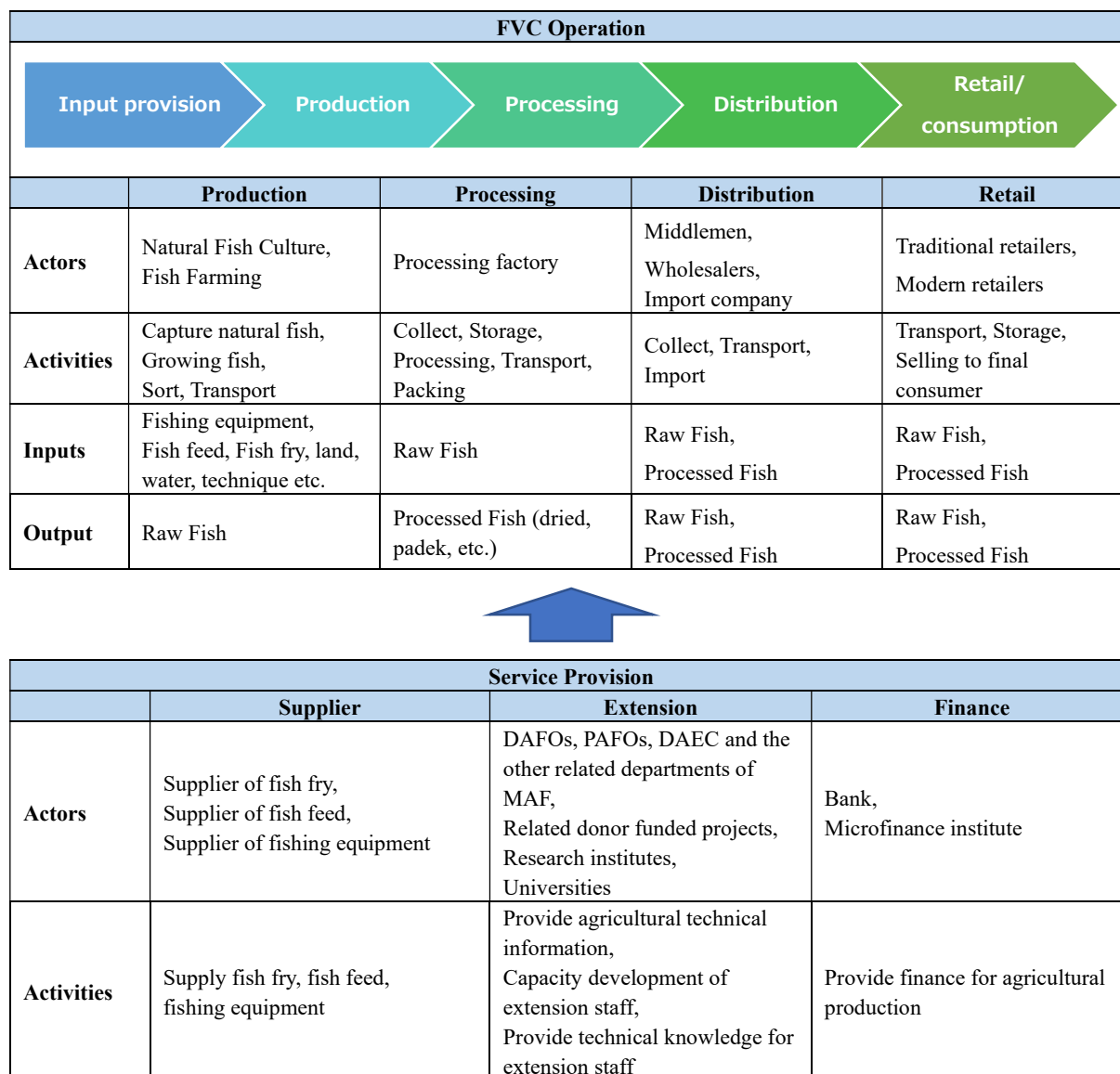
districts except for few large banana plantations companies for export.

- The quality of bananas in markets in Vientiane Capital is deteriorated because of the long transportation distance.

(10) Fish FVC

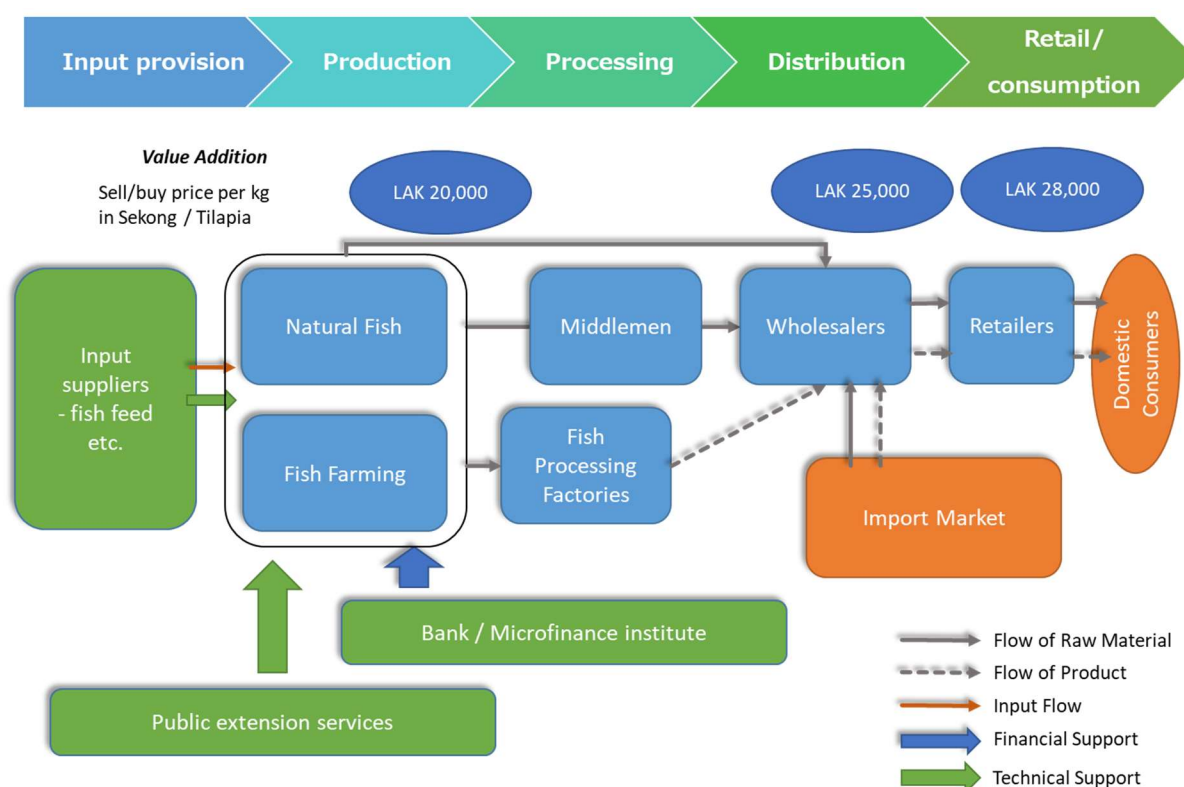
Main actors and activities of Fish FVC is summarized in the table below:

Table 5.2.10 Actors and Activities of Fish FVC



Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.10 Linkage and Value Addition of Fish FVC

Current status of Fish FVC is summarized below:

- Fish are supplied to markets from natural and farming fish.
- Production amount of local fish farming is fluctuated and unstable. The production amount of natural fish caught has been decreasing for a past couple of years due to fish catchment by using electric devise and/or other factors.
- Much of the fish feed is imported.
- Prices of fuel for boat fishing is escalating.
- Competition with foreign fish producers is getting higher and higher.
- Fish processing industries such as Padek (seasoning of Laos fermented fish) are facing severe competition from Thai companies.
- Price of raw materials for fish processing is increasing.

(11) Pig & Cattle FVC

Main actors and activities of Pig & Cattle FVC is summarized in the table below:

Table 5.2.11 Actors and Activities of Pig & Cattle FVC

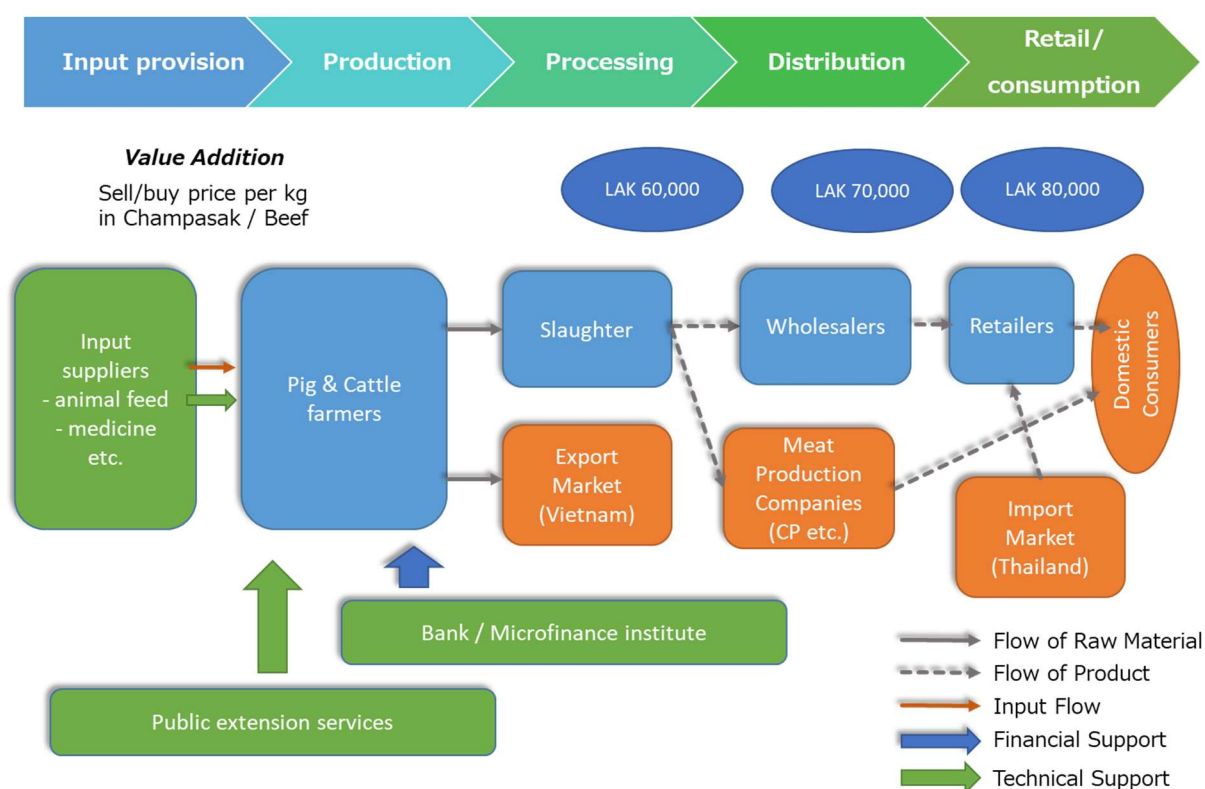
FVC Operation				
	Production	Processing	Distribution	Retail
Actors	Pig & Cattle Farm	Slaughter, Meet production company	Middlemen, Wholesalers, Export company, Import company	Traditional retailers, Modern retailers
Activities	Growing Pig & Cattle, Transport	Collect, Slaughter Sort, Transport	Collect, Transport, Processing, Export	Transport, Storage, Selling to final consumer
Inputs	calves and piglet for growing, animal feed, barn, land, water, technique etc.	Pig & Cattle, Carcass	Carcass, Pig & cattle meat, Pig & Cattle	Pig & cattle meat
Output	Pig & Cattle	Carcass, Pig & cattle meat	Pig & cattle meat, Pig & Cattle	Pig & cattle meat



Service Provision			
	Supplier	Extension	Finance
Actors	Supplier of calves and piglet for growing, Supplier of animal feed, Supplier of animal medicine	DAFOs, PAFOs, DAEC and the other related departments of MAF, Related donor funded projects, Research institutes, Universities	Bank, Microfinance institute
Activities	Supply of calves and piglet for growing, animal feed, animal medicine	Provide agricultural technical information, Capacity development of extension staff, Provide technical knowledge for extension staff	Provide finance for agricultural production

Source: JICA project team

Linkage of each FVC step and value addition through FVC is summarized in the figure below:



Source: JICA project team

Figure 5.2.11 Linkage and Value Addition of Pig & Cattle FVC

Current status of Pig & Cattle FVC is summarized below:

- Producers have insufficient knowledge for disease management for livestock.
- Livestock farming has characteristics of high Initial investment cost and longer time to return on investment.
- Despite market needs, the number of cattle raised in Laos has been declining due to low levels of breeding and fattening technology.
- The number of pig slaughtered by local slaughterhouses is decreasing due to the monopolized livestock market by large scale companies.
- Large scale companies control distribution of meat in terms of amount and price.
- Pre-processed cattle and pigs are exported to foreign countries. After processing, they are not exported due to Laos' low sanitary standards.
- Most beef sold in modern supermarkets is imported from other countries. Most of the variety of Lao local cattle is not suitable for steak or BBQ.

5.3 Key Issues on FVCs for Target Commodities

This section shows key issues on FVC from the FVC survey results and FVC analysis for five categories including vegetables, fruits, medicinal plant, fish and pig & cattle.

(1) Key Issues on Vegetable (including maize) FVC

Table 5.3.1 Key Issues on Vegetable (including maize) FVC

FVC Operation			
Producers	Processing	Middlemen/ Wholesalers	Retailers/ Consumers
<u>Farming Techniques</u> ✓ Insufficient knowledge for vegetable cultivation (improper land preparation, single cropping, insufficient knowledge for disease control) ✓ No application of compost and lime, sometimes even fertilizer ✓ Severe damage of diseases and insects ✓ Low negotiation power to middlemen <u>Farm Management</u> ✓ Insufficient knowledge for farm management (accounting, cropping pattern arrangement, group management etc.)	✓ Increase of price of raw material of maize ✓ Limited capacity of pesticide residual testing of soil or crops that meet GAP standards ✓ Occurrence of sudden electricity failure	✓ Unstable quantity of vegetables brought to the market resulted in large price fluctuations and supply shortages ✓ Damage due to high temperature during storage and transportation ✓ No regulation and restriction on foreigners for agricultural production ✓ Many layers of middlemen to control the prices ✓ Unsuitable market facilities for various levels of traders ✓ Escalation of fuel, fertilizer prices	✓ Few supplies of domestic quality vegetables are even highly demanded by modern retailers ✓ Competition with imported vegetable products ✓ Low packing techniques



Service Provision		
Input suppliers	Bank / Microfinance institute	Public extension services
✓ No quality control system for seeds and fertilizers ✓ Low compliance to relevant laws and regulations ✓ Limited technical knowledge of input suppliers ✓ High dependence on imported agricultural inputs	✓ Limited finance service coverage and support for agriculture sector ✓ Untimely loan provision ✓ Necessity of a lot of efforts to get farmers' management information and market information	✓ Lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ No utilization of the agricultural technology possessed by the academic and/or private sector. ✓ Limited budget and human resources of PAFO/DAFO ✓ Limited information of FVCs actors and no function of coordination role of FVCs

Source: JICA project team

(2) Key Issues on Fruit FVC

Table 5.3.2 Key Issues on Fruit FVC

FVC Operation			
Producers	Processing	Middlemen/ Wholesalers	Retailers/ Consumers
<u>Farming Techniques</u> ✓ Insufficient information for fruit tree management (grafting, soil improvement, irrigation system, fertilization, and pest control) ✓ No information on accurate pest diagnosis and appropriate countermeasures ✓ Quality and quantity of local fruits does not meet the market demand ✓ Low negotiation power to middlemen <u>Farm Management</u> ✓ Insufficient knowledge for farm management (accounting, cropping pattern arrangement, group management etc.)	✓ Challenging to instruct farmers to follow cultivation methods for matching demanded quality of processors ✓ Limited capacity of pesticide residual testing of soil or crops that meet GAP standards ✓ Occurrence of sudden electricity failure	✓ Unstable quantity of vegetables brought to the market resulted in large price fluctuations and supply shortages ✓ Damage due to high temperature during storage and transportation ✓ No regulation and restriction on foreigners for agricultural production ✓ Many layers of middlemen to control the prices ✓ Unsuitable market facilities for various levels of traders ✓ Increase in fuel, fertilizer prices	✓ Few supplies of domestic quality vegetables are even highly demanded by modern retailers ✓ Competition with imported fruit products



Service Provision		
Input suppliers	Bank / Microfinance institute	Public extension services
✓ No quality control system for seeds and fertilizers ✓ Low compliance to relevant laws and regulations ✓ Limited technical knowledge of input suppliers ✓ High dependence on imported agricultural inputs	✓ Limited finance service coverage and support for agriculture sector ✓ Untimely loan provision ✓ Necessity of a lot of efforts to get farmers' management information and market information	✓ Lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ No utilization of the agricultural technology possessed by the academic and/or private sector. ✓ Limited budget and human resources of PAFO/DAFO ✓ Limited information of FVCs actors and no function of coordination role of FVCs

Source: JICA project team

(3) Key Issues on Medicinal Plant (Ginseng) FVC

Table 5.3.3 Key Issues on Medicinal Plant (Ginseng) FVC

FVC Operation			
Producers	Processing	Middlemen/ Wholesalers	Retailers/ Consumers
<u>Farming Techniques</u> ✓ Lao ginseng plant has not been identified. ✓ Damage by unknown disease of Ginseng <u>Farm Management</u> ✓ Insufficient knowledge for farm management (accounting, cropping pattern arrangement, group management etc.)	✓ Medicinal effects and ingredients are not confirmed	✓ No regulation and restriction on foreigners for agricultural production ✓ Many layers of middlemen to control the prices ✓ Unsuitable market facilities for various levels of traders ✓ Escalation of fuel, fertilizer prices	✓ Competition with imported ginseng products



Service Provision		
Input suppliers	Bank / Microfinance institute	Public extension services
✓ No quality control system for seeds and fertilizers ✓ Low compliance with relevant laws and regulations ✓ Limited technical knowledge of input suppliers ✓ High dependence on imported agricultural inputs	✓ Limited finance service coverage and support for agriculture sector ✓ Untimely loan provision ✓ Necessity of a lot of efforts to get farmers' management information and market information	✓ Lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ No utilization of the agricultural technology possessed by the academic and/or private sector. ✓ Limited budget and human resources of PAFO/DAFO ✓ Limited information of FVCs actors and no function of coordination role of FVCs

Source: JICA project team

(4) Key Issues on Fish Culture FVC

Table 5.3.4 Key Issues on Fish Culture FVC

FVC Operation			
Producers	Processing	Middlemen/ Wholesalers	Retailers/ Consumers
<u>Farming Techniques</u> ✓ Decrease in natural fish yield ✓ Fluctuation and unstable of production amount of fish farming ✓ Competition with foreign fish producers ✓ Increase of fuel prices for boat <u>Farm Management</u> ✓ Insufficient knowledge of farm management (accounting, group management etc.)	✓ Increase of raw material price for fish processing ✓ Shortage of raw fish for processing	✓ Damage during storage and transportation ✓ No regulation and restriction on foreigners for agricultural production ✓ Many layers of middlemen to control the prices ✓ Unsuitable market facilities for various levels of traders ✓ Escalation of fuel prices	✓ Competition with imported fish products



Service Provision		
Input suppliers	Bank / Microfinance institute	Public extension services
✓ No quality control system for seeds and fertilizers ✓ Low compliance with relevant laws and regulations ✓ Limited technical knowledge of input suppliers ✓ High dependence on imported agricultural inputs	✓ Limited finance service coverage and support for agriculture sector ✓ Untimely loan provision ✓ Necessity of a lot of efforts to get farmers' management information and market information	✓ Lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ No utilization of the agricultural technology possessed by the academic and/or private sector. ✓ Limited budget and human resources of PAFO/DAFO ✓ Limited number of staff with specialty for fish culture and livestock production ✓ Limited information of FVCs actors and no function of coordination role of FVCs

Source: JICA project team

(5) Key Issues on Pig & Cattle FVC

Table 5.3.5 Key Issues on Pig & Cattle FVC

FVC Operation			
Producers	Processing	Middlemen/ Wholesalers	Retailers/ Consumers
<u>Farming Techniques</u> ✓ Insufficient knowledge for disease management for livestock ✓ High Initial investment cost and longer time to return on investment ✓ Most of the variety of Lao local cattle is not suitable for steak or BBQ <u>Farm Management</u> ✓ Insufficient knowledge for farm management (accounting, group management etc.)	✓ Decrease in the number of pigs slaughtered due to monopolized livestock market by large scale companies	✓ Large scale companies control distribution of meat in terms of amount and price. ✓ Damage during storage and transportation ✓ No regulation and restriction on foreigners for agricultural production ✓ Many layers of middlemen to control the prices ✓ Unsuitable market facilities for various levels of traders ✓ Escalation of fuel prices	✓ Most beef sold in modern supermarkets is imported from other countries. ✓ Competition with imported meat products



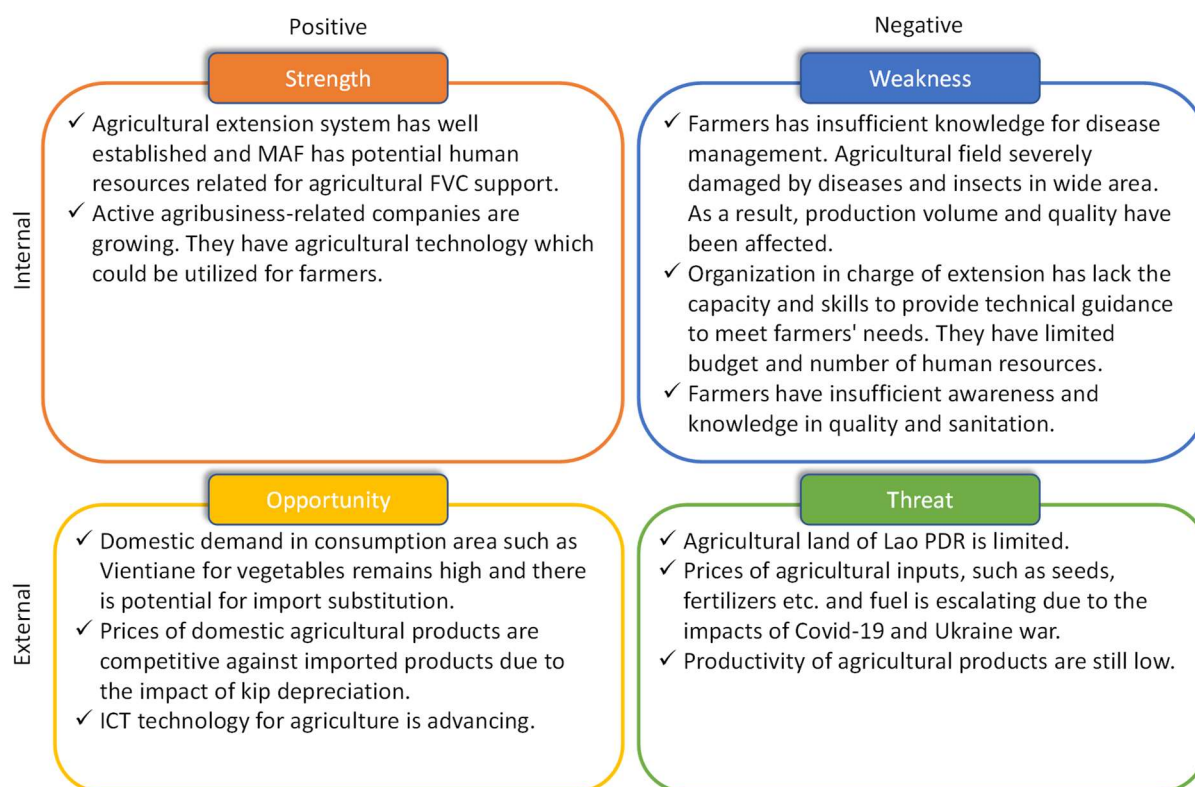
Service Provision		
Input suppliers	Bank / Microfinance institute	Public extension services
✓ No quality control system for seeds and fertilizers ✓ Low compliance with relevant laws and regulations ✓ Limited technical knowledge of input suppliers ✓ High dependence on imported agricultural inputs	✓ Limited finance service coverage and support for agriculture sector ✓ Untimely loan provision ✓ Necessity of a lot of efforts to get farmers' management information and market information	✓ Lack the capacity and skills to provide technical guidance to meet farmers' needs. ✓ No utilization of the agricultural technology possessed by the academic and/or private sector. ✓ Limited budget and human resources of PAFO/DAFO ✓ Limited number of staff with specialty for fish culture and livestock production ✓ Limited information of FVCs actors and no function of coordination role of FVCs

Source: JICA project team

5.4 SWOT Analysis for Strengthening of FVC in Lao PDR

Based on the results of the FVC analysis, SWOT analysis of the characteristics of FVCs for three categories namely domestic, modern domestic and export FVCs in Lao PDR is presented in the figure below.

(1) FVC for domestic market



Source: JICA project team

Figure 5.4.1 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of domestic agricultural products from the surrounding area of the consumption area such as Vientiane meet increasing demand of agricultural products

Strength & Threat: A strategy to manage threats with strengths.

To promote and support activities for strengthening agricultural techniques to increase productivity of agriculture

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

To improve awareness, capacity and knowledge of farmers to control pests and diseases and to improve quality control system by the government to meet quality and demand of agriculture

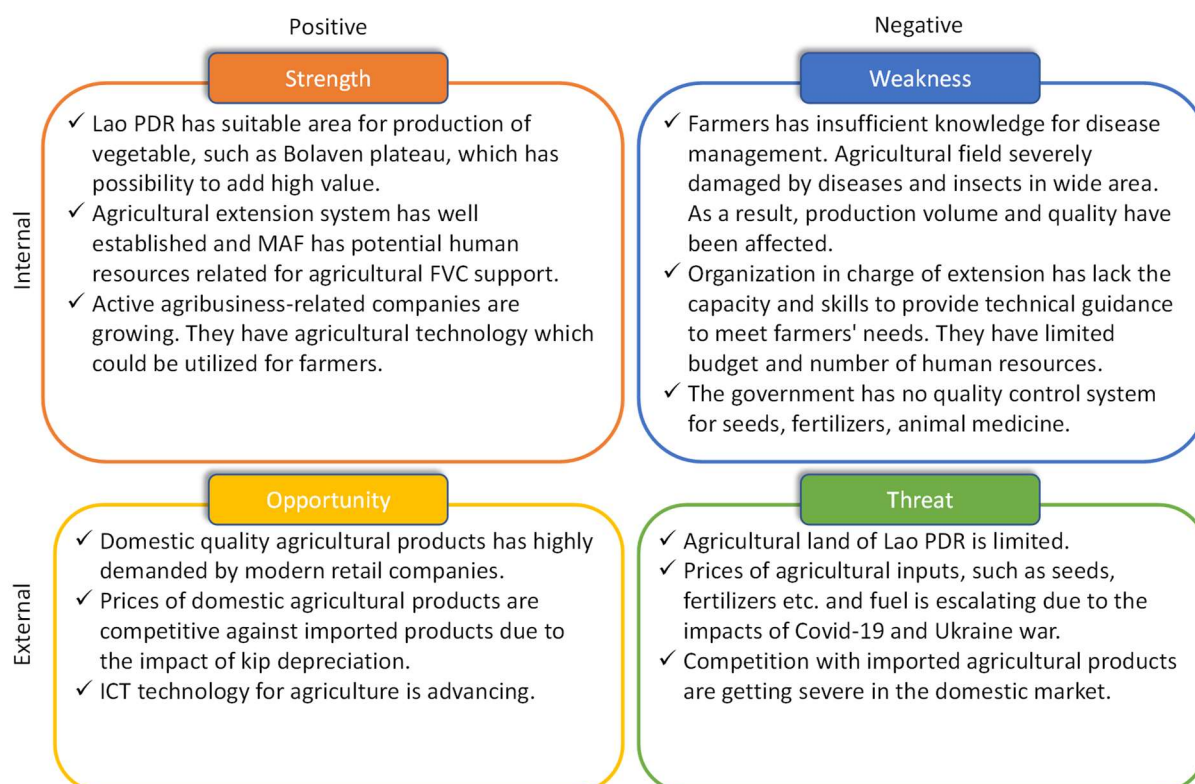
To introduce an extension approach utilizing ICT technologies to overcome budget and human

resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To support farmers technically to reduce agricultural input such as fertilizers, agro-chemicals etc. to address increase of price of agricultural input

(2) FVC for modern domestic market



Source: JICA project team

Figure 5.4.2 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for modern domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of domestic agricultural products in suitable areas such as Bolaven plateau to meet increasing demand of agricultural products

Strength & Threat: A strategy to manage threats with strengths.

To promote and support activities outstanding agribusiness-related companies in Lao PDR to increase competitiveness of agricultural products in the country

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

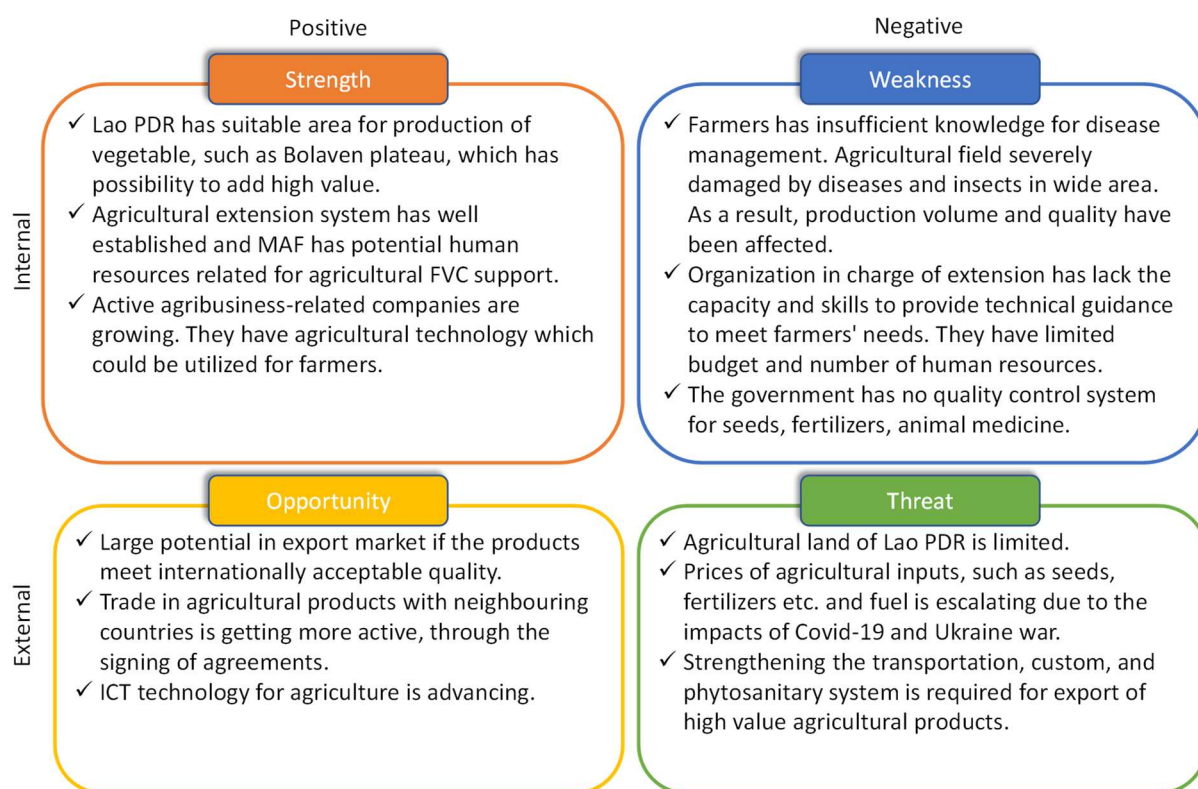
To improve the capacity and knowledge of farmers to control pest and diseases and to improve quality control system by the government to meet quality and demand of agricultural products

To introduce an extension approach utilizing ICT technologies to overcome budget and human resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To support farmers technically to reduce agricultural input such as fertilizers, agro-chemicals etc. to address increase of price of agricultural input

(3) FVC for export market



Source: JICA project team

Figure 5.4.3 SWOT Analysis of Domestic FVC in Lao PDR

The following are the results of study of FVC's strategy for domestic market in Lao PDR based on the above SWOT analysis to combine two factors from strengths, weaknesses, opportunities, and threats.

Strength & Opportunity: A strategy to maximize opportunities by making use of strengths

To promote production of export quality agricultural products in suitable areas such as Bolaven plateau to meet increasing demand of neighboring countries

Strength & Threat: A strategy to manage threats with strengths.

To promote and support activities outstanding agribusiness-related companies in Lao PDR to increase competitiveness of agricultural products in the country

Weakness & Opportunity: A strategy not to miss opportunities because of weaknesses

To introduce an extension approach utilizing ICT technologies to overcome budget and human resource shortage

Weakness & Threat: A strategy to avoid the worst-case scenario because of weaknesses and threats

To strengthen the transportation, custom, and phytosanitary system including regulation, procedure etc. for accelerating export of agricultural products based on international standards.

CHAPTER 6

TECHNICAL MEASURES FOR STRENGTHENING FVC

CHAPTER6 TECHNICAL MEASURES FOR STRENGTHENING FVC

6.1 Introduction

Based on the issues identified through preparatory study and field survey, technical measures have been considered. This chapter explains the proposed technical measures for strengthening FVC in Lao PDR.

- ◆ Technical Measures are the techniques to solve the issues on FVC processes, which were identified through field survey
- ◆ Category: The proposed technical Measures are categorized into 5 subjects, PR (Production and Processing), FM (Farm Management particularly in relation to farmers and farmer's group strengthening), MAR (Marketing consisting of distribution and retail), SUP (Supporting measures such as financial support, policy recommendation and quality checking), EX (Extension services by public, PAFO/DAFO, academic and private sector)
- ◆ Evaluation: To put sequential priority in the course of FVC strengthening MP till 2040, the proposed technical measures were prioritized through the evaluation on the criteria; (i) level of technology, (ii) cost to be required, and (iii) coverage whether the techniques can be widely disseminated

The concept and number of the proposed technical measures are as follows:

Table 6.1.1 Concept and Number of Technical Measures

Category	Concept	Number
PR (Production and Processing)	To stabilize and increase quality products as the most upstream of FVC	15
FM (Farm Management particularly in relation to farmers and farmer's group strengthening)	To enhance farmers and their groups to be part of vital key actors in FVC process	12
MAR (Marketing consisting of distribution and retail)	To ensure delivering quality domestic agricultural and processed products to consumers in timely manner	9
SUP (Supporting measures such as financial support, policy recommendation and quality checking)	To increase value addition by supporting input supply, financial and policy intervention	7
EX (Extension services by public, PAFO/DAFO, academic and private sector)	To enhance extension services by public as well as private and other external resources	6
Total		49

Source: JICA project team

6.2 Technical Measures for Production and Processing

6.2.1 Overview

Considering that production and processing stages are “Fundamental basis for FVC”, technical measures were proposed based on the following concept.

PR (Production and Processing)

Fundamental Basis for FVC

Issues

- Insufficient knowledge for vegetable cultivation, especially disease control
- Severe damage of diseases and insects
- Limited capacity of pesticide residual testing of soil or crops that meets GAP standards



Technical measures (PR) are “to stabilize and increase quality products as the most upstream of FVC

- Top priority in MP focusing on basic crop production techniques consisting of soil preparation, crop planning, fertilizer application and disease control etc.
- Livestock production basic techniques such as fattening, disease control etc.
- Processing for priority products on which DAEC focus
- Unique products promotion

Source: JICA project team

Figure 6.2.1 Concept of Technical Measures: PR (Production and Processing)

6.2.2 Technical Measures

The proposed technical measures for production and processing are as follows:

Table 6.2.1 Technical Measures for Production and Processing

No.	Technical Measures	Issues	Description of Measures
PR-01	Crop rotation	Farmers do not apply crop rotation techniques.	Study regional crop rotation systems, create guidance, and disseminate it to end farmers through PAFO and DAFO.
PR-02	Intercropping and mixed cropping	Few farmers introduce intercropping, and mixed cropping.	Carry out research on companion plants, create guidance on intercropping and mixed cropping, and disseminate it to end farmers through PAFO and DAFO.
PR-03	Soil preparation	Farmers do not apply lime and compost.	Carry out soil preparation research, create regional soil preparation guidelines, and disseminate them to end farmers through PAFO and DAFO, which includes lime and compost preparation and application methods.
PR-04	Coordination strengthening among research and extension	Farmers have no information on proper crop cultivation.	Carry out crop cultivation research, create regional cultivation guidelines with research institutes, and disseminate them to end farmers through PAFO and DAFO.
PR-05	Fertilizer application	Farmers do not apply fertilizers appropriately (type, timing,	Conduct Training on crop cultivation and fertilizer application with record creation and

No.	Technical Measures	Issues	Description of Measures
		amount).	disclosure of created records. Install simple measuring equipment for soil EC and soil pH in all PAFOs and DAFOs and train PAFO and DAFO extension staff
PR-06	Disease management for agricultural products	Farmers do not understand measures for diagnosis of diseases and how to control them.	Accelerate research on diagnosis and countermeasures of pests of major crops and establish diagnosis system to respond to consultations on pests from extension staff and farmers. Alternatively, develop AI diagnosis system in collaboration with organizations which have already created such a system. And the system will be utilized by all PAFO and DAFO extension staffs and farmers
PR-07	Pesticide application	Farmers do not use pesticides correctly (type, timing, amount).	Create Chemical Pesticide Usage Guideline and train PAFO and DAFO extension staff using the guideline.
PR-08	Product componential analysis	Lao ginseng plant has not been identified.	Identify plants to protect the lives and safety of consumers.
		Ginseng processors do not confirm medicinal effect and ingredients of Lao Ginseng.	Provide administrative guidance to processors from the perspective of monitoring misrepresentation of products
PR-09	Regulation of foreign investment in agricultural production (fishery)	Competition with foreign fish producers is getting higher and higher.	Regulate and restrict foreigners to engage in agricultural production to protect producers such as Lao fish farmers
PR-10	Disease management for livestock	Producers have insufficient knowledge for disease management for livestock.	Train agricultural specialists, especially veterinarians at university and vocational school
PR-11	Livestock production	Livestock farming has characteristics of high Initial investment cost and longer time to return on investment.	Improve access to preferential interest rate loans for large livestock producers
PR-11	Livestock production	Despite market needs, the number of cattle raised in Laos has been declining due to low levels of breeding and fattening technology.	Introduce new cattle breeds from breeders to meet market demand.
PR-12	Local pig promotion	The number of pig slaughtered by local slaughterhouse is decreasing due to monopolized livestock market by large scale company.	Promote productions of local pigs by branding
PR-13	Fish yield control and management	The price of raw materials for fish processing is increasing.	Preserve wild fish for sustainable wild fish catchment to stabilize wild fish production and price.
PR-14	Niche high valued products promotion	Ginseng production does not match the amount of ginseng demanded by processors.	Promote ginseng production to meet market demands
PR-15	Processing promotion of priority products	Processing for value addition is still challenging.	Promote processing of priority vegetables by DAEC

Source: JICA project team

6.3 Technical Measures for Farm Management

6.3.1 Overview

Considering that production and processing stages are “Important human resources to sustain FVC”, technical measures were proposed based on the following concept.

FM (Farm Management)

Important human resources to sustain FVC

Issues

- Farmers or farmers’ group skills and knowledge in farm management are still challenging in cropping, group management, marketing, market information access, financial access etc.

Technical measures (FM) are to enhance farmers and their groups to be part of vital key actors in FVC process.

- Group management technique
- Post-harvest techniques in farmers’ group level
- Financial management
- Marketing

Source: JICA project team

Figure 6.3.1 Concept of Technical Measures: FM (Farm Management)

6.3.2 Technical Measures

The proposed technical measures for farm management are as follows:

Table 6.3.1 Technical Measures for Farm Management

No.	Technical Measures	Issues	Description of Measures
FM-01	Household accounting management	Farmers or farmers' groups have insufficient knowledge for farm management for FVC strengthening.	Basic account technique
FM-02	Bookkeeping (Farm Record)		Computation of crop/product budgets, Record expenses and incomes, Cost reduction, Value addition
FM-03	Cropping Calendar (Cropping Pattern Arrangement)		Selection of suitable crops, Crop arrangement for maximum profit
FM-04	Post Harvest		Sorting, Grading, Processing, Packing, Packaging,
FM-05	Business plan		Business planning for Business activities in a sustainable manner
FM-06	Group formation/ Group strengthening		Advantages of group formation, Necessity of group strengthening
FM-07	Group accounting management		Basic skills to budget group activities
FM-08	Establishment of Cooperatives		Advantages in establishment of cooperative, Registration method
FM-09	Formulation of Water Users Association		Necessity of WUA
FM-10	Collective Selling / Purchasing		Advantages of collective selling / purchasing,

No.	Technical Measures	Issues	Description of Measures
FM-11	Rural finance accessibility improvement		Microfinance, bank loan, Self Help Group (SHG)
FM-12	Market information access improvement		Concept of marketing, main element of marketing, marketing strategies

Source: JICA project team

6.4 Technical Measures for Marketing consisting of Distribution and Retail

6.4.1 Overview

Considering that production and processing stages are “Distribution and retail to deliver products to consumers”, technical measures were proposed based on the following concept.

MAR (Marketing)

Distribution and retail to deliver products to consumers

Issues

- Few supplies of domestic quality vegetables even highly demanded by modern retailers
- Competition with imported vegetable products



Technical measures (MAR) are to ensure delivering quality domestic agricultural and processed products to consumers in timely manner

- Marketing facilities improvement
- Financial scheme to marketing actors
- Government policy support to promotion of domestic agricultural products
- Market information system improvement

Source: JICA project team

Figure 6.4.1 Concept of Technical Measures: MAR (Marketing)

6.4.2 Technical Measures

The proposed technical measures for Marketing are as follows:

Table 6.4.1 Technical Measures for Marketing

No.	Technical Measures	Issues	Description of Measures
MAR-01	Cold storage installation	Vegetables are damaged during storage due to the insufficient capacity of cold storage facility of markets. Markets also cannot store vegetables for long periods of time.	Support markets in finance to install cold storage.
MAR-02	Strengthening financial scheme to middlemen	Middlemen has low financial capacity to purchase a light truck.	Support middlemen in finance to purchase a light truck
MAR-03	Cold chain improvement	High temperatures during storage and transportation of vegetables have caused damage.	Install air-conditioning system in transportation of vegetables
MAR-04	Price control policy by the Government	Many layers of middlemen are forming network among them and controlling	The government to prevent middlemen to control prices

No.	Technical Measures	Issues	Description of Measures
		the prices of vegetables.	
MAR-05	Foreign investment control by the Government	There is no regulation and restriction on foreigners for agricultural production.	The government to restrict foreigners from agricultural production. Restrict imports of vegetables and fruits which have potential to produce in Laos.
MAR-06	Market information system improvement	The unstable quantity of vegetables brought to the market has resulted in large price fluctuations and supply shortages.	Establish an information system to collect and share the amount and price of vegetables handling in each market.
MAR-07	Distribution improvement to preserve products	Vegetables and fruits are damaged caused by the transportation of long distance.	Introduce loss reducing system during the transportation of vegetables and fruits
MAR-08	Market facilities improvement to suit various levels of traders	Market facilities may not be suitable and convenient for traders in some markets, such as parking areas for loading/unloading the products.	Support markets in finance to improve the market facilities. Promote investors to develop a new market in the areas where market capacity is inadequate.
MAR-09	Packing improvement for distribution	Some processing companies have insufficient techniques of packing.	Train some of the consignment companies on packing and management of the vegetables on shelf.

Source: JICA project team

6.5 Technical Measures for Supporting Measures for Agricultural Input Supply and Finance

6.5.1 Overview

Considering that production and processing stages are “Supporting measures by soft skills to overall FVC process”, technical measures were proposed based on the following concept.

SUP (Supporting measures for Agricultural Input Supply and Finance)

Supporting measures by soft skills to overall FVC process

Issues

- Limited finance service coverage and support for agriculture sector
- No quality control system for seeds and fertilizers
- Limited technical knowledge of input suppliers



Technical measures (SUP) are to increase value addition by supporting input supply, financial and policy intervention

- Increase financial support to agriculture sector
- Group strengthening for financial management
- Support improvement of loan approval process by the bank
- Strengthening law and regulation enforcement in support to agriculture sector

Source: JICA project team

Figure 6.5.1 Concept of Technical Measures: SUP (Supporting Measures)

6.5.2 Technical Measures

The proposed technical measures for supporting measures are as follows:

Table 6.5.1 Technical Measures for Supporting Measures

No.	Technical Measures	Issues	Description of Measures
SUP-01	Strengthening financial support to farmers' group	Finance service coverage is limited (APB) Support for agriculture is limited (BOL)	Change government finance policy to place more emphasis on agriculture Formulate Policy Finance for agriculture Invite Two Step Loans from development partners
		Limited finance to agriculture sector (LDB & JDB)	Change Government finance policy to place emphasize on agriculture and agro-related industry
		A lot of efforts to get farmers' management information and market information (ACLEDA Bank)	Provide market information to decide which crop is promising in next cropping season Conduct appropriate zoning based on soil and other analysis (To make maps for suitable places for suitable crops)
		Finance service coverage is limited. (DTMFI)	Increase funds by more income
SUP-02	Strengthening farmers' group in financial management	Difficulties of Group Management (APB)	Set up collaboration with PAFO, DAFO in strengthening groups for financial management
SUP-03	Strengthening coordination with private financial institutions	Untimely loan provision (Nayoby Bank only)	Need to change their loan approval process but it will take several decades
SUP-04	Strengthen law and regulations enforcement in agriculture and livestock sector	Pesticide Law, Animal Medicine Law and other relevant regulations have not been implemented.	Strengthen Law Enforcement with checking system and nationwide training system for shops Develop capacity of pesticide formulation and residue analysis laboratory in PPC Establish pest and disease diagnosis system at extension level To establish the animal medicine checking system with laboratory
SUP-05	Strengthening seed quality checking system	Seed Quality questionable, some seeds have been contaminated with disease	Strengthen seed test laboratory
SUP-06	Strengthen fertilizer quality checking system	Fertilizer quality questionable (Some fertilizers have lower percentage than indicated percentage of components (Nobody check them))	Establish a fertilizer quality checking system nationwide
SUP-07	Product traceability system	Consumers are unable to know at the time of purchasing the production area and safety of vegetables and other products. For this reason, differentiation by production area is not possible.	Develop, verify and introduce traceability system

Source: JICA project team

6.6 Technical Measures for Extension Services by Public and Academia and Private Sector

6.6.1 Overview

Considering that production and processing stages are “Strengthening both public and private extension services”, technical measures were proposed based on the following concept.

EX (Extension Services by public and academic and private sector)

Strengthening both public and private extension services

Issues

- Insufficient number, capacity and skills to provide technical guidance to meet farmers' needs. Need to transfer techniques from senior staff.
- No utilization of the agricultural technology possessed by the academic, public and/or private sector.



Technical measures (EX) are to enhance extension services by public as well as private and other external resources

- Strengthening PAFO and DAFO staff in relation to extension
- Monitoring and coordination function by DAEC and other relevant departments
- Coordination with public, private and community (PPC) and other external resources
- Utilization of ICT in extension

Source: JICA project team

Figure 6.6.1 Concept of Technical Measures: EX (Extension Services)

6.6.2 Technical Measures

The proposed technical measures for extension services are as follows:

Table 6.6.1 Technical Measures for Extension Services

No.	Technical Measures	Issues	Description of Measures
EX-01	Strengthening capacity of extension officers	DAFOs lack the capacity and skills to provide technical guidance to meet farmers' needs. Agricultural extension materials are not updated to meet farmers' needs.	Strengthening planning, extension, monitoring, and capacity development activities based on the farmers' needs and strategy of priority crops of FVC
EX-02	Strengthening coordination mechanism with private sectors	DAFOs are not fully utilizing the agricultural technology possessed by the private sector.	Involving private sector for extension activities
EX-03	ICT extension system development	The number of staff are limited for extension activities to meet farmers' needs. Budgets for extension activities, monitoring activities and capacity development of DAFO staff is limited. It is difficult to increase budgets for extension in a short period of time.	Utilize ICT for extension activities such as extension materials, diagnosis of disease etc.
EX-04	Strengthening coordination role between PAFOs and DAFOs	DAFOs have limited information of FVCs actors and do not play coordination role of FVCs.	Strengthen PAFOs/DAFOs coordination role of FVCs
		Linkage with PAFOs and DAFO are weak for	Strengthening linkage with PAFOs

No.	Technical Measures	Issues	Description of Measures
		technical support activities matching farmers' needs.	and DAFO for sharing information of famers, agriculture in an area
EX-05	Strengthening coordination role between public and input suppliers	Technical knowledge of input suppliers is limited for providing necessary agricultural knowledge to farmers. Though production companies or pesticide, fertilizers etc. have technical knowledge, there is no mechanism transferring the knowledge to farmers through suppliers.	Involving input supplier as a key actor for extension activities
		Human resources with technical knowledge of input suppliers are very limited for providing support for farmers. There are no quick reference materials for input suppliers or farmers to understand easily how to use pesticides.	Strengthening capacity of private companies for supporting activities for farmers with utilization of private knowledges
		Very few companies are providing support necessary for farmers such as usage of pesticides, cultivation techniques etc. Most companies provide only some advises and explanations to farmers. Many of private companies, especially input suppliers are marginal or small, therefore they cannot afford to provide support to farmers.	Support private companies to expand their business area ex) input supplier to expand their business area to trading of agricultural products
EX-06	Strengthening Coordination among extension and educational institutions	Coordination and cooperation with academic sectors such as universities for agricultural extension is weak.	Support agricultural education through universities and vocational schools

Source: JICA project team

6.7 Evaluation and Prioritization of Technical Measures

To put sequential priority in the course of FVC strengthening MP till 2040, the proposed technical measures were prioritized through the evaluation on the criteria as follow: (i) level of technology, (ii) cost to be required, and (iii) coverage whether the techniques can be widely disseminated.

Table 6.7.1 Evaluation and Prioritization of Technical Measures

No.	Technical Measures	Possibility of extension of the technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
Production and Processing							
PR-01	Crop rotation	Basic	Low	Wide	Yes	Yes	Yes
PR-02	Intercropping and mixed cropping	Basic	Low	Wide	Yes	Yes	Yes
PR-03	Soil preparation	Basic	Low	Wide	Yes	Yes	Yes
PR-04	Coordination strengthening among research and extension	Intermediate	Moderate	Wide	Yes	Yes	Yes
PR-05	Fertilizer application	Basic	Low	Wide	Yes	Yes	Yes
PR-06	Disease management for agricultural products	Intermediate to high	Moderate	Wide	Yes	Yes	Yes
PR-07	Pesticide application	Basic	Low	Wide	Yes	Yes	Yes
PR-08	Product componential analysis	Intermediate	Low	Small	Yes	Yes	Yes

No.	Technical Measures	Possibility of extension of the technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
PR-09	Regulation of foreign investment in agricultural production (fishery)	High	Moderate	Medium	No	Yes	Yes
PR-10	Disease management for livestock	Intermediate	Moderate	Medium	No	Yes	Yes
PR-11	Livestock production	Basic	Moderate	Medium	No	Yes	Yes
PR-12	Local pig promotion	Basic	Moderate	Medium	No	Yes	Yes
PR-13	Fish yield control and management	Basic	Moderate	Medium	No	Yes	Yes
PR-14	Niche high valued products promotion	Intermediate	Moderate	Small	Yes	Yes	Yes
PR-15	Processing promotion of priority products	Basic	Moderate	Medium	Yes	Yes	Yes
Farm Management							
FM-01	Household accounting management	Basic	Low	Wide	Yes	Yes	Yes
FM-02	Bookkeeping (Farm Record)	Basic	Low	Wide	Yes	Yes	Yes
FM-03	Cropping Calendar (Cropping Pattern Arrangement)	Basic	Low	Wide	Yes	Yes	Yes
FM-04	Post Harvest	Basic	Low	Wide	Yes	Yes	Yes
FM-05	Business plan	Intermediate	Low	Medium	No	Yes	Yes
FM-06	Group formation/ Group strengthening	Basic	Low	Wide	Yes	Yes	Yes
FM-07	Group accounting management	Basic	Low	Wide	Yes	Yes	Yes
FM-08	Establishment of Cooperatives	Basic	Low	Wide	Yes	Yes	Yes
FM-09	Formulation of Water Users Association	Basic	Low	Wide	Yes	Yes	Yes
FM-10	Collective Selling / Purchasing	Basic	Low	Wide	Yes	Yes	Yes
FM-11	Rural finance accessibility improvement	Intermediate	Low	Medium	No	Yes	Yes
FM-12	Market information access improvement	Basic	Low	Wide	Yes	Yes	Yes
Marketing							
MAR-01	Cold storage installation	Basic to High	Low to High	Small	Yes	Yes	Yes
MAR-02	Strengthening financial scheme to middlemen	Intermediate to High	High	Medium	No	Yes	Yes
MAR-03	Cold chain improvement	Basic to High	Low to High	Small	Yes	Yes	Yes
MAR-04	Price control policy by the Government	High	High	Wide	Yes	Yes	Yes
MAR-05	Foreign investment control by the Government	High	High	Wide	No	Yes	Yes
MAR-06	Market information system improvement	Intermediate to High	Moderate to High	Medium	Yes	Yes	Yes

No.	Technical Measures	Possibility of extension of the technology			Term		
		Level of technology	Cost	Coverage	Short	Medium	Long
MAR-07	Distribution improvement to preserve products	Intermediate	Moderate to High	Medium	No	Yes	Yes
MAR-08	Market facilities improvement to suit various levels of traders	Basic	High	Medium	No	Yes	Yes
MAR-09	Packing improvement for distribution	Basic	Moderate	Medium	No	Yes	Yes
Supporting							
SUP-01	Strengthening financial support to farmers' group	Intermediate to High	Moderate to High	Wide	No	Yes	Yes
SUP-02	Strengthening farmers' group in financial management	Basic	Moderate	Wide	No	Yes	Yes
SUP-03	Strengthening coordination with private financial institutions	Intermediate	Moderate	Wide	No	Yes	Yes
SUP-04	Strengthen law and regulations enforcement in agriculture and livestock sector	High	High	Wide	Yes	Yes	Yes
SUP-05	Strengthening seed quality checking system	Basic	Moderate	Wide	No	Yes	Yes
SUP-06	Strengthen fertilizer quality checking system	Basic	Moderate	Wide	No	Yes	Yes
SUP-07	Product traceability system	Intermediate	High	Wide	No	Yes	Yes
Extension							
EX-01	Strengthening capacity of extension officers	Basic	Low	Wide	Yes	Yes	Yes
EX-02	Strengthening coordination mechanism with private sectors	Basic	Low	Wide	Yes	Yes	Yes
EX-03	ICT extension system development	High	Moderate	Wide	Yes	Yes	Yes
EX-04	Strengthening coordination role between PAFOs and DAFOs	Basic	Low	Wide	Yes	Yes	Yes
EX-05	Strengthening coordination role between public and input suppliers	Intermediate	Low	Wide	Yes	Yes	Yes
EX-06	Strengthening Coordination among extension and educational institutions	Intermediate	Moderate	Medium	No	Yes	Yes

Source: JICA project team

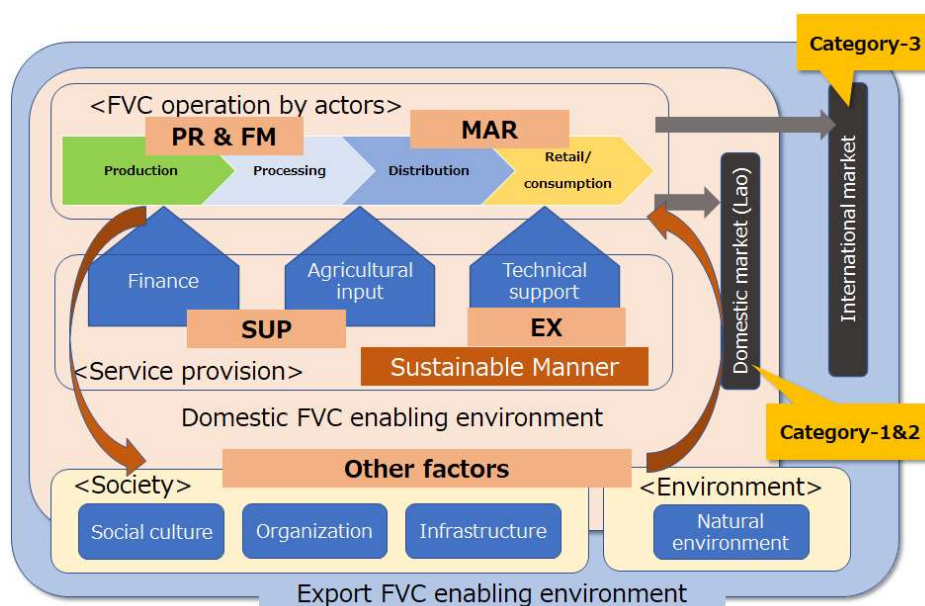
CHAPTER 7

DEVELOPMENT DIRECTION AND APPROACH

CHAPTER7 DEVELOPMENT DIRECTION AND APPROACH

7.1 Introduction

This chapter shows the development direction and approach of MP for strengthening FVC in Lao PDR. Since the respective stages of FVC from production to retail/consumption are not mutually independent, they need to be improved through integrated manner in correspondence with the market potential and needs in different areas. The sustainability of FVC framework as a basis of formulating the master plan is depicted below:



Source: JICA project team

Figure 7.1.1 Sustainable FVC Framework

MP contributes to developing 3 categories of FVC: Category-1 FVC for the domestic market: Category-2 FVC for the modern domestic market and Category-3 Export FVC.

In order to strengthen FVC Category-1 and 2, FVC process from production to retail/consumption needs to be supported by service provision (such as finance, agricultural input or supply, technical support etc.). Such process needs to be carried out by ensuring integral safeguard factors consisting of society and environment including improved or upgraded rural infrastructures. If such mechanism is materialized in sustainable manner and domestic market requirement can be met, FVC Category-1 and 2 can be strengthened. To realize the development and strengthening of FVC Category-3, the agricultural products need to satisfy international market standards in sustainable manner, though higher standard of market is required than the domestic market.

Considering these mechanisms to strengthen FVC, technical measures are proposed as discussed in the previous chapter under 5 subjects, in total 49 topics, to strengthen FVC consisting of: (i) production and processing (PR), (ii) farm management (FM), (iii) distribution and retail (MAR), and (iv) supporting measures (SUP) and extension services (EX). In addition, lessons learnt from pilot projects and feedback from FVC stakeholders during the Project are carefully considered as follows:

- ◆ All the lessons learnt from PPs useful to finalize MP are presented in Volume-IV: Pilot Projects.
- ◆ PPs implementation including Public-private-academic (PPA) coordination through platform activities has shown that proposed framework of MP is applicable for strengthening FVC in Lao PDR.
- ◆ JICA project team identified the following lessons learnt from PPs and feedback from FVC stakeholders.

Table 7.1.1 Lessons Learnt from PPs and Feedback from FVC Stakeholders

Lessons Learnt	Description
Basic production techniques	Basic production techniques need to be continuously strengthened among production farmers and extended with the support by PAFO/DAFO in the course of MP (Club-root disease of cabbage etc.). Quality products are, first and foremost, essential to strengthen FVC.
Group formation	<Importance of financial support> Group formation will facilitate farmers accessibility to formal financial institutions, to which attention need to be paid.
Tangible benefit to farmers	<Necessity of cost comparisons of activities> Tangible benefit (B/C or others) needs to be clear to introduce new technical measures to FVC stakeholders especially farmers, upstream of FVC.
Strengthening PPCP especially private sector mobilization	<Better coordination of related organizations> In order to strengthen the overall value of the chain, mobilization is required particularly the downstream of FVC, which need to consider incentive of such private sectors.
Enabling environment for agribusiness and FVC	DAEC in collaboration with FVC related departments as well as line Ministries are required to foster enabling agribusiness and FVC environment (law, decree, guidelines etc.).

Source: JICA project team

7.2 Approach of Master Plan

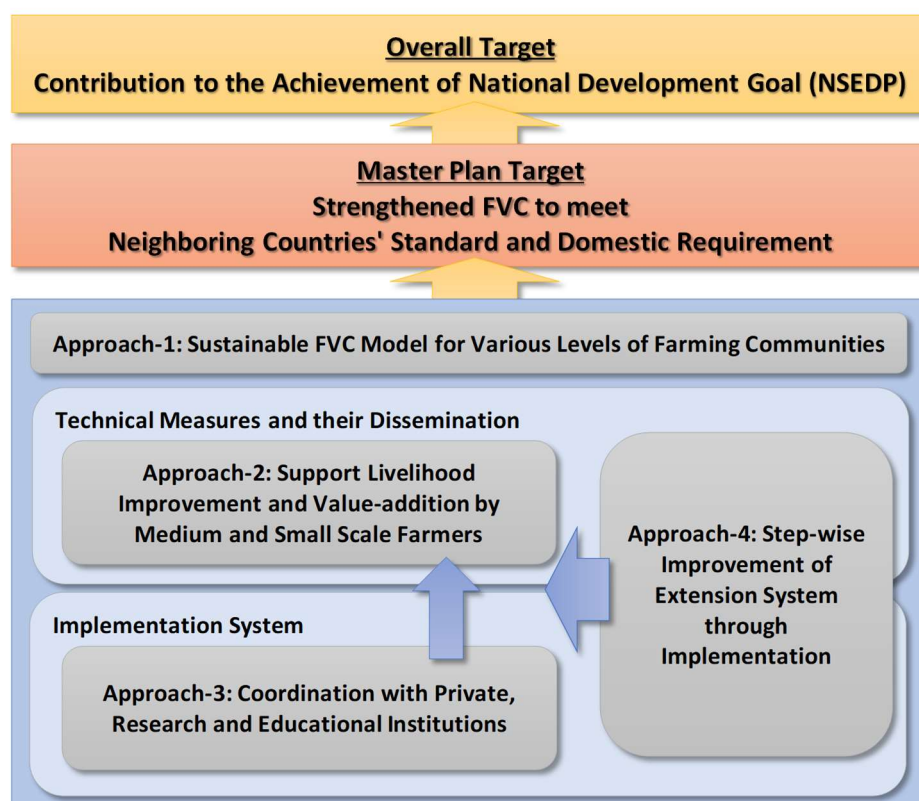
7.2.1 Approach of Master Plan

In accordance with the series of meetings with various stakeholders at the different levels consisting of: (i) NPSC, (ii) JCC, (iii) FVCWG, (iv) PP Implementation Taskforce, (v) PAFOs and DAFOs of 3 provinces, findings from joint field survey with the members of FVUWG and relevant technical staff under PAFOs and DAFOs, review of relevant policies, strategy document, FVC related laws and regulations, lesson learnt from previous projects to agricultural sector particularly FVC-related projects, and pilot projects carried out until now, overall goal, master plan goal and the approach of strengthening FVC in Lao PDR is formulated as shown in the following table and figure.

Table 7.2.1 Overall Target, Master Plan Target and Approaches of Master Plan

Overall Goal	Contribution to the Achievement of National Development Goal (NSEDG)
Master Plan Goal	Strengthened FVC to meet neighboring countries' standard and domestic requirement
Approaches of MP	
Approach-1	Sustainable FVC model for various levels of farming communities
Approach-2	Support Livelihood Improvement and Value-addition by medium and small-scale Farmers
Approach-3	Coordination with Private, Research and Educational Institutions
Approach-4	Stepwise Improvement of Extension system through Implementation

Source: JICA project team



Source: JICA project team

Figure 7.2.1 Approach of Master Plan

Approach-1: Sustainable FVC model for various levels of farming communities

The joint survey conducted shows various constraints for the value chain process but also wide potential for development. As shown in sustainable FVC framework, “*various levels of farming communities*” consists of 3 levels of FVC: (i) FVC for domestic market, (ii) FVC for modern domestic market and (iii) . Through the FVC survey result and analysis in target 3 provinces, FVCWG and the project team prepared FVC category-wise strengthening approach in accordance with each potential and constraints. The category-wise strengthening approach is summarized in the following figure.

Table 7.2.2 FVC Category-wise Strengthening Approach

Category	Potential	Constraints	Strengthening Approach
FVC for domestic market	✓ Increasing active agribusiness companies with appropriate techniques ✓ Improvement of productivity and quality of products by enhancing farming techniques ✓ Reduction of transportation losses by improving transport infrastructure and delivery management ✓ Value addition and new market development for traditional food ✓ Expand market by improving sanitation etc.	✓ Low techniques in production and post-harvest ✓ Outflow of young generation from farming community thereby insufficient rural work force for farming ✓ Poor conditions in transport infrastructure, particularly farm-to-main road ✓ Insufficient awareness and knowledge in quality and sanitation ✓ Competition with foreign-invested supermarkets and mini mart	Increase rural income: Most of the rural areas ✓ Improvement of techniques in production, marketing, processing and retail-related actors ✓ Improving quality by introducing mechanization particularly processing stage of FVC ✓ Minimization of information gap among FVC actors ✓ Institutional and infrastructure development in relation to FVC ✓ Expansion of financial support to small and medium farmers and state company

Category	Potential	Constraints	Strengthening Approach
FVC for modern domestic market	✓ Increasing active agribusiness companies with appropriate techniques ✓ High demand for domestic products by modern retail companies ✓ Improvement of productivity and quality of products by foreign-invested technology ✓ Expansion of outreach by improving road and transport infrastructure ✓ Value addition by introducing foreign investment and new technology	✓ Low quality of products unsatisfied by modern retail companies ✓ Insufficient dissemination of foreign-invested new technology among local farmers ✓ Insufficiency in roads, cold chain system, storage and refrigeration facilities ✓ Pressure to local SME due to competition with foreign-invested FVC activities	Connection with local SME: Advanced rural areas ✓ Promotion of new techniques and knowledge to small and medium farmers and local SME through government initiative ✓ Promotion of PPCP for implementation ✓ Promotion of effective utilization of knowledge and funds through PPCP approach ✓ Support strengthening state companies in relation to FVC by the government
Export FVC	✓ Suitable area for production of vegetables such as Bolaven plateau, which has possible to add high value ✓ Large potential in export market if the products meet internationally acceptable quality	✓ Insufficient bargaining power with foreign traders ✓ Transportation loss because of slow procedure in custom clearance and SPS ✓ Relevant laws and regulations under development	Partnership and joint business with foreign-invested firms in relation to FVC: Advanced FVC model (such as Bolaven plateau) ✓ Improvement of international trade (import and export) related regulation and procedure ✓ Coordination with development partners including multi- and bilateral institutions such as WB and ADB in relation to Export FVC

Source: JICA project team

Through implementation of PP in 3 provinces, three models of FVC will be developed by verifying appropriate techniques in production, processing, distribution and retail as well as supporting techniques such as organizational and implementation system.

Table 7.2.3 FVC Model to be Developed through PP

Category	Vientiane capital (2 models)	Champasak province (3 models)	Sekong province (2 models)
FVC for domestic market	O	O	O
FVC for modern domestic market	O	O	O
Export FVC	-	O	-

Source: JICA project team

PP results dissemination to other similar provinces: According to the provincial statistical data, the current status of agriculture sector in each province can be summarized as follows. The data shows the general regional category (eight categories), socio-economic conditions and priority and potential crops of each province. Currently, provincial characteristics are temporarily clarified using the above data. By analyzing more details such statistical and spatial data, provincial categorization or grouping will be made by inherent provincial context so that final MP, covering entire country of Lao PDR delineate how PP results in 3 provinces are applied in which provinces based on categorization/grouping.

Table 7.2.4 Summary of Provincial Status of Agriculture Sector

Province Name		Northern Region	1	2	3	4	5	6	7	Central Region	8	9	10	11	12	13	14	Southern Region	15	16	17	18
			Phongsaly	Luangnamtha	Oudomxay	Bokeo	Luangprabang	Huaphanh	Xayaboury		Vientiane Capital	Xiengkhuang	Vientiane	Borikhamxay	Khammuane	Savannakhet	Xaysomboun		Saravane	Sekong	Champasak	Attapeu
Regional Category	Item																					
	1. Vientiane Plain										○		○	○			○					
	2. Area along northern Mekong river								○				○									
	3. Northern basin		○	○	○	○	○	○														
	4. Plain of Jar						○					○					○					
	5. Middle and southern mountainous area											○			○	○	○			○	○	
	6. Area along southern Mekong river															○	○			○		○
	7. Bolaven plateau																			○	○	○
8. Southeast highland																			○		○	
Population							○		○		◎		○		○	◎	×			×	◎	
Area			○		○	×	○	○	○		×	○	◎	○	○	◎	×			×	○	
Population Density											◎					○			○		○	
Poverty Rate			×		◎	○	○	○	○		×	○	×	○	○	○	×		○	◎	×	○
Priority Crop	Rice										○		○		○	◎			○		◎	
	Maize				◎			○	◎			◎										
	Coffee																		◎	○	◎	
	Sugar Cane		◎	◎			○										◎					◎
	Cassava								◎					○					◎		◎	
Potential Crops	Job's Tear				○		◎		◎				◎									
	Sesame		◎		○		◎		◎													
	Tea		◎				◎					○										
	Tobacco		×				◎		○				◎	◎	◎	◎	×					
	Beans								◎				○									
	Vegetables						○		○		○		○			○				○	◎	
Livestock	Fruit Trees						○	○													◎	
	Buffalo														○	◎			○		◎	
	Cattle								○			○	○		○	◎			○		○	
	Pig		○				○						○				○			◎		○
Fish	Poultry						○		○		○					◎	×		○		◎	○
	Capture		×						○		○		◎		○	◎			○		◎	×
	Culture										○					◎					○	
Agriculture households			○	○	○	○	○	○	◎		×						○		○	○		
No road access			○		◎	○	○	◎													○	○
Production Group/Cooperatives			○	○			◎	◎				◎			○	×	○		×	◎	×	
Irrigation System				○	◎	○	×	○	◎		○		◎	○			○			○	×	×
Water use group					◎	○	×		◎			○	◎	○		×	○		×	◎	×	×
Permanent market								○	◎					○			◎				◎	○
Agricultural input shops			×	×					○		◎		◎	○	○	○	○				○	○
Agricultural Machinery shop			×			○		×	○		◎	×	◎	◎		○	○					
Financial Institutions			×	◎					○			×	◎	◎						×	○	◎
Land size	0-1 ha		○			○		◎			◎		○		○		×					
	1-2 ha		○	○		◎		○	×			○	×		◎	○	×			◎	○	○
	2-3 ha			○			○	×			×			◎	○	○	×		◎	○	◎	○
	3- ha			○	○		◎	×	○			○	○	○	×		◎		○		○	
Households with Loan			○	◎	◎	○	○	○	×			○	×			×	○			○		○
Machinery Usage			×	×		×	×	○	○		○	◎	○		◎	○			◎		◎	
Natural Disaster	Flood														◎	◎			◎	○	○	◎
	Drought		×		◎	◎	○								○	◎	×		○	×		◎
	Storm													○	○	○			○	◎		◎
	Pest		◎	○	◎			○			×		×		×					◎	○	◎
	Animal Disease		◎	○	◎	○	○	○				○								◎		◎
	Others		◎	○	◎		○					×	○	×	○		×					○
Production efficiency									○		◎	◎	○			×			○	×	◎	

Note) ○: more than average plus standard deviation, ○: more than average, ×: less than average minus standard deviation

Source: JICA project team

Approach-2: Support Livelihood Improvement and Value-addition by Medium and Small scale Farmers

MP for FVC strengthening focuses on developing 3 models of FVC as in Approach-1. However, most of the provinces including Sekong, one of the target areas for the field survey of value chains, are occupied by medium and small-scale farmers, targeting FVC for domestic market. Therefore, MP focuses on development, dissemination of appropriate technical measures to support particularly livelihood improvement and value-addition by medium and small-scale farmers.

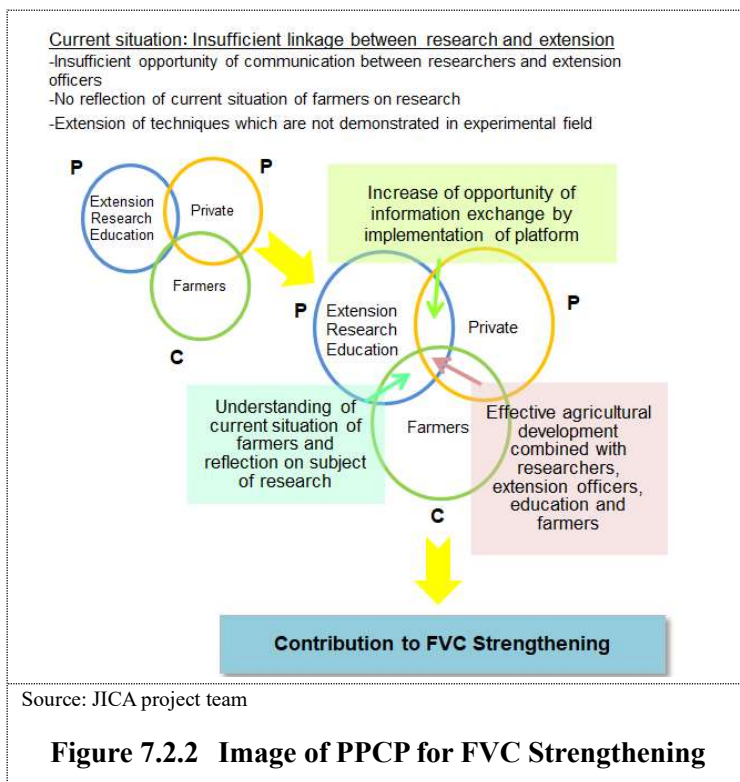
Approach-3: Coordination with Private Research and Educational Institutions

The joint field survey revealed that the production techniques by farmers or farmers' groups are still challenging. In addition, extension officers or research institutes have insufficient experiences to provide knowledge or techniques to meet farmers' need. Not only production techniques, although most of the production is carried out under some kind of contract with traders, farmers or farmers group have limited capability to negotiate prices or terms of contract. Similarly, traders have little power in comparison to foreign traders according to the joint field survey in cabbage export in Champasak province. It is remarkable that only a few actors have accessibility to new skills, including climate resilience techniques, from public extension services, academic institutions and research institutions. As climate change is pressing issue in Lao PDR, giving highly impacts to agriculture crops and plants, finally leading to reduction of agriculture production.

To reduce such impacts of climate change, attention should be given to academic and research institutions such as National University of Laos, NAFRI and PPC also to seek useful adaption practices such as introduction of climate-ready crops or thermal stress-tolerant varieties, diversifying crops, improvement of pest management, improvement of soil loss as well as adjustment of planting dates, improvement of water conservation and management practices and use of efficient irrigation and fertilizer management.

Based on the discussion above; in

order to increase the overall benefit of value chain process, it is inevitable to create a favourable enabling environment for FVC through public-private community partnership (PPCP) as DAEC is currently promoting. Figure 7.3.1 shows the image of PPCP for FVC strengthening.



Approach-4: Stepwise Improvement of Extension system through Implementation

FVC is required to pay attention to market status including both domestic and international market. As MP will cover until 2040, implementation of value chain strengthening process under MP needs to be improved stepwise through the implementation in compliance with verification of technical measures proposed. To do so, monitoring and evaluation are essential to understand the level of progress and constraints on a regular basis. The results to be obtained from monitoring and evaluation will give useful information for operation and management of on-going or future technical dissemination in the course of MP. In addition, it is important to carry out the monitoring and evaluation works for the capacity development of FVC actors in relation to improve overall process of VC, which is expected through monitoring and evaluating their own activities and preparing recommendation based on this process.

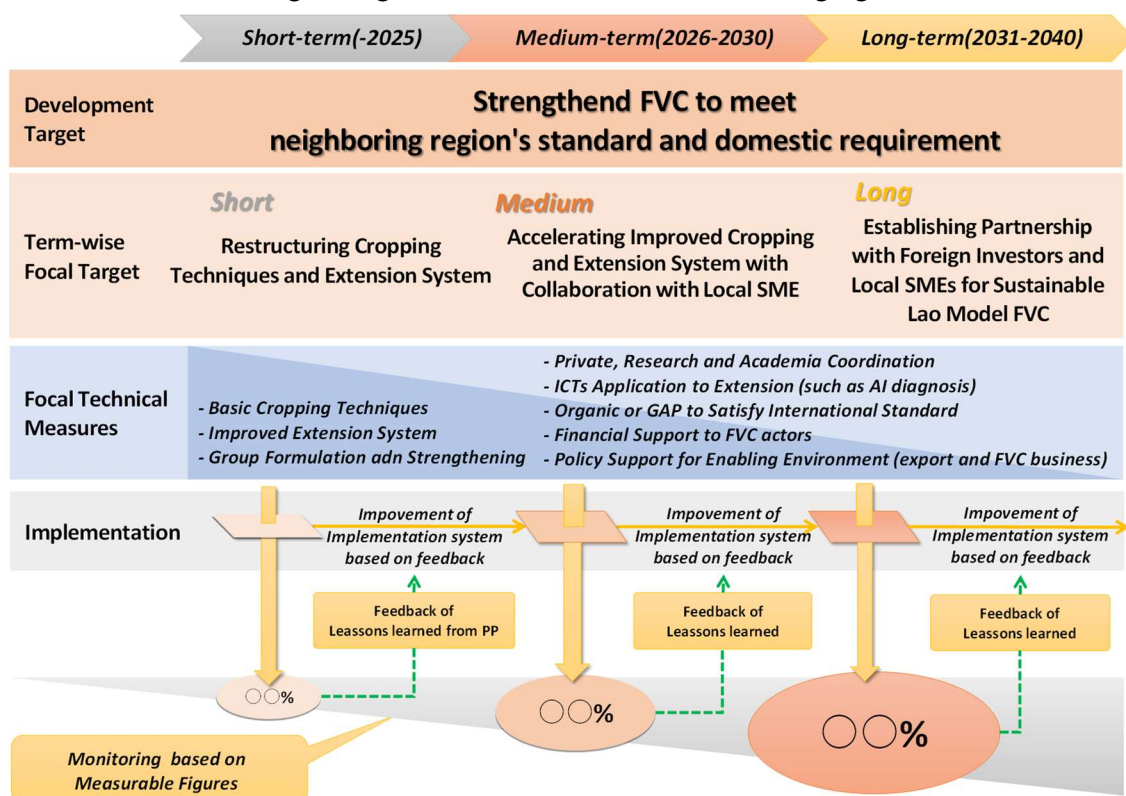
7.2.2 Climate Resilience of Master Plan

Climate change or climate resilience is one of the most pressing issues worldwide and Lao PDR is not left out from this trend. One aspect of climate change impacts in Lao PDR is on the pressures that may exist to cultivate marginal land or to adopt unsustainable cultivation practices when crop yields drop. These would likely lead to land degradation and over-use of natural resources, endangering biodiversity of both wild and domestic species.

As discussed in chapter 2, national plans and policies focus on climate change and resilience in agriculture sector. For instance, Agriculture Strategy 2025 described that *“Economy has strongly grown in line with industrialization and modernization direction, comprehensive infrastructure, ensuring economic growth at the constant level, effective, stable and ensuring food security and strongly ensures quality in terms of nutrition, producing agricultural products with quantity and quality that are highly competitive as well as are adaptable to climate change”*. In consistent with the plans and policies, multilateral financial institutions also support the Government of Lao PDR in various field including agriculture sector by addressing climate resilience such as (i) Climate-Friendly Agribusiness Value Chains Sector Project (ADB), (ii) Lao Agriculture Competitiveness Project (LACP) (WB) and (iii) Sustainable Rural Infrastructure and Watershed Management Sector Project (ADB/ EU). Taking into due consideration the problems and challenges facing to Lao PDR, and targets of superordinate national policies and plans discussed in chapter 2, MP is formulated aiming to climate resilience of agricultural infrastructures and to enhance crop productivity, diversification and commercialization through FVC strengthening process which will finally lead to increase of household income and improvement of overall value chain. MP for strengthening FVC is prepared in consistent with this government policy particularly focusing on one of the effective measures, integrated farming.

7.3 Framework of Master Plan

Framework of MP for strengthening FVC is summarized as the following figure and table.



Source: JICA project team

Figure 7.3.1 Framework of Master Plan for Strengthening FVC in Lao PDR

Table 7.3.1 Framework of Master Plan for Strengthening FVC in Lao PDR

Subject	Description
Development target	Strengthened FVC to meet neighboring countries' standard and domestic requirement
Term	Three terms as follows: ◆ Short: from 2022 to 2025 (during JICA technical cooperation) ◆ Medium: from 2026 to 2030 ◆ Long: from 2031 to 2040
Term-wise development scenario	◆ Short: Restructuring production techniques and extension system ◆ Medium: Accelerating improved production techniques and extension system with collaboration with local SMEs ◆ Long: Establishing partnership with foreign investors and local SMEs for sustainable Lao model FVC
Focal technical measures	Proposed basic, intermediate and advanced technical measures for FVC strengthening are adopted and disseminated stepwise in the course of MP.
Implementation structure	◆ Technical measures are disseminated by creating key model FVC promotion clusters in each province. ◆ Based on LEA, DAEC will promote improved implementation system by involving various FVC actors (private, research, and educational institutions). ◆ Implementation structures are periodically improved by continuous monitoring.
Measurable figures for monitoring	Clear measurable figures are established in consistent with NSEDP and MAF strategy in promotion of commercial agriculture.

Source: JICA project team

7.3.1 Development Target

Development target of MP is to realize “Strengthened FVC to meet neighboring countries standard and domestic requirement”.

7.3.2 Term and Development Scenario

The period of MP will be divided into 3 terms: short, medium and long term.

- ◆ **Short term** is covered with this JICA technical corporation and lasts until 2025. The development target of this term is “Restructuring production techniques and extension system”.
- ◆ **Medium term** will be set from 2026 to 2030. The development target of this term will be “Accelerating improved production techniques and extension system with collaboration with local SMEs”.
- ◆ **Long term** will start from 2031 and last until 2040. In this term, “Establishing partnership with foreign investors and local SMEs for sustainable Lao model FVC” will be realized.

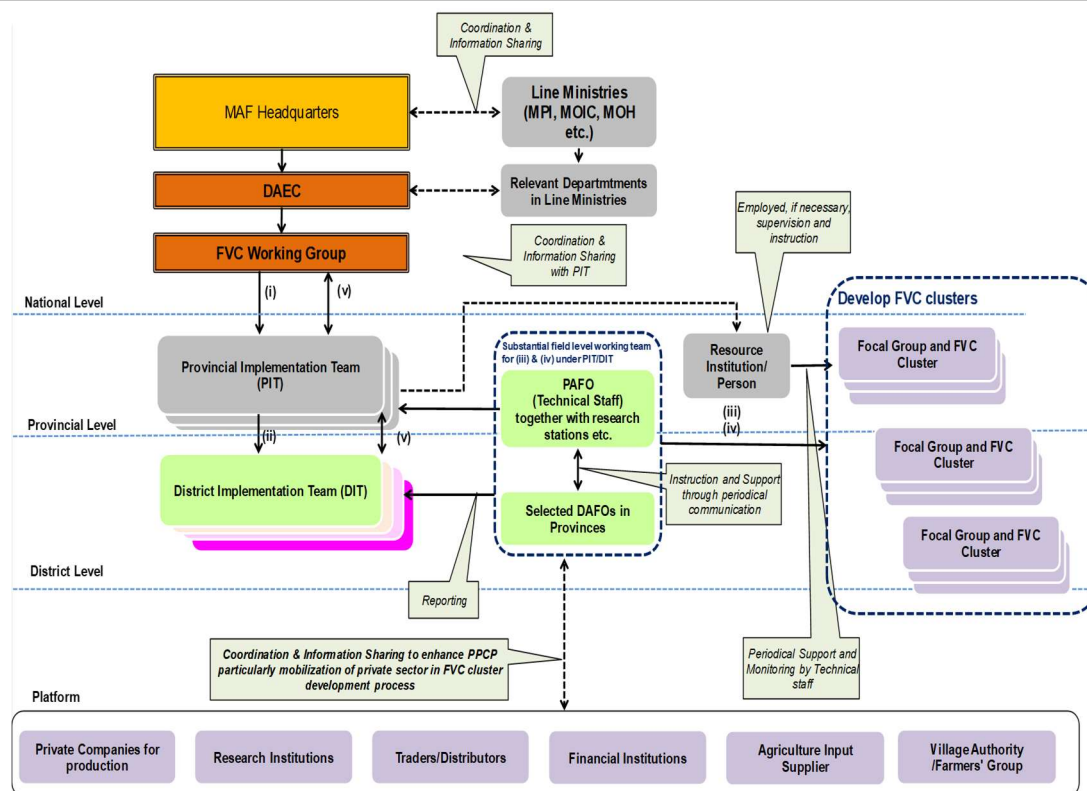
7.3.3 Focal Technical Measures

As discussed in chapter 6, technical measures are proposed for five subjects: (i) production and processing, (ii) farm management, (iii) distribution/retail, (iv) supporting measures and (v) extension services with the aim of resolving the issues identified through the joint field survey.

Proposed technical measures are classified into basic, intermediate and advanced according to the level and will be adopted and disseminated stepwise in the course of MP. In the short-term period of MP, technical measures will be focused on “basic cropping techniques”, “improvement of extension system” and “group formulation and strengthening”. From medium term to long term, focal technical measures will be extended to “private, research and academia coordination”, “ICT application to extension (such as AI diagnosis)”, “Organic or GAP to satisfy international standard”, “Financial support to FVC actors” and “Policy support for enabling environment (export and FVC business)”.

7.4 Implementation Structure

As for the pilot project implementation, technical measures verified at the demonstration groups and good practice will be disseminated to key farmers/groups contributing to creating FVC promotion clusters of target products in each province. Based on Lao Extension Approach (LEA) as well as PPCP, DAEC will promote improved implementation system by involving various FVC actors (private, research and educational institutions). Field level implementation structures will be periodically improved by continuous monitoring. At present, implementation structures of PP can be adopted and functioned for master plan implementation.



Source: JICA project team

Figure 7.4.1 Implementation Structure of Master Plan

The points for the master plan institutional framework and implementation flow are as follows:

- i. Instruction to mobilization of provincial level stakeholders to organize Provincial Implementation Team (PIT)
- ii. Instruction and support organization of District Implementation Team (DIT) at each district
- iii. Implementation of FVC activities: (i) step-1 situation analysis and selection of target crops/commodities and sharing the goal among stakeholders, (ii) step-2 clarification of GAP to determine required technical measures, (iii) step-3 facilitation of preparing implementation plan, (iv) step-4 implementation based on the plan and (v) monitoring and follow-up.
- iv. Substantial field activities of (iii) and (iv) will be carried out by selected staff from PIT and DIT
- v. Organize annual review meeting to evaluate and improve master plan implementation system

7.5 Measurable Figures for Monitoring

Clear measurable figures will be established consistently with NSEDP and MAF strategy in promotion of commercial agriculture. The proposed monitoring indicators for FVC strengthening process is summarized as follows:

Table 7.5.1 Proposed Indicators for Monitoring of FVC Strengthening Process (1/2)

Master Plan Implementation Monitoring

FVC Stage	Indicators/ Key Techniques	Data Source
1. SUP (Supporting measures for agricultural input supply and finance)	◆ Domestic production of input materials (feed/ calf/ fingerling/ seeds bulbs) ◆ Import substitute of input materials (Percentage of imports in domestic market) ◆ Commercial Banks' Credit in Agriculture Sector	DOP/ MAF (Agricultural Statistical Yearbook) Custom/MoF Bank of Lao PDR
2. FM (Farm Management)	◆ GDP in Agricultural Sector ◆ Crop production mainly for sale ◆ Number of farmers certified with standards (GAP, organic) ◆ Use of organic/ chemical fertilizers ◆ Use of farm machinery	Ministry of Planning Investment /Lao Statistical Bureau Lao Census of Agriculture MAF
3. MAR (Marketing, distribution and retail)	◆ Import substitution ◆ Export expansion ◆ Trade across borders indicators	Ministry of Planning Investment /Lao Statistical Bureau Custom/MoF/World Bank
4. PR (Production and Processing)	◆ Value-added by food processing industry	Ministry of Planning Investment /Lao Statistical Bureau
5. EX (Extension services)	◆ Educational qualification of PAFO/DAFO technical staffs	DAEC Personnel Division

Source: JICA project team

Table 7.5.2 Proposed Indicators for Monitoring of FVC Strengthening Process (2/2)

Project Implementation Monitoring

FVC Stage	Indicators/ Key Techniques
1. SUP (Supporting measures for agricultural input supply and finance)	◆ Increase of domestic production of input materials ◆ Farmers' access to quality inputs with affordable price ◆ Farmers' availability of public/ private finance in agriculture sector
2. FM (Farm Management)	◆ Increase in household income of farmers ◆ Improvement of productivity (per hectare, per input labor) ◆ Application of new techniques/technologies ◆ Dissemination of knowledge on pest control
3. MAR (Marketing, distribution and retail)	◆ Increase in household income of farmers ◆ Export expansion of agricultural products ◆ Higher value-addition of agricultural products ◆ Reduction of post-harvest loss ◆ Reduction of transportation costs ◆ Improvement of market management ◆ Simplification of export procedures
4. PR (Production and Processing)	◆ Higher value-addition by food processing ◆ Introduction/ application of food processing standards (GMP, HACCP etc.)
5. EX (Extension services)	◆ Capacity building of extension staff ◆ Frequency of extension staff visit to farmers ◆ Techniques transferred to farmers

Source: JICA project team

CHAPTER 8

PRIORITY PROJECTS AND PROGRAMS

CHAPTER8 PRIORITY PROJECTS AND PROGRAMS

8.1 Introduction

This chapter explains the priority projects and programs for the master plan of strengthening FVC in Lao PDR. The basic consideration for the priority projects and programs is as follows:

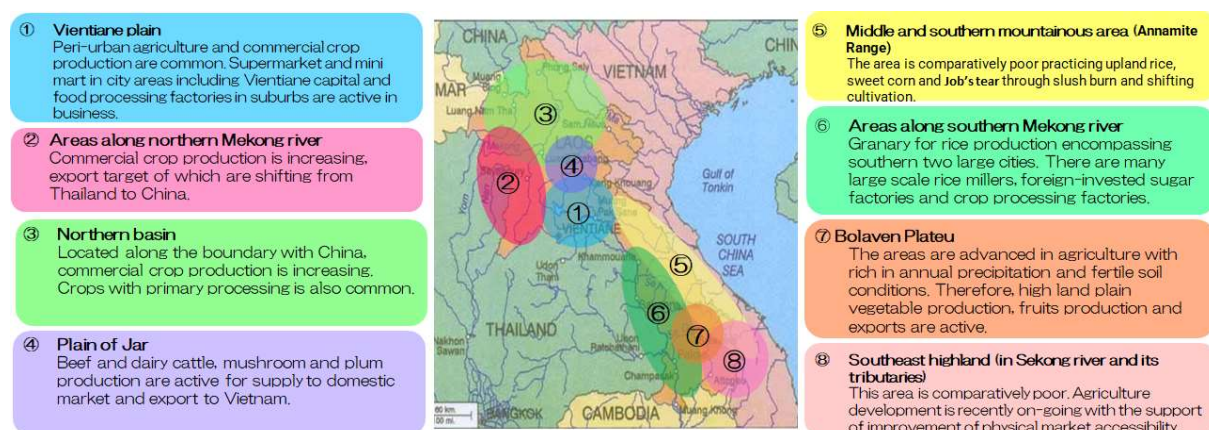
Basic considerations

Basic considerations for action plan for the master plan including proposing priority projects/programs for strengthening FVC is as follows:

- ◆ Priority projects and programs for FVC strengthening are designed by considering regional resources inherent in the provinces.
- ◆ Priority projects and programs are proposed, based on the FVC category-wise strengthening approaches mentioned in Chapter 7, for strengthening 3 models of FVC, cross-cutting activities (law, regulation, guidelines development, agriculture input and agriculture finance), and external activities in relation to strengthening FVC, and
- ◆ Priority projects and programs are the combination of technical measures proposed by the Project consisting of (i) production, (ii) farm management, (iii) marketing including distribution and retail, (iv) supporting measures for agricultural input supply and finance and (v) extension services by public, PAFO/DAFO, academic and private sector.

Regional development direction

As explained above, under the master plan, projects and programs, are prioritized and implemented by considering the available regional resources such as domestic and international market connection, infrastructure development and so on, based on the eight regional categories for FVC.



Source: JICA project team

Figure 8.1.1 Eight Regional Categories for FVC

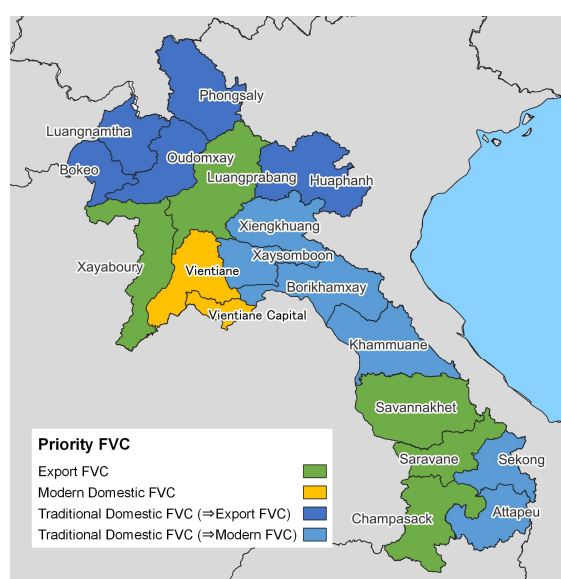
In addition, provincial-wise FVC model to be proposed are depicted as follows which are based on the analysis of provincial level statistical and spatial data, summarized in the approach of MP.

Table 8.1.1 Provincial-wise Priority FVC Model

FVC model	Provinces	Remarks
Export FVC	Luangprabang, Xayboury, Savannakhet, Saravane and Champasack	- Easier access to international market using cross-boarder corridor - Unique production potential such as Bolaven plateau
Modern domestic FVC	Vientiane province and Vientiane capital	- Located near large scale modern domestic market
Traditional domestic FVC	<u>With potential of Export FVC</u> Phongsaly, Luangnamtha, Bokeo, Oudomxay and Huaphanh	- During the long-term of the master plan period, the area will have potential for expanding Export FVC
	<u>With potential of Modern Domestic FVC</u> Xiengkhuang, Xaysomboon, Borikhamxay, Khammuane, Sekong and Attapeu	- During the long-term of the master plan period, the area will have potential for expanding Modern Domestic FVC

Source: JICA project team

As small and medium scale farmers are dominant in Lao PDR, it should be noted that all the provinces need to pay attention to promotion of traditional domestic FVC during the implementation of the master plan for FVC strengthening. In concurrence with the promotion of commercial agriculture by traditional domestic FVC, however, provinces having potential for production of commercial crops/commodities will be expected to promote export such commodities or target modern domestic market.



Source: JICA project team

Figure 8.1.2 Provincial-wise Priority FVC Model

8.2 Priority Projects and Programs

In order to effectively achieve the thematic goals in the master plan as mentioned in the previous chapter, the following priority projects and programs will support strengthening FVC in Lao PDR: (i) 3 models of FVC, (ii) cross-cutting activities and (iii) external activities to support FVC strengthening.

- ◆ 3 models of FVC: (i) FVC for domestic market, (ii) FVC for modern domestic market and (iii) Export FVC: area specific activities based on available regional resources (as above-mentioned in 8.1)
- ◆ Cross-cutting activities: combined with activities (projects) for promoting 3 models of FVC
- ◆ External activities to support FVC strengthening coordination with other departments in MAF and Ministries

Table 8.2.1 Priority Projects and Programs for 3 Models of FVC

Type of FVC	Priority Projects/Programs	Target Provinces
FVC for domestic market <i>Targeting traditional market</i>	- Organic farming and/or clean agriculture production system standard strengthening and extension with business entities. - Market-oriented crops production for traditional market - Agriculture products processing and food system development - Livestock production development and extension project - Improved traditional fish culture promotion - Quality brood stock supply for fish farmers	All the provinces
FVC for modern domestic market <i>Targeting the modern domestic market</i>	- Organic farming and/or clean agriculture production system standard strengthening and extension with business entities - Agribusiness promotion support - Agriculture products processing and food system development - Livestock production development and extension project - Fish culture promotion Commercial high yield grass seed production and supply for livestock - Quality brood stock supply for fish farmers Promotion of high value niche products	Vientiane province and Vientiane capital
Export FVC <i>Targeting export</i>	- Organic farming and/or clean agriculture production system standard strengthening and extension with business entities Market-oriented crops production for export (priority crops such as coffee, maize, cassava, banana, watermelon, potential fruits crops etc.) - Agriculture products processing and food system development - Livestock production development and extension project - Food safety in livestock products improvement - Food safety in fishery products improvement Commercial high yield grass seed production and supply for livestock Promotion of high value niche products	Luangprabang, Xayboury, Savannakhet, Saravane and Champasack

Source: JICA project team

Table 8.2.2 Priority Projects and Programs for Cross-cutting Activities

Cross-cutting activities	Priority Projects/Programs
Law, decree and guidelines	- Law on agricultural finance facility system Upgrade from ministerial agreement to law for agriculture input Wholesale marketing system - Prepare practical guidelines through the Project <i>* Details of which are explained in the next section</i>
Agriculture input	- Biofertilizer production and promotion - Livestock and fish feeds production promotion - Legal Enforcement Program for Pesticide Control - Legal Enforcement Program for Fertilizer Management
Agriculture finance	- Matching grant - Agriculture financing scheme - Agricultural Credit facilities System - Accessibility improvement of farmers to formal financial institutions
Others (information sharing)	- ICT utilization for production and marketing support Information accessibility improvement and development
Capacity Development	- Strengthening agriculture extension and analysis capacity of extension offices - Agriculture producer's group and cooperative formation and strengthening - Subject-wise capacity development (insect, plant disease, laboratory testing and analysis, plant breeding etc.) - Capacity development for plant quarantine staff at international checkpoints in the country - Capacity development of coordination among national, provincial and district levels - Capacity development for coordination among public and private academia for FVC - Veterinary medical management system development

Cross-cutting activities	Priority Projects/Programs
	◆ Capacity development of livestock and fishery production and marketing ◆ Functional Extension System Development Program ◆ Research, testing and experiment infrastructure strengthening and development (including testing of chemical residues) <i>* current situation of testing of chemical residues is summarized in Table 8.2.4</i>

Source: JICA project team

Table 8.2.3 Priority Projects and Programs for External Activities to Support FVC Strengthening

External activities	Priority Projects/Programs	Coordination with
Infrastructure development	Value chain infrastructure development such as ◆ Farm to market access improvement (paved road including district/village level) ◆ Irrigation infrastructure development (ensuring appropriate water supply for crop production)	Department of Irrigation (DOI, MAF) Ministry of Public Works
Safeguard management	◆ Social safeguard management for FVC activities ◆ Environmental management for FVC activities ◆ Gender awareness etc.	Ministry of Natural Resources and Environment (MONRE)

Source: JICA project team

Table 8.2.4 Current Situation of Testing of Chemical Residues

Organization	Current Situation
Plant Protection Center, MAF	◆ Chemical residue testing equipment is available, but there is a lack of human capacity and budget. ◆ There is a problem with the equipment and operation of the laboratory. ◆ There is no track record of chemical residue analysis. ◆ No relevant certifications (ISO17025) obtained.
National Center of Food and Drug Analysis, MOH	◆ Chemical residue testing equipment is available, ◆ Relevant certifications (ISO17025 for drugs) obtained. ◆ Analysis of chemical residues in fresh vegetables is not in the scope of the organization's duties.
Private Company (Phanthamit Analytical Lab., PAL)	◆ Chemical residue testing equipment is not available. ◆ Relevant certifications (ISO17025 for environmental analysis) obtained. ◆ Analysis of chemical residue testing is outsourced for laboratory in Thailand since lack of necessary equipment for testing. ◆ Agreements have been signed with Dongdok National University.
Center of Excellence in Environment, Dongdok National University	◆ Chemical residue testing equipment is available, but there is a lack of human capacity and budget. ◆ There is no track record of chemical residue analysis. ◆ No relevant certifications (ISO17025) obtained. ◆ Agreements have been signed with PAL.

Source: Prepared by JICA project team based on information of the JICA private sector survey in Laos

8.3 FVC-related Law, Regulation and Policy for Enabling Environment

There are varieties of FVC-related Law, Regulation and Policy to be strengthened/improved to create an enabling environment for FVC promotion. Among others, Table 8.2.2 listed agriculture finance, upgrade of ministerial decree, wholesale marketing system and strengthening guidelines. The details are summarized in the next table.

Table 8.3.1 FVC-related Law, Regulation and Policy for Enabling Environment

Topic	Law or Regulation <Organizations in charge>	Current Status	Necessary Measures
Land Management	Land Law (2019) Decree on Agreement Guideline (2023) <MONRE, MAF>	✓ Only 10% of districts have made land allocation plans. ✓ Several conflicts between public interests and private interests	✓ Expedite plan making process ✓ Ambiguities of law implementation need to be removed in terms of land categories change, adjustment process on gaps between plans and actual occupation
Plant Variety Protection	Law on Intellectual Properties (2011) (2017 amended) <MOIC, MAF>	✓ No plant varieties have been registered at present. Recently Law on IP is on the process of amendment to be consistent with UPOV regulations. At this opportunity MIC started to operationalize the variety registration system and asked NAFRI to carry out DUS test, and to send draft Examination Guidelines for rice and maize. ✓ Rice guidelines have been prepared. Maize guidelines are under consideration (70% finished). ✓ NAFRI is ready to carry out DUS test for rice after announcement of the guideline, but other crops guidelines are still under consideration by each relevant institute.	✓ Enlighten relevant staff on IP Protection as soon as possible. ✓ Expand the coverage of Examination Guidelines for DUS test as soon as possible, especially for fruits to invite foreign seed companies to sell their varieties in Laos. ✓ Once Laos joins UPOV, GOL will have a duty to establish all kinds of plants variety registration system within 10 years. (In 2024, MIC may start the process to join UPOV based on the amended Law on IP)
Seed Quality	Decree on Plant Variety (2020) <MAF>	✓ Seeds are sold in shops without quality check by authorities concerned. (Many seedborne diseases are reported)	✓ Increase seed sampling by seed inspectors and laboratory check.
Food Safety	Law on Food (2004) National Food Safety Policy (2009) Decision on Food Inspection (Feb 2012) Regulation on Labeling of Packaged Food (Dec 2015) Regulation on Lao GMP with HACCP <MOH, MAF>	✓ Inconsistency among relevant Laws and Regulation is observed. Limited communication among relevant organizations to ensure food safety. ✓ Pesticide Residue analysis is limited. ✓ Lao GMP with HACCP is not internationally accredited, so Processed Food Exporters need to get Certification of GMP or HACCP internationally accredited. This is very costly, because the HACCP certification body is located in Bangkok or other foreign places.	✓ Establish consistent legal framework and enforce the laws and regulation by developing implementing capacity including laboratories ✓ Upgrade Lao GMP with HACCP to GMP or HACCP internationally accredited or establish internationally accredited HACCP certification body in Laos.
Pesticide Control	Decree on Pesticide Management (2017) Guideline for Pesticide Labeling (2018) <MAF>	✓ Limited training opportunities for input business operators. ✓ Pesticide itself analysis and Pesticide Residue analysis are limited. No efficacy test for new imported pesticide. ✓ Some kinds of pesticide are lacking PHI, Expire Date on the label. No	✓ Pesticide itself (Pesticide Formulation) analysis laboratories need to be established in Government. ✓ The Pesticide Registration System should be strengthened to prevent illegal, fake or low-quality pesticide marketing.

Topic	Law or Regulation <Organizations in charge>	Current Status	Necessary Measures
		penalties.	
Fertilizer Control	Decision on Fertilizer Management (2014) <MAF>	✓ Limited fertilizer quality check due to very few analysis institutes.	✓ Nationwide fertilizer analysis network needs to be established by increasing more analysis centers region by region.
Plant Quarantine	Law on Plant Protection and Quarantine (2016) <MAF>	✓ Tobacco leaves, rice, fresh beans, and sweet potatoes could be exported to China (28 Aug 2023). But many kinds of crops cannot be exported to foreign countries due to lack of agreed quarantine condition based on Pest Risk Assessments.	✓ Carry out more Pest Risk Assessments to establish agreed quarantine conditions for more kinds of crops with foreign countries, such as strawberry, jackfruits <i>Note: Laos has quarantine agreements with Thailand, Vietnam and China, as shown in Table 8.3.2.</i>
Animal Quarantine	Decree on the Control of the Movement of Animal and Animal Products (2012) <MAF>	✓ Border Check Points and relevant laboratories in MAF are checking imported animal health. Some procedures do not meet international standards (Some imported animals are moored for 21 days at destination farms (not under MAF) after checking their health by eye observation.)	✓ Meet international standards by constructing mooring facilities to isolate all imported animals for several days (these days depend on kinds of animals). After mooring imported animals, quarantine offices conduct necessary laboratory tests such as micrology, serology, then decide to allow importation.
Animal Meat	Law on Livestock Production and Veterinary Matter (2016) Decree on Livestock Slaughtering and meat inspection (2020) Decree on Slaughterhouse of Animal, Destruction of Animal Remains and Compensation (2022) <MAF, MOH>	✓ After amendment of Law on Livestock Production and Veterinary Matter, relevant regulations have been made one after another and implemented. The legal framework for meat hygiene has been established. ✓ Only one slaughterhouse got GHP (internationally accredited) in 2021.	✓ Based on the established legal framework, implementation framework needs to be established as soon as possible by developing the capacity of veterinarian and other technical officers and laboratory capacity. ✓ The number of slaughterhouses with GHP internationally accredited need to be increased.
Animal Feed	Decree on Animal Feed (2020) <MAF>	✓ Non licensed shops are selling animal feed together with pesticide. The nutrition of feed check is limited.	✓ Strict law enforcement by fining shops to violate the decree.
Animal Medicine	Law on Livestock and Veterinary Matter (2016) (Article 41,68,76,77) <MAF>	✓ Non-licensed shops are selling animal medicine together with pesticide.	✓ Strict law enforcement by fining shops to violate the law.
Organic Agriculture	Agreement on Organic Agriculture Standards (2022)	✓ Difficult to identify the violation cases to the standard (Article 8-1), due to no analysis capacity in	✓ Carry out pesticide residue analysis to certify organic agriculture. Self-declaration on

Topic	Law or Regulation <Organizations in charge>	Current Status	Necessary Measures
	<MAF>	domestic laboratories in terms of pesticide residue. (Article 8-8) Linked paddy fields are easily contaminated from chemicals used in other upstream fields. But this Article not clearly deny these cases.	organic could not be reliable. ✓ Clarify the details of contamination situation about water and other elements.
GAP	Agreement of the minister on Good Agriculture Practices for Environmental Management (Feb 2021) Agreement On Good Agriculture Practices for Food Safety Standard (June 2022) Agreement on Good Agriculture Practice for Woker Health, Safety and Welfare Standard (Feb 2011) <MAF>	✓ Producers are facing difficulties understanding the details of the standards, because some articles on standards are not so clear. (Environment Article 10-3. IPPS, most farmers are not aware) ✓ Difficult to identify the violation cases to the Standards due to no pesticide residue check ✓ Lao GAP does not comply with ASEAN GAP and is not internationally accredited. ✓ Neighboring countries set requirements of exporters to get GAP certificate. ✓ internationally accredited such as Global GAP.	✓ Prepare Control Points with Compliance Criteria on each management activity. ✓ Carry out pesticide residue analysis to certify appropriate use of pesticide. ✓ Make Lao GAO comply with ASEAN GAP, then Upgrade Lao GAP to internationally accredited GAP or establish internationally accredited GAP Certification Body in Laos.
Wholesale Market	Agreement on Market (May 2013) <MOIC>	✓ Lacking elements about strengthening ✓ important Market Functions such as product collecting, information dissemination. Price manipulation took place due to free participation by all traders.	✓ Make Wholesale Market Law in future after making regulations to strengthen market functions on information dissemination, trader licensing system.
Farmers' Organization	Cooperative Law (2023 draft) Decree on Groups and Cooperatives (2020) <MAF, MOIC>	✓ Upgrading existing Decree to Cooperative Law is must, and the Law proposed new ideas of Cooperative Promotion Fund and Tax exemption on cooperative income, especially for agriculture cooperative.	✓ The drafted Cooperative Law need to strengthen income tax exemption, and financial support to cooperatives that enables cooperatives to borrow money from commercial banks
Contract farming	Law on Contract (1990) Decree of Contract Farming (2023 draft) <MOIC, MAF>	✓ Law on Contract does not mention the details of contract farming. This decree could clarify the contract farming to avoid conflicts between producers and buyers.	✓ Strengthening Law Enforcement by clarifying duties of parties and imposing heavy penalty for infringement cases.
Agriculture Finance	SME Law <MOIC>	✓ SME Promotion Fund (3%, 5 years Repayment) is available. But Agriculture Cooperatives have difficulty accessing this fund.	Establish Credit Guarantee System by organizing Lao Credit Guarantee Company that enables borrowers to access SME Promotion Fund more easily.
Investment Tax	Law on Investment Promotion (2017) <MOIC>	In some areas such as SEZ ✓ Corporate Income Tax exemption (10 years) Tarif Exemption on seed, fertilizer, raw materials for processing and machinery	✓ The list of goods and services exempted from value added tax need to include materials such as pipes for drip irrigation, mulching sheet plastic, vinyl sheet for green

Table 8.4.1 Overall Cost for the Master Plan Implementation (Summary)

Term Amount Unit	Short (2025)	Medium (2026-2030)	Long (2031-2040)	Total
USD	10,795,000	153,150,000	404,150,000	568,095,000
JPY	1,619,250,000	22,972,500,000	60,622,500,000	85,214,250,000

Source: JICA project team

Technically such amount is required for implementation of MP. In order to implement MP as planned, MAF/DAEC is requested to arrange budget from both government as well as financial and technical assistance from development partners in relation to FVC since various FVC-related projects are on-going or planned. The Project suggest herein that the master plan for strengthening food value chain can be utilized as good reference to negotiate within the government and with development partners to formulate appropriate direction of future projects and programs to support promotion of food value chain.

Table 8.4.2 Implementation Schedule of Priority Projects and Programs[illegible]

				2025				2026				2027				2028				2029				2030				2031				2032				2033				2034				2035				2036				2037				2038				2039				2040			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4												
Master Plan (Terms)				S	Medium Term																				Long Term																																										
		b	Market-oriented crops production for export (priority crops such as coffee, maize, cassava, banana, water melon, potential fruits crops etc.)																																																																
		c	Agriculture products processing and food system development																																																																
		d	Livestock production development and extension project																																																																
		e	Food safety in livestock products improvement																																																																
		f	Food safety in fishery products improvement																																																																
		g	Commercial high yield grass seed production and supply for livestock																																																																
		h	Promotion of high value niche products																																																																
2	FVC-related Law, Regulation and Policy for Enabling Environment			Strengthening and improving FVC-related law, regulation and policy for enabling environment for VC promotion																																																															
	A	Overall agriculture development related																																																																	
		a	Decree on Groups and Cooperatives																																																																
		b	Agreement on Market																																																																
		c	Land Law																																																																
		d	Agreement on Organic Agriculture Standard																																																																
		e	Agreement of GAP related Standard (GAP)																																																																
		f	Law for Agriculture Credit Facilities																																																																
		g	Law on Intellectual Property																																																																
	B	Food safety																																																																	
		i	Overall food safety																																																																
		a	Law on Food																																																																
		b	Agriculture Law																																																																
		ii	Production																																																																
		a	Law on Plant Protection and Quarantine																																																																
		b	Decree on Implementing the Law on Plant Protection																																																																
		c	Decree on Pesticide Management																																																																
		d	National Food Safety Policy																																																																
		iii	Inland fishery																																																																
		a	Fisheries Law																																																																
		iv	Livestock																																																																
		a	Law on Livestock Production and Veterinary Matters																																																																
		b	Decree on the Control of the Movement of Animal and Animal Products																																																																
		c	Decree on Animal Feed																																																																
		d	Decree on Livestock Slaughtering and Meat Inspection																																																																
		e	Decree on Notification for Enforcement of the Strategy on Food Safety for Livestock Primary Products																																																																
		f	Decree on Veterinary Medicines																																																																
		v	Others																																																																
		a	Wildlife and Aquatic Resource Law																																																																
3	Agriculture input																																																																		
	A	Biofertilizer production and promotion																																																																	
	B	Livestock and fish feeds production promotion																																																																	
	C	Legal Enforcement Program for Pesticide Control																																																																	
	D	Legal Enforcement Program for Fertilizer Management																																																																	
4	Agriculture finance																																																																		
	A	Matching grant																																																																	
	B	Agriculture financing scheme																																																																	
	C	Agricultural Credit facilities System																																																																	
	D	Accessibility improvement of farmers to formal financial institutions																																																																	

[illegible]

Source: JICA project team

Table 8.4.3 Related Technical Measures for Priority Projects and Programs

			Crop rotation	Intercropping and mixed cropping	Soil preparation	Coordination strengthening among research and extension	Fertilizer application	Disease management for agricultural products	Pesticide application	Product componential analysis	Regulation of foreign investment in agricultural production (fishery)	Disease management for livestock	Livestock production	Local pig promotion	Fish yield control and management	Niche high valued products promotion	Processing promotion of priority products	Household accounting management	Book keeping (Farm Record)	Cropping Calendar (Cropping Pattern Arrangement)	Post Harvest	Business plan	Group formation/ Group strengthening	Group accounting management	Establishment of Cooperatives	Formulation of Water Users Association	Collective Selling / Purchasing	Rural finance accessibility improvement	Market information access improvement	Cold storage installation	Strengthening financial scheme to middlemen	Cold chain improvement	Price control policy by the Government	Foreign investment control by the Government	Market information system improvement	Distribution improvement to preserve products	Market facilities improvement to suit various level of traders	Packing improvement for distribution	Strengthening financial support to farmers' group	Strengthening farmers' group in financial management	Strengthening coordination with private financial institutions	Strengthen law and regulations enforcement in agriculture and livestock sector	Strengthen seed quality checking system	Strengthen fertilizer quality checking system	Product traceability system	Strengthening capacity of extension officers	Strengthening coordination mechanism with private sectors	ICT extension system development	Strengthening coordination role between PAFOs and DAFOs	Strengthening coordination role between public and input suppliers	Strengthening Coordination among extension and educational institutions	
			PR-01	PR-02	PR-03	PR-04	PR-05	PR-06	PR-07	PR-08	PR-09	PR-10	PR-11	PR-12	PR-13	PR-14	PR-15	FM-01	FM-02	FM-03	FM-04	FM-05	FM-06	FM-07	FM-08	FM-09	FM-10	FM-11	FM-12	MAR-01	MAR-02	MAR-03	MAR-04	MAR-05	MAR-06	MAR-07	MAR-08	SUP-01	SUP-02	SUP-03	SUP-04	SUP-05	SUP-06	SUP-07	EX-01	EX-02	EX-03	EX-04	EX-05	EX-06		
Priority projects and programs																																																				
1 Strengthening three models of FVC																																																				
	A	FVC for domestic market																																																		
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	1	1	1	1	1	1	1	1								1	1	1	1	1	1	1				1								1		1					1	1	1	1	1	1	1	1		
	b	Market-oriented crops production for traditional market	1	1	1	1	1	1	1	1								1	1	1	1							1		1						1	1						1				1			1		
	c	Agriculture products processing and food system development													1		1						1	1	1	1			1							1			1					1				1	1			
	d	Livestock production development and extension project										1	1	1					1				1						1	1							1					1	1	1			1	1	1			
	e	Improved traditional fish culture promotion									1				1								1						1	1						1					1	1	1				1	1	1			
	f	Quality brood stock supply for fish farmers									1				1																												1	1	1			1	1	1		
	B	FVC for modern domestic market																																																		
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	1	1	1	1	1	1	1	1								1	1	1	1	1	1	1				1									1		1					1	1	1	1	1	1	1	1	
	b	Agribusiness promotion support																1	1	1	1		1	1	1	1		1	1	1														1	1			1	1	1		
	c	Agriculture products processing and food system development													1		1						1	1	1	1			1							1			1				1				1	1		1	1	
	d	Livestock production development and extension project										1	1	1					1				1						1	1							1						1	1	1			1	1	1		
	e	Fish culture promotion									1					1							1						1	1							1						1	1	1			1	1	1		
	f	Commercial high yield grass seed production and supply for livestock										1	1	1					1				1						1	1													1	1	1			1	1	1		
	g	Quality brood stock supply for fish farmers									1				1																													1	1	1			1	1	1	
	h	Promotion of high value niche products			1	1	1	1	1							1	1	1	1	1	1	1	1	1	1				1	1	1						1						1	1			1			1		
	C	Export FVC																																																		
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	1	1	1	1	1	1	1	1								1	1	1	1	1	1	1				1										1						1	1	1	1	1	1	1		
	b	Market-oriented crops production for export (priority crops such as coffee, maize, cassava, banana, water melon,	1	1	1	1	1	1	1	1								1	1	1	1	1	1	1	1			1	1	1						1	1	1						1	1	1	1	1	1	1		
	c	Agriculture products processing and food system development													1		1						1	1	1	1			1								1			1				1				1	1		1	1
	d	Livestock production development and extension project										1	1	1					1				1						1	1							1			1	1	1			1	1	1			1	1	1
	e	Food safety in livestock products improvement										1	1																										1				1	1					1		1	
	f	Food safety in fishery products improvement													1																												1	1					1		1	
	g	Commercial high yield grass seed production and supply for livestock										1	1	1					1				1						1	1														1	1	1			1	1	1	
	h	Promotion of high value niche products			1	1	1	1	1							1	1	1	1	1	1	1	1	1	1				1	1	1													1	1			1			1	
2 FVC-related Law, Regulation and Policy for Enabling Environment																																																				
	A	Overall agriculture development related																																																		
	a	Decree on Groups and Cooperatives																						1	1	1																										
	b	Agreement on Market																																																		
	c	Land Law																																																		
	d	Agreement on Organic Agriculture Standard			1		1		1																																											

[illegible]

		Crop rotation	Intercropping and mixed cropping	Soil preparation	Coordination strengthening among research and extension	Fertilizer application	Disease management for agricultural products	Pesticide application	Product componential analysis	Regulation of foreign investment in agricultural production (fishery)	Disease management for livestock	Livestock production	Local pig promotion	Fish yield control and management	Niche high valued products promotion	Processing promotion of priority products	Household accounting management	Book keeping (Farm Record)	Cropping Calendar (Cropping Pattern Arrangement)	Post Harvest	Business plan	Group formation/ Group strengthening	Group accounting management	Establishment of Cooperatives	Formulation of Water Users Association	Collective Selling / Purchasing	Rural finance accessibility improvement	Market information access improvement	Cold storage installation	Strengthening financial scheme to middlemen	Cold chain improvement	Price control policy by the Government	Foreign investment control by the Government	Market information system improvement	Distribution improvement to preserve products	Market facilities improvement to suit various level of traders	Packing improvement for distribution	Strengthening financial support to farmers' group	Strengthening farmers' group in financial management	Strengthening coordination with private financial institutions	Strengthen law and regulations enforcement in agriculture and livestock sector	Strengthen seed quality checking system	Strengthen fertilizer quality checking system	Product traceability system	Strengthening capacity of extension officers	Strengthening coordination mechanism with private sectors	ICT extension system development	Strengthening coordination role between PAFOs and DAFOs	Strengthening coordination role between public and input suppliers	Strengthening Coordination among extension and educational institutions	
		PR-01	PR-02	PR-03	PR-04	PR-05	PR-06	PR-07	PR-08	PR-09	PR-10	PR-11	PR-12	PR-13	PR-14	PR-15	FM-01	FM-02	FM-03	FM-04	FM-05	FM-06	FM-07	FM-08	FM-09	FM-10	FM-11	FM-12	MAR-01	MAR-02	MAR-03	MAR-04	MAR-05	MAR-06	MAR-07	MAR-08	MAR-09	SUP-01	SUP-02	SUP-03	SUP-04	SUP-05	SUP-06	SUP-07	EX-01	EX-02	EX-03	EX-04	EX-05	EX-06	
6	Capacity Development																																																		
	A Strengthening agriculture extension and analysis capacity of extension offices																																																		
	B Agriculture producer's group and cooperative formation and strengthening																				1	1	1	1													1	1	1												
	C Subject-wise capacity development (insect, plant disease, laboratory testing and analysis, plant breeding etc.)	1	1	1	1	1	1	1	1																																										
	D Capacity development for plant quarantine staff at international checkpoints in the country																																																		
	E Capacity development of coordination among national, provincial and district levels																																																		
	F Capacity development for coordination among public, private academia for FVC																																																		
	G Veterinary medical management system development										1																																								
	H Capacity development of livestock and fishery production and marketing																																																		
	I Functional Extension System Development Program																																																		
	J Research, testing and experiment infrastructure strengthening and development (including testing of chemical residues)																																																		
7	FVC-related infrastructure development																																																		
	A Farm to market access improvement																												1	1	1	1				1															
	B Irrigation development																																																		

Source: JICA project team

Table 8.4.4 Overall Cost for Proposed Projects and Programs

				Unit cost and number of sites			Period (year)															Total			
				Per year per site			Sites	Per year	Short	Medium					Long					Short	Medium	Long	Grand total		
				2025	2026	2027				2028	2029	2030	2031	2032	2033	2034	2035	2036	2037					2038	2039
1 Strengthening three models of FVC																									
A		FVC for domestic market																							
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
	b	Market-oriented crops production for traditional market	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
	c	Agriculture products processing and food system development	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
	d	Livestock production development and extension project	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
	e	Improved traditional fish culture promotion	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
	f	Quality brood stock supply for fish farmers	60,000	18	1,080,000	360,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	360,000	5,400,000	10,800,000	16,560,000	
B		FVC for modern domestic market																							
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	b	Agribusiness promotion support	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	c	Agriculture products processing and food system development	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	d	Livestock production development and extension project	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	e	Fish culture promotion	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	f	Commercial high yield grass seed production and supply for livestock	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	g	Quality brood stock supply for fish farmers	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
	h	Promotion of high value niche products	90,000	18	1,620,000	540,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	1,620,000	540,000	8,100,000	16,200,000	24,840,000	
C		Export FVC																							
	a	Organic farming and/or clean agriculture production system standard strengthening and extension with business entities	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	b	Market-oriented crops production for export (priority crops such as coffee, maize, cassava, banana, water melon)	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	c	Agriculture products processing and food system development	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	d	Livestock production development and extension project	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	e	Food safety in livestock products improvement	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	f	Food safety in fishery products improvement	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	g	Commercial high yield grass seed production and supply for livestock	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
	h	Promotion of high value niche products	120,000	18	2,160,000							2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	0	0	21,600,000	21,600,000	
2 FVC-related Law, Regulation and Policy for Enabling Environment																									
A		Overall agriculture development related																							
	a	Decree on Groups and Cooperatives	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	b	Agreement on Market	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	c	Land Law	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	d	Agreement on Organic Agriculture Standard	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	e	Agreement of GAP related Standard (GAP)	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	f	Law for Agriculture Credit Facilities	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000										5,000	50,000	0	55,000	
	g	Law on Intellectual Property	10,000	1	10,000	5,000	10,000	10,000	10,000	10,000	10,000														