

# THE IN-DEPTH STUDY OF CHILI VALUE CHAIN IN CAMBODIA

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BY KERCAL CO., LTD FOR GIZ CAMBODIA





# EXECUTIVE SUMMARY

This study is exploratory research to collect in-depth information. It aims to provide the implementation partners the better insights and dynamics of the current chili value chain in Cambodia, the specific objectives of this in-depth study are:

- To map and analyze the current actors and stakeholders involving in the chili value chain in Cambodia as well as the opportunities and challenges.
- To perform export readiness assessment on selected key private sector companies, who are based on initial assessment more likely export-ready in terms of processing chili for export to international markets, particularly ASEAN markets.
- To suggest value chain development approaches, which the project partners should focus and prioritize in supporting the private sector to successfully export to the identified ASEAN markets for chili.

Method	Number
1. Review documents related to the chili value chain in Cambodia	18 documents
2. Discuss and consult with key stakeholders	22 stakeholders
3. Review video reporting about chili farmers	7 videos

## KEY FINDINGS

### SEEDING

- Bird's eye, Cayenne (Lady's Finger), and Hawaii (Sweet) are the three most grown chili varieties in Cambodia. Cayenne variety is the most potential.
- Most chili seeds sold by agricultural input suppliers are imported seeds from Thailand and Vietnam.
- No stakeholder has bred any chili variety to produce chili seeds in Cambodia due to the lack of priority and funding. Priority and budget are not allocated for the chili value chain yet.



Stakeholder	
Government Institution	Ministry of Agriculture, Forestry and Fisheries (MAFF), General Department of Agriculture (GDA), Department of Horticulture, MAFF's Provincial Departments
Private Institution	East-West Seed (Cambodia), Chia Tai Cambodia, Kasikorn Chamroeun Phal Co., Ltd, Chili Agriculture Cooperatives (AC), Agricultural Input Suppliers (AIS)
Donor/Development Partner/ NGO Institution	GIZ Cambodia, Cambodia-Australia Agricultural Value Chain Program (CAVAC)
Research Institute	Cambodian Agricultural Research and Development Institute (CARDI)

## PRODUCTION

- There is a seasonality challenge of chili production in Cambodia. Fresh chilies are tremendously available in the dry season. In the rainy season, fresh chili supply is limited.
- Fresh chilies supplied by many farmers are found to contain a high level of chemical residual.
- Transforming from regular buy-sale practice to contract farming between chili farmers and processors is currently challenging. Many chili farmers still prefer to sell their fresh chilies based on market price rather than the contract price.



Stakeholder	
Government Institution	GDA, Department of Horticulture, MAFF's Provincial Departments, Ministry of Water Resources and Meteorology, Ministry of Rural Development
Private Institution	La Plantation, CSL Enterprise, Rural Support C.A.P, Cambodia Pepper and Spice Federation (CPSF), Pepper Enterprises, Chili Sauce Enterprises, Chhean Lerng Chamroeun Phal Cooperative, Other Horticulture Cooperatives, Tropicam Fruit and Vegetable, Pkar Chouk Co., Ltd (Mr. Ieng Sotheara), Natural Agriculture Village (NAV), Khmer Organic Cooperative
Donor/Development Partner/ NGO Institution	GIZ Cambodia, Cambodia-Australia Agricultural Value Chain Program (CAVAC)
Research Institute	GIZ, CAVAC, SNV-CHAIN, Food, and Agriculture Organization (FAO)

## PROCESSING

- Dried chilies and chili sauce are the two main processed chili products in Cambodia.
- Capital constraint limits purchasing capacity of the processor to source a large volume of fresh chilies during the chili season.
- Lack of hygiene practice for the semi-dried chilies made by farmers is a major concern for processors.



Stakeholder	
Government Institution	Ministry of Commerce (MoC)-General Department of Trade Promotion (GDTP), MAFF-GDA, MEF-KE
Private Institution	La Plantation, CSL Enterprise, Rural Support C.A.P, CPSF, Pepper Exporters
Donor/Development Partner/ NGO Institution	GIZ, CAVAC

## DIGITAL SOLUTION

- There is not any official digital system or platform dedicating to disseminated information or improve the productivity of the chili value chain in Cambodia.
- Digital literacy among chili farmers is still relatively weak, so there might be difficult to increase the adoption of digital solutions with some sophistication.
- Development of digital solutions, such as App or Website, is difficult; however, the operation and maintenance are more difficult.



Stakeholder	
Government Institution	MAFF's ArDOC, MoC-General Department of Trade Promotion (GDTP), MEF-KE, Techo Startup Centre
Private Institution	AMK Tonel Sap App, SPIEN, Agribuddy, Agribee, Money Transfer Agents, AMRU
Donor/Development Partner/ NGO Institution	GIZ, CAVAC, Feed the Future of Cambodia HARVEST II International Fund for Agriculture Development (IFAD), Oxfam, Konrad Adeneuer Stiftung





## RECOMMENDATIONS

### SEEDING

- This study recommends stakeholders pay attention to the breeding of Cayenne Chili (Lady Finger) because this variety is a potential with good demand by the local chili processing sector and export market.
- GDA and CARDI should be funded to carry out a project to breed selected chili varieties. Private seed-producing companies should be engaged to scale up the productions of the newly-bred chili seeds.

### PRODUCTION

- Stakeholders should collaborate to conduct the two experiments, including 1) to grow chili in the non-flooded region during the rainy season and 2) to grow chili in the net-house or green-house.
- MAFF's Chili Farmer Guideline should be improved with the adoption of newly-bred chili seeds and CAM-GAP standards. After the guideline is improved, a training of trainers from agricultural cooperative should be conducted. Farmers should be advised to rotate crops to reduce disease risk.
- Stakeholders should create funds for some committed trainers to create model chili farms to demonstrate to farmers the chili planting techniques and technology.
- Stakeholders should collaborate to involve more agricultural cooperatives to grow chilies and facilitate contract farming with chili processors and CPSF.
- Fund the experiment of chili farms in the non-flooded areas with the purpose to solve the seasonality issue.

### PROCESSING

- Farmer's awareness and capacity about hygiene for drying chilies should be raised.
- CPSF encourages its members, who are pepper producers, to expand the business lines to produce dried chilies.
- The capacity of dried chili processors should be strengthened on several topics as below:
  - Training/workshop about the available supports from government and development partners.
  - Training about the creation of contract farming with agricultural cooperatives or farmers.

## **MARKET AND EXPORT**

- Processors' export skills should be strengthened by providing training about quality infrastructure, the export process, and selling on the international e-commerce platforms.

## **DIGITAL SOLUTION**

- Stakeholders should collaborate to create and moderate Facebook page, Facebook group, Telegram Group, and Youtube channel for sharing content and initiate discussion about the chili value chain in Cambodia
- After the chili value chain is larger, stakeholders should consider the replication and adoption of digital solutions from other value chains, such as BlocRice of AMRU and the rice eco-system technology of AgriBee.

# CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	i
LIST OF FIGURES .....	vii
LIST OF TABLES .....	viii
<b>1. INTRODUCTION</b> .....	1
<b>2. METHODOLOGY</b> .....	1
2.1 FRAMEWORK .....	1
2.2 DATA COLLECTION .....	2
2.2.1 DOCUMENT REVIEW .....	2
2.2.2 DISCUSSION AND CONSULTATION WITH KEY INFORMANT .....	3
2.2.3 VIDEO REVIEW .....	4
2.3 LIMITATION .....	5
<b>3. CHILI VALUE CHAIN</b> .....	5
3.1 VARIETY AND SEED .....	6
STAKEHOLDER .....	6
OPPORTUNITY AND CHALLENGE .....	7
3.2 PRODUCTION .....	11
STAKEHOLDER .....	11
OPPORTUNITY AND CHALLENGE .....	13
3.3 PROCESSING .....	19
STAKEHOLDER .....	19
OPPORTUNITY AND CHALLENGE .....	20
3.4 MARKET AND EXPORT .....	25
STAKEHOLDER .....	25
OPPORTUNITY AND CHALLENGE .....	26
3.5 DIGITAL SOLUTION .....	27
STAKEHOLDER .....	27
OPPORTUNITY AND CHALLENGE .....	28
<b>4. EXPORT READINESS OF DRIED CHILI COMPANIES</b> .....	29
LA PLANTATION .....	30
CSL ENTERPRISE .....	32
RURAL SUPPORT C.A.P. ....	33
KHENG YARY DEVELOPMENT AND INVESTMENT CO., LTD .....	34



<b>5. CONCLUSION AND RECOMMENDATION</b> .....	34
5.1 SUMMARY OF KEY FINDINGS .....	34
5.2 RECOMMENDATIONS .....	36
<b>REFERENCE</b> .....	39

## **LIST OF FIGURES**

Figure 1: Cayenne Chili Plants .....	8
Figure 2: Bird's Eye Chili Plants .....	9
Figure 3: Sweet Or Hawaii Chili Plants .....	9
Figure 4: East-West Seed's Cayenne Chili Seed .....	10
Figure 5: Choke Kasikorn Chili Seeds From Thailand .....	10
Figure 6: Farming Steps Of Chili .....	11
Figure 7: Harvest And Post-Harvest Steps Of Chili .....	14
Figure 8: Workers Are Harvesting Bird's Eye Chilies .....	15
Figure 9: Cayenne Chilies Are Packaged Into Plastic Bags .....	16
Figure 10: Chilies Are Being Sorted By Workers In Kampong Chhnang Province ..	17
Figure 11: Farmer's Processing Method of Dried Chili .....	21
Figure 12: Villagers Are Sorting And Cutting Sweet Chilies In Kampong Chhnang Province .....	21
Figure 13: Villager Is Boiling Sweet Chilies In Kampong Chhnang .....	22
Figure 14: Workers Are Preparing Sweet Red Chilies For Sundry .....	22
Figure 15: Sweet Red Chilies Are Dried Under Sunlight And Uncontrolled Environment .....	23
Figure 16: Chilies Are Dried Under Sunlight In Tboung Khmum Province .....	24
Figure 17: Enterprise's Processing Method Of Dried Chili .....	18
Figure 18: Smoked Sweet Long Chili Powder .....	30
Figure 19: Whole Smoked Bird's Eye Chili .....	30
Figure 20: Whole Smoked Bird's Eye Chili .....	31
Figure 21: Whole Dried Bird's Eye Chili In Paper Box .....	31
Figure 22: Bird's Eye Chili Whole Dried In Paper Bag .....	31
Figure 23: Whole Dried Cayenne Chilies .....	32
Figure 24: Whole Dried Sweet Chilies .....	32
Figure 25: Grouned Chilies .....	33

## LIST OF TABLES

Table 1: Export Readiness Assessment Grid For The Chili Value Chain In This Study...	2
Table 2: List Of Documents Found And Reviewed By Researchers .....	3
Table 3: Numbers Of Key Informants Discussed And Consulted By Researchers ...	3
Table 4: List Of Videos Reviewed By Researchers.....	4
Table 5: Stakeholders Related To Chili Seeding .....	6
Table 6: Opportunities And Challenges In Seeding Stage.....	7
Table 7: Stakeholder Related To Chili Production .....	11
Table 8: Opportunities And Challenges In Production Stage .....	13
Table 9: Stakeholders Related To The Processing Of Chili Processing .....	19
Table 10: Opportunities And Challenges In Processing Stage.....	20
Table 11: Stakeholders Related To Market And Export .....	25
Table 12: Opportunities And Challenges In Market And Export.....	26
Table 13: Stakeholders Related To Digital Solution .....	27
Table 14: Opportunities And Challenges In Market And Export.....	28
Table 15: Readiness Assessment .....	30
Table 16: Readiness Assessment .....	32
Table 17: Readiness Assessment .....	33
Table 18: Readiness Assessment .....	34

# 1. INTRODUCTION

In 2020, GDA and GIZ agreed on supporting the chili value chain under the framework of the ASEAN AgriTrade project. The decision was made based on the “Rapid Assessment of Potential Cambodia Agriculture Value Chain On Chillies, Mangoes and Cashew Nuts in ASEAN Markets”, successfully undertaken by Kercal Co.Ltd between August and October 2020.

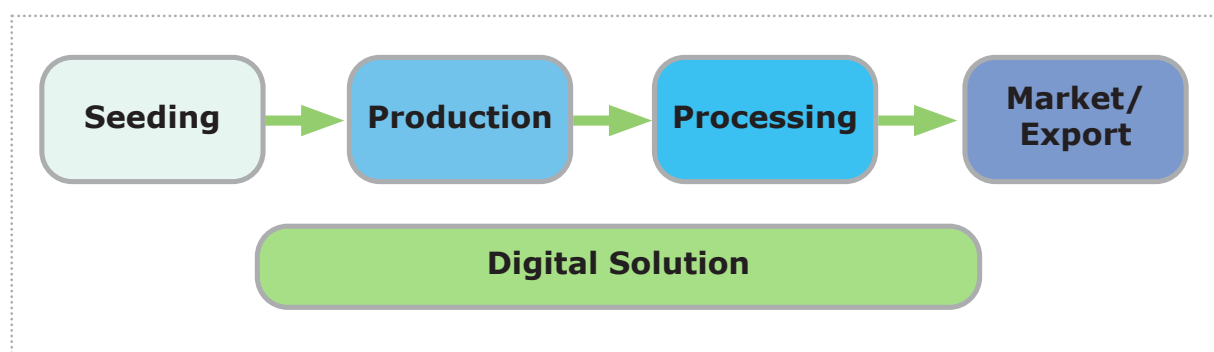
To provide the implementation partners better insights and dynamics of the current chili value chain in Cambodia, researchers from Kercal Co., Ltd were commissioned to perform “An In-dept Study on Chili Value Chain in Cambodia”. The specific objectives of this in-depth study are:

- To map and analyze the current actors and stakeholders involving in the chili value chain in Cambodia (including opportunity and challenges)
- To perform export readiness assessment on selected key private sector companies, who are based on initial assessment more likely export-ready in terms of processing chili for export to international markets, particularly ASEAN markets.
- To suggest value chain development approaches, which the project partners should focus and prioritize in supporting the private sector to successfully export to the identified ASEAN markets for chili.

## 2. METHODOLOGY

### 2.1 FRAMEWORK

This study aims to provide information on the chili value chain to stakeholders. Therefore, the researchers used a value chain framework to collect information in each step of the value chain, including seeding, production, processing, market/export, and digital solution. For each stage, information about stakeholders, opportunity, and challenge are collected and analyzed to demonstrate in the report.



Source: Authors' consolidation

In addition, the researchers reviewed the framework for assessing the export readiness of SMEs in the USA and Australia. The researchers synthesized a basic export readiness framework for assessing dried chili processors as below.

**Table 1: Export Readiness Assessment Grid For The Chili Value Chain In This Study**

Factor	Assessment	Explanation
Motivation	Ready or Not Ready?	Explain the motivation of the owner or management team to export.
Raw Material	Ready or Not Ready?	Describe if the processor has a channel or relationship to source good and sufficient fresh chili.
Production	Ready or Not Ready?	Describe production capacity and standards.
Product	Ready or Not Ready?	Describe product, packaging, and labeling.
Market	Ready or Not Ready?	Describe if the processor has successfully supplied to the local supermarket and developed an understanding of the export market.

Source: Authors' consolidation

## 2.2 DATA COLLECTION

This study is exploratory research to collect in-depth information on the chili value chain for the stakeholders. To meet this objective within the context of the Covid-19 pandemic outbreak, the researchers applied three methods as below:

- Document review
- Discussion and consultation with key informant
- Video review

### 2.2.1 DOCUMENT REVIEW

This method is used to gather all relevant existing secondary data from different available sources. Reports, case studies, policy and strategy papers, and best practices, as well as successful cases related to seeding, production, processing, contract farming, and commercialization of chili, were reviewed to identify stakeholders and collect relevant information about the chili value chain in Cambodia.

**Table 2: List Of Documents Found And Reviewed By Researchers**

1. AUSVEG. “Guide to the export readiness checklist”.
2. AVRDC. “Creation and management of small-scale vegetable packaging house for linking farmers with the market”. Year: 2016.
3. AVRDC. “Post-harvest technique for vegetables”. Year: 2010.
4. AVRDC. “Post-harvest Technology for Fresh Chili Pepper in Cambodia, Laos, and Vietnam”.
5. CAVAC. “Markets for Cambodian Crops with Promising Prospects”. Year: 2020.
6. CARDI. “Post-harvest value chain of chili”. Year: 2007.
7. Dr. Vivian Ku and Sok Bunna. “Mapping chili supply chain from Kompong Cham province to Cambodia-Thai border, Pailin”. Year: 2017.
8. FAO and WHO. “Conclusion of the in-session working group on the regional standard for chili sauce”. Year: 2010.
9. Institute of Standard of Cambodia. “Presentation on quality infrastructure for food processing sector and its roles in the creation of the standard for the export market”. Year: 2019.
10. MAFF. “Chili farmer manual”. Year: 2012.
11. Michigan State University. “Export Readiness Initial Assessment”.
12. SNV-CHAIN. “Major diseases for eggplant, tomato, and chilies”.
13. Theoun News: Interview with Farmer Sokun in Sangkat Sambo Meal, Krung Kampong Cham, Kampong Cham Province. Year 2021 Link: <https://www.youtube.com/watch?v=sæem7mIPIn0>
14. USAID. “An analysis of three commodity value chains in Cambodia”. Year: 2015.
15. USAID. “Bulletin No 94 on harvest and post-harvest technique for chili”. Year: 2013.
16. USAID. “Cambodia agriculture competitiveness opportunity assessment”. The year 2019.
17. US Department of Small and Local Business Development. “Export Readiness Assessment (ERA) Questionnaire.
18. USAID. “Best Practices in Determining Export Readiness”.

Source: Authors’ consolidation

### 2.2.2 DISCUSSION AND CONSULTATION WITH KEY INFORMANT

The researchers discussed and consulted with the selected key informants from government institutions, private companies, donor/development partners/NGOs, and research institutes. The purposes of this method were to 1) collect their opinion and information, 2) validate information, 3) identify more stakeholders or request contact information.

**Table 3: Numbers Of Key Informants Discussed And Consulted By Researchers**

Factor
1. Deputy Director-General of GDA of MAFF
2. Director of Department of Horticulture of MAFF
3. Director of Department of SME of MISTI

Private Institutions
<ol style="list-style-type: none"> <li>1. CEO of CSL Enterprise</li> <li>2. Owner of La Plantation</li> <li>3. Marketing Manager of Rural Support C.A.P</li> <li>4. Director of Kheng Yary Development and Investment Co., Ltd</li> <li>5. CEO of AMRU</li> <li>6. Secretary-General of Cambodian Pepper and Spice Federation</li> <li>7. Director of Signature of Asia</li> <li>8. CEO of Agribee-Beerice</li> <li>9. The staff of Rari Handicraft</li> <li>10. The staff of East-West Seed (Cambodia)</li> <li>11. Owner of a chili sauce handicraft in Chroy Changvar district, Phnom Penh.</li> </ol>
Donor/Development Partner/NGO
<ol style="list-style-type: none"> <li>1. Agricultural Specialist of FAO</li> <li>2. Competitiveness Coordinator of CAVAC</li> <li>3. Representative of USAID-HARVEST II</li> </ol>
Research Institute
<ol style="list-style-type: none"> <li>1. Deputy chief of Plant Breeding Division</li> </ol>
Input Supplier and Farmer
<ol style="list-style-type: none"> <li>1. Two farmers in Trey Sla Commune, Sa Ang District</li> <li>2. Representative of Strey Kdei Sang Khoeum Treng Tror Yoeng Cooperative</li> <li>3. chili seed seller found from the online source.</li> </ol>

Source: Authors' consolidation

### 2.2.3 VIDEO REVIEW

Due to the Covid-19 pandemic outbreak during the time of this study, the researchers were not able to contact and interview many chili farmers. To understand the chili farmers, the researchers found and reviewed seven credible video reports of chili farmers in many locations in Cambodia. Most of the questions asked by the program hosts were similar to the topic that the researchers intended to collect from farmers. Therefore, the seven videos could provide very useful information for this study.

**Table 4: List Of Videos Reviewed By Researchers**

<ol style="list-style-type: none"> <li>1. Australian Embassy Video: Interview with chili (Cayenne) farmer Vann Sokhorn. Year: 2017.</li> <li>2. BTV Report: Chili (Cayenne variety) planting under Boosting Food Production Program in Kampong Cham province. Year: 2020</li> <li>3. BTV TV Program: Interview chili (Bird's eye Variety) farmer Touch Pun in Prek Koy Commune, S' Ang District, Kandal Province. Year: 2017</li> <li>4. BTV TV Program: Interview with chili (Hawaii variety) farmer Chy Meng Seak in Kampong Siem District, Kampong Cham Province. Year: 2016</li> <li>5. Interview with chili (Bird's eye Variety) farmer in Muk Kampol District, Kandal Province. Year: 2020.</li> <li>6. MAFF AiDOC. "Hawaii chili farmer guide". Year: 2019.</li> <li>7. Theoun News: Interview with Farmer Sokun in Sangkat Sambo Meal, Krung Kampong Cham, Kampong Cham Province. Year 2021</li> </ol>
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Source: Authors' consolidation



## 2.3 LIMITATION

The researchers discussed and consulted with the selected key informants from government institutions, private companies, donor/development partners/NGOs, and research institutes. The purposes of this method were to 1) collect their opinion and information, 2) validate information, 3) identify more stakeholders or request contact information.

Despite producing a significant amount of useful data, the study results reported herein are subject to several limitations.

First, the third wave of community outbreak (20th-Feb Event) of the Covid-19 pandemic in Cambodia affected researchers' fieldwork plan. After research methodology and tools were prepared, the researchers were unable to conduct fieldwork to observe chili farms, chili packaging, and chili processing.

Second, only a few concerned ministries and stakeholders agreed to participate in the study. The research team contacted relevant stakeholders on many attempts and by all means. However, the research team did not receive their confirmation for the interview during this study. The limited participation by concerned ministries and key stakeholders is rather challenging for the research team to make a comprehensive review of the existing support interventions from the Cambodian government and other development partners.

Third, there is also a methodological limitation in this study because the phone interview method was used to collect the data for the second phase. The phone interview method has a lower response rate and a higher rejection rate than the face-to-face interview. The chili sauce makers, who hang up the interview, expressed the fear of telephone scams or fraud or disclosure of their personal information through a telephone interview.

## 3. CHILI VALUE CHAIN

No official record of chili production land is found in the annual report of MAFF or other institutions. According to the Director of the Department of Horticulture, Cambodia's chili sector is relatively small with a lot of room for improvement.

Cambodia's largest chili production region is in the North-West region covering Battambang, Banteay Meanchey, and Pailin provinces. The production of chili in this region is high because of three main reasons <sup>1</sup>.

First, chili production in these provinces has been boosted by the supports of government-funded programs, such as Boosting Food Production (BFP) and Agriculture Services Programme for Innovation, Resilience, and Extension (ASPIRE). BFP introduced farmers with new farming techniques such as irrigation drips as well as farming methods, which have enabled farmers to increase the scale of their chili farm. Previously, farmers grew chili and other vegetables on a low scale (Below 1 ha) because they used simple pumper to water the vegetable farms. This traditional method is labor-intensive and inefficient comparing to the use of irrigation drips <sup>2</sup>.

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<sup>1</sup> Ibid.

<sup>2</sup> Interview with Director of Department of Horticulture.

Second, the sizes of farms owned by farmers in these provinces are larger than the sizes of farms in other provinces. Most farmers own farming land between 3 ha to 4 ha or even larger, while many farmers in provinces, such as Kandal province own less than 0.5 ha household due to high land price. The transition of several agricultural cooperatives from other crops to grow chili has resulted in the rapid increase of chili farmland in this province <sup>3</sup>.

Third, chili farmers in these provinces enjoy good access to markets. These provinces are located near Thailand. Many chili collectors purchase chili from farmers and export it to Thailand. In addition, a neighbor Siem Reap province, where millions of local and international tourists visited annually before the Covid-19 pandemic, could absorb a large amount of chili from this region. Last but not least, the presence of the Phu Poy Vegetable Wholesale Market in Battambang helped to facilitate and distribute fresh chili more efficiently from these provinces to Phnom Penh and other parts of Cambodia <sup>4</sup>.

Kandal Province, particularly the Basac River Basin, is estimated to be the second-largest chili production region in Cambodia. This province, mainly S'Ang and Koh Thom districts, is the long-time vegetable production region of Cambodia because its geography is blessed with many natural canals attached to the Bassac River. However, most chili farmers in this province own small farms, which are around 0.5 ha. Chili farmers in this region produce fresh chili for selling in the vegetable wholesale market in Phnom Penh and exporting to Vietnam via Chrey Thom Border Point <sup>5</sup>.

Kampong Cham and Tboung Khmum are the third and fifth largest chili production provinces in Cambodia. An observation mapping report conducted by Dr. Vivian Ku and Mr. Som Bunna with supports from the CARDI team in 2016 found that chili farmers in these provinces produced chili for selling to the local market and exporting to Thailand via Pailin province <sup>6</sup>.

### 3.1 VARIETY AND SEED

#### STAKEHOLDER

**Table 5: Stakeholders Related To Chili Seeding**

N	Name	Involvement
<b>Government Institution</b>		
1	GDA, Department of Horticulture	• Has horticulture stations and technical capabilities to carry out chili breeding projects.
2	MAFF's Provincial Departments	• Is a potential channel to promote high-quality chili seeds to farmers.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

<sup>5</sup> 2021 data of chili production provided by MAFF's Department of Horticulture.

<sup>6</sup> Vivian Ku and Som Bunna. "Mapping Chili supply chain from Kompong Cham province to Cambodia-Thai border, Pailin". 2017.

Private Institution		
3	East-West Seed (Cambodia)	• Imports chili seeds and other seeds from Thailand to distribute in Cambodia.
4	Chia Tai Cambodia	• Imports chili seeds and other seeds from Thailand to distribute in Cambodia.
5	Kasikorn Chamroeun Phal Co., Ltd	• Imports chili seeds and other seeds from Thailand to distribute in Cambodia.
6	Chili Agriculture Cooperatives (AC)	• Is a potential channel to distribute good chili seeds to farmers.
7	Agricultural Input Suppliers (AIS)	• Retailers good chili seeds to farmers.
Donor/Development Partner/NGO Institution		
8	GIZ	• Has been working with GDA to conduct studies on the chili value chain.
9	CAVAC	<ul style="list-style-type: none"> <li>• Previously collaborated with East-West Seed (Cambodia) to introduce high-quality chili seeds, which were imported from Thailand to farmers.</li> <li>• Has recently identified chili as one of the potential crops for Cambodia. There</li> </ul>
Research Institute		
10	CARDI	• Has technical capabilities and facilities to research chili variety and chili breeding projects.

Source: Authors' Synthesis from desk research and stakeholder consultations

## OPPORTUNITY AND CHALLENGE

**Table 6: Opportunities And Challenges In Seeding Stage**

Opportunity	Challenge
<ul style="list-style-type: none"> <li>• Cayenne Chili (Lady Finger) is a potential variety with good demand by the local chili processing sector and export market.</li> <li>• GDA's breeding stations and CARDI have technical capabilities and facilities to carry out chili breeding projects, but no budget/fund is allocated for these projects.</li> <li>• Agricultural cooperatives and agriculture inputs suppliers are potential channels to distribute seeds from newly-bred varieties to farmers.</li> </ul>	<ul style="list-style-type: none"> <li>• There is an absence of locally-bred chili variety and chili seeds.</li> <li>• Farmers rely on imported chili seeds, which might not suit local climatic conditions.</li> <li>• There is strong competition from Vietnam for Cayenne chili seed.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

## Chili Varieties

Three chili varieties, Bird's eye Chili, Cayenne Chili, and Sweet Chili, are commonly grown by farmers.

Cayenne variety is found as the most promising variety. Cayenne is a long body chili, which is commonly used to cook with food and processed to dried chili or chili sauce. This variety is popular for export to Thailand. Depending on the soil quality and use of fertilizer, the yield of this variety ranges between five to ten tons per ha. Many farmers grow this chili variety in Kampong Chhnang, Kampong Chan, and Tboung Khmum.

For this chili variety, there is strong competition from Vietnam, where farmers grow this chili variety export it to Thailand through Cambodia. This study suggests Cambodian chili stakeholders assess the situation of the cayenne chili market carefully (Supply and Demand, Price) before promoting farmers to increase production of this variety. Too much production of cayenne chili and competition from Vietnamese cayenne chili can bring the price down, so cayenne chili farmers are affected.

**Figure 1: Cayenne Chili Plants**



Source: Fresh News reported on 06 June 2020 <sup>7</sup>

Bird's eye variety chili is small but very spicy. Many farmers in Battambang province grow this type of chilies. The yield of this variety is around two tons per ha per season. It is commonly found that this type of chili is used to make pickled chili or used as an ingredient in local cuisine.

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<sup>7</sup> Fresh News. "Cambodia has exported more than 30,000 tons of fresh chilies to Thailand in the 1st five months of this year". Date: 06 June 2020.  
Link: <https://www.freshnewsasia.com/index.php/en/localnews/161533-2020-06-06-00-03-10.html>

**Figure 2: Bird's Eye Chili Plants**



Source: Fresh News reported on 06 June 2020 <sup>8</sup>

Hawaii variety or commonly called Sweet Pepper is a large and. It is found grown by farmers in Pailin and Banteay Meanchey. Depending on soil quality and use of fertilizer, the yield of this variety ranges between 10-17 tons per ha. Consumers commonly use this variety to cook with food or serve fresh in a salad. The dried red Hawaii chilies also have a good market. This variety is mainly sold to local markets.

**Figure 3: Sweet Or Hawaii Chili Plants**



Source: [www.eangsophalleth.com](http://www.eangsophalleth.com) <sup>9</sup>

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<sup>8</sup> Fresh News. "Cambodia has exported more than 30,000 tons of fresh chilies to Thailand in the 1st five months of this year". Date: 06 June 2020.

Link: <https://www.freshnewsasia.com/index.php/en/local-news/161533-2020-06-06-00-03-10.html>

<sup>9</sup> Ibid.



## Chili Seeds

Currently, most farmers rely on imported chili seeds, mainly from Vietnam and Thailand. Only a small number of farmers produced their chili seeds. Vietnamese chili seeds are sold at KHR 4,000 per gram by agricultural input suppliers in local markets. For Thai chili seeds, which are mainly imported with registered companies, the price is KHR 6,000 per gram.

Farmers estimated that one hectare of chili farm needed around 300g of chili seeds and cost approximately KHR 1.3-2.0 million<sup>10</sup>. Based on farmers' provided information and MAFF's data of chili farms in Cambodia, the Cambodian chili sector demands at least 180 Kg of chili seeds per year. Assuming the price of chili seeds is KHR 5,000 per g, the chili seed market would value around KHR 900 million recently.

This study found several companies, such as East-West Seed (Cambodia), Chia Tai (Cambodia), and Kasikorn Chamroeun Phal, imported different brands of chili seeds to distribute in Cambodia. Among them, East-West Seed (Cambodia) collaborated with CAVAC to introduce high-quality chili seeds to many farmers via agricultural cooperatives in Cambodia. According to a documentary video prepared by Australian Embassy in Cambodia 2017, a chili farmer in Kampong Cham province mentioned that the chili plant grown from chili seeds provided by CAVAC provided a higher yield than the chili seeds that she planted in the year before.

**Figure 4: East-West Seed's Cayenne Chili Seed**



Source: Authors' Found on Online Sources

**Figure 5: Choke Kasikorn Chili Seeds From Thailand**



Source: Authors' Found on Online Sources

<sup>10</sup> Researchers' discussion with farmers in S' Ang district, Kandal province. Date: February 2021.



Chili has not been officially bred in Cambodia. This study found no evidence that private entities have bred any chili variety and produce any chili seeds in Cambodia. This finding can be explained by two reasons. First, most chili growers in Cambodia are smallholder farmers or small entities. It is financially unfeasible for smallholder growers to invest time and cash in chili breeding. In addition, they have limited technical capacities to carry chili breeding activities. Second, breeding a chili variety is a research and development activity, which is categorized as an externality issue or market failure in a broader term. The private chili growers or agricultural cooperatives carrying out R&D incur the full costs of their efforts to breed a new variety in Cambodia, but they do not capture the full benefits. Other growers can easily use the new chili seeds to plant on their farm by buying fresh chili or dried chili from markets. Therefore, the breeding of new chili varieties for Cambodia should be in the hand of the public sector.

The Director of the Department of Horticulture and Deputy Chief of Plant Breeding Division of CARDI of MAFF confirmed that neither MAFF's horticulture stations nor CARDI has previously bred any chili variety and produce any chili seeds to supply to farmers. Although MAFF's horticulture stations and CARDI have technical capabilities and facilities to breed local chili varieties and produce seeds, their mission and focus were placed on other crops. More importantly, these two institutions have not received any funds to finance their chili breeding and seeding activities.

Relying on imported chili seeds will challenge the growth of Cambodia's chili value chain in long run. The imported chili seeds might be inconsistent in quality and not suit local climatic conditions in different provinces in Cambodia, so the chili plants grown from imported seeds could be unhealthy and prone to disease. Ultimately, chili growers will be unable to maximize yield and profit from chili plantations in Cambodia.

## 3.2 PRODUCTION

### STAKEHOLDER

**Table 7: Stakeholder Related To Chili Production**

N	Name	Involvement
<b>Government Institutions</b>		
1	GDA Department of Horticulture	<ul style="list-style-type: none"> <li>Developed "Chili Farmer Guide" as an extension tool to aid farmers in growing chilies.</li> <li>Has been recording data related to chili productions.</li> <li>Has been collaborating with GIZ to improve the chili value chain.</li> <li>Leads in the development of agricultural policy, strategy, and project for the horticulture sector.</li> <li>Prepares and promotes agricultural standards such as Good Agricultural Practice (GAP) at the national level.</li> </ul>
2	MAFF's Provincial Departments	<ul style="list-style-type: none"> <li>Has been recording data related to chili productions.</li> <li>Facilitates the creations of agricultural cooperatives.</li> <li>Promotes farmers to adopt GAP.</li> <li>Provide agricultural extension services to farmers.</li> </ul>

3	Ministry of Water Resources and Meteorology	<ul style="list-style-type: none"> <li>• Designs and implement irrigation projects to solve the seasonality issues of agricultural value chains</li> </ul>
4	Ministry of Rural Development	<ul style="list-style-type: none"> <li>• Builds rural roads to give farmers better access to their farms and markets.</li> </ul>
<b>Private Institutions</b>		
5	La Plantation	<ul style="list-style-type: none"> <li>• Has been working with farmers around their farm to grow organic chilies in Kampot province.</li> </ul>
6	CSL Enterprise	<ul style="list-style-type: none"> <li>• Has been working with farmers to grow chilies with GAP standard.</li> </ul>
7	Rural Support C.A.P	<ul style="list-style-type: none"> <li>• Commits to source chilies from farmers and is planning to work on contract farming with chili farmers.</li> </ul>
8	Cambodia Pepper and Spice Federation	<ul style="list-style-type: none"> <li>• Is planning to expand their activities to chilies by focusing on creating cooperatives and linking with buyers.</li> </ul>
9	Pepper Enterprise	<ul style="list-style-type: none"> <li>• Has potential to expand their activities with chili farmers because they can potentially adapt their operation and facilities of pepper for chili.</li> </ul>
10	Chili Sauce Enterprises	<ul style="list-style-type: none"> <li>• Are potential buyers because many of them can switch to source directly from agricultural cooperatives instead of the wholesale market.</li> </ul>
11	Chhean Lerng Chamroeun Phal Cooperative	<ul style="list-style-type: none"> <li>• Has members growing chilies.</li> </ul>
12	Other Horticulture Cooperatives	<ul style="list-style-type: none"> <li>• Are potential producers of fresh chilies.</li> </ul>
13	Tropicam Fruit and Vegetable	<ul style="list-style-type: none"> <li>• Has to plan to work with farmers to produce sweet chilies in Kratie province with the introduction of CAM-GAP standard and greenhouse technology.</li> </ul>
14	Pkar Chouk Co., Ltd (Mr. Ieng Sotheara)	<ul style="list-style-type: none"> <li>• Works with farmers to produce organic vegetables in Koh Peam Raing and other parts of Cambodia.</li> </ul>
15	Natural Agriculture Village (NAV)	<ul style="list-style-type: none"> <li>• Works with farmers to produce organic and seasonal vegetables. NAV has been supplying vegetables to AEON Supermarket in Cambodia.</li> </ul>
16	Khmer Organic Cooperative	<ul style="list-style-type: none"> <li>• Works with farmers to produce organic and seasonal vegetables and then supplies them to their stores in Phnom Penh.</li> </ul>
<b>Donor/Development Partner/NGO</b>		
17	GIZ	<ul style="list-style-type: none"> <li>• GIZ has not supported any project for chili breeding yet. GIZ is working with GDA to improve the chili value chain.</li> </ul>

18	CAVAC	<ul style="list-style-type: none"> <li>CAVAC has not supported any project for chili breeding yet. CAVAC has identified chili as one of the potential crops for Cambodia.</li> </ul>
19	SNV-CHAIN	<ul style="list-style-type: none"> <li>CHAIN has been working on the development of the horticulture sector in Cambodia.</li> </ul>
20	FAO	<ul style="list-style-type: none"> <li>Participates in the development of policies and projects related to the agricultural sector.</li> </ul>
<b>University/Research Institute</b>		
21	CARDI	<ul style="list-style-type: none"> <li>CARDI's research can contribute to the development of the chili value chain.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

## OPPORTUNITY AND CHALLENGE

**Table 8: Opportunities And Challenges In Production Stage**

Opportunity	Challenge
<ul style="list-style-type: none"> <li>Agricultural programs (e.g. BFP and ASPIRE) have introduced farmers with new techniques in seedlings, land preparation, and irrigation drip to increase chili production and productivity.</li> <li>Promoting chili plantations in high-altitude areas during the rainy season might be able to address the seasonality challenges.</li> <li>Net house technology and CAM-GAP standard are potential instruments to address the high chemical residual issues.</li> <li>Crop rotation helps to address the disease risk of the chili plant.</li> </ul>	<ul style="list-style-type: none"> <li>There is a seasonality issue of chili production with a tremendous supply of fresh chili in the dry season (during low-temperature time) and little supply of fresh chili in the rainy season.</li> <li>A high level of chemical residual found in fresh chilies challenges the export of chili products to markets with strict requirements.</li> <li>Some farmers lack the knowledge to store fresh chilies correctly, so quality loss is incurred.</li> <li>Many chili farmers hesitate to join contract farming due to concern about chili prices.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultation

### Cropping Calendar

Seasonality issue is one of the major challenges for the chili value chain in Cambodia.

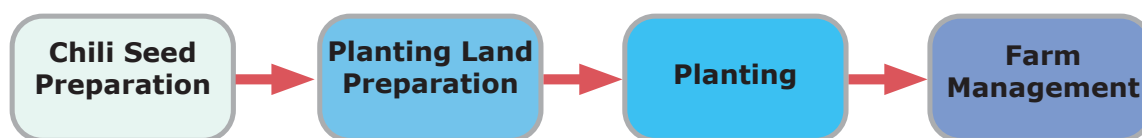
Cambodia's cropping calendar of chili is from November to June. After their flooded land is dried up, most chili farmers start to plant chili from November. After three months, chili plants start to yield chili fruits, which can be harvested for three to five months <sup>13</sup>.

<sup>13</sup> Consultation with stakeholders

From July to October of the calendar year, also the rainy season in Cambodia, most chili land is flooded or replaced by wet-season crops. In addition, chili plants and fruits are affected by rainwater and insects during the rainy season. Therefore, the supply of locally-grown chilies is very small.

## Farming Technique

**Figure 6: Farming Steps Of Chili**



Source: Authors' consolidation

In the first month, farmers start with the preparation of chili seedlings. Good chili seeding requires good seed planting in fertilized and pest-free soil. Therefore, farmers mix soil with paddy husk and animal manure and then fry the soil to kill the insects and bacteria. A good practice is planting the seed and soil in the seeding tray and the greenhouse. Farmer Vann Sokhorn, who received support from CAVAC in 2017, said her chili seedlings grown in trays and greenhouses were healthier than chili seedlings grown on seeding beds in open fields. The chili seeding would grow and become ready for planting on the farm after 20-25 days<sup>14</sup>.

The preparation of planting land should be started two weeks before the planting day. In addition to the regular land preparation practice, preparing planting beds with plastic cover are commonly adopted by chili farmers. The plastic cover technique helps to reduce weed significantly, so chili farmers apply very little herbicide too<sup>15</sup>.

In addition, the drip irrigation system is adopted by some chili farmers with a large farms. Chili requires water every day. With a drip irrigation system, farmers can manage water and fertilizer efficiently with less labor. The cost of drip ranges between \$1,500 to \$2,000 per ha of chili farm<sup>16</sup>.

Almost all farmers grow chili in the open field, which is prone to disease and pests due to direct exposure to air, rainwater, and sunlight. The disease and pests forced chili farmers to use pesticides and herbicides to protect or treat their chili farms. Incorrect uses of pesticides, herbicides, or fertilizers could increase the chemical residual in chili fruits. This practice could be a challenge for Cambodia to export chili products to markets with high requirements. Recently, stakeholders begin to discuss the use of net-house as a measure to minimize the use of pesticides and herbicides because net-house could help to protect plants from disease and insects. More research on the application of net-house for planting chili should be conducted by technical stakeholders.

<sup>14</sup> Australian Embassy Video: Interview with chili (Cayenne) farmer Vann Sokhorn. Year: 2017. Link: [https://www.youtube.com/watch?v=a97zxsy9\\_5U](https://www.youtube.com/watch?v=a97zxsy9_5U)

<sup>15</sup> Ibid.

<sup>16</sup> Interview with a chili farmer in S'ang district, Kandal province.

This study found that individual farmers applied a lot of agricultural fertilizer and herbicide to reduce loss and achieve a good yield. For example, a chili farmer in S'Ang district of Kandal province applied fertilizer and pesticide three times per season as per recommendations of agricultural input suppliers in the market instead of reading the manufacturer's instructions<sup>17</sup>. Many individual farmers followed the practice of other farmers without understanding the correct applications of fertilizer and pesticides. This practice results in high chemical residual in chili fruits.

Processors, such as La Plantation, CSL Enterprise, and Rural Support C.A.P, confirmed that fresh and dried chili sourced from farmers contained a high level of chemical residual. The representative of La Plantation said that they bought small samples of chilies from Kampong Chhnang and Kampong Cham for laboratory tests. The lab result indicated a high level of pesticide, which is not eligible to export to markets such as Europe or Japan. Instead of buying from farmers in other provinces, La Plantation cooperates with smallholder farmers near their plantations to grow chilies with organic standards<sup>18</sup>. CSL Enterprise requires their farmer and suppliers to grow chili based on CAM-GAP standards for the chilies that are sold to them<sup>19</sup>.

On the other hand, Rural Support C.A.P is planning to cooperate with farmers via agricultural cooperative and contract farming to grow chilies with GAP standards. Although they have not successfully signed any contract farming, they believe farmers working with agricultural cooperatives will be trained about the standard and correction application of pesticides and herbicides<sup>20</sup>.

Incorrect use of pesticides and herbicides harms farmers, workers, and consumers. Therefore, educating and promoting farmers to adopt agricultural standards, such as CAM-GAP and organic standards are important tasks for the stakeholders.

Harvest and Post-Harvest

Figure 7: Harvest And Post-Harvest Steps Of Chili



Source: Authors' Synthesis from desk research and stakeholder consultations

<sup>17</sup> Interview with a chili farmer in S'ang district, Kandal province.  
<sup>18</sup> Interview with representative of La Plantation  
<sup>19</sup> Interview with representative of CSL Enterprise  
<sup>20</sup> Interview with representative of Rural Support C.A.P

Chili is entirely harvested by human labor in Cambodia. Farm owners usually hire workers to pick the bird's eye or cayenne chilies for the cost of KHR 500-700 per kilogram in the morning and sort chilies in the afternoon. Each worker can pick and sort between 15 Kg to 20 Kg per day. They can earn between KHR 25,000 to KHR 30,000 per day<sup>21</sup>.

Chilies chili are stored at the farmer's house for about an hour before sorting and packing. Chilies with defects (mainly rotting) are taking out which were about 7-8%<sup>22</sup>. It takes about 2 hours for sorting and packing into a plastic bag holding about 10 Kg. Then, farmers send the sorted chilies to local collectors and markets. The green chilies are mainly eaten fresh, cooked with other food, and processed to pickled chilies. Red chilies are more popular for processing dried chili, chili powder, chili paste, and chili sauce<sup>23</sup>.

The agricultural expert mentioned that many farmers' post-harvest practices incur the quality loss of chili quality at the farm. First, the harvested chilies were placed under the Sun without any heat protection. The heat increases the rate of metabolism and accelerates the deterioration rate. As a result, the quality declines quickly and postharvest life shortens. Second, the fresh chilies are packaged into plastic bags without any physical protection. Impact/compression from the overpacking; loading and unloading operations cause significant mechanical damage. This practice not only leads to loss of visual quality but also weight loss and decay. To reduce postharvest loss, it is important to improve the on-farm handling procedures and the packaging method. To avoid chili storing under the Sun during the supply chain an alternative packaging method to reduce mechanical damage would be critical<sup>24</sup>.

**Figure 8: Workers Are Harvesting Bird's Eye Chilies**



Source: Thmey Thmey News reported on 31 January 2021<sup>25</sup>

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<sup>21</sup> Consolidation of secondary and primary data.

<sup>22</sup> Interview with representative of Rural Support C.A.P

<sup>23</sup> Dr. Vivian Ku and Sok Bunna. "Mapping chili supply chain from Kompong Cham province to Cambodia-Thai border, Pailin". Year: 2017.

<sup>24</sup> Dr. Vivian Ku and Sok Bunna. "Mapping chili supply chain from Kompong Cham province to Cambodia-Thai border, Pailin". Year: 2017.

<sup>25</sup> Thmey Thmey News. "Techniques for planting chilies which are on demand in market". Date: 31 January



**Figure 9: Cayenne Chilies Are Packaged Into Plastic Bags**



Source: Rasmei News reported on 3 May 2021<sup>26</sup>

**Figure 10: Chilies Are Being Sorted By Workers In Kampong Chhnang Province**



Source: Koh Santepheap Daily reported on 3 May 2021<sup>27</sup>

## **Contract Farming**

MAFF has successfully facilitated the creation of many agricultural cooperatives in Cambodia. However, information about chili agricultural cooperatives is very limited.

La Plantation, a producer of well-known Kampot Pepper, also works with farmers to grow organic chili for their processing products. They expressed the challenge to convince

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<sup>26</sup> Rasmei News. "Villager earns KHR 25,000 per day from the job in chili processing handicraft".

<sup>27</sup> Koh Santepheap Daily. "One household earns KHR 100,000 per day for working in chili processing handicraft". Date: 3 May 2021.

Link: <https://kohsantepheapdaily.com.kh/article/1315698.html>

farmers to grow organic chili because an organic chili farm is labor-intensive and produces a lower yield than a non-organic farm. With experience in working with farmers for other crops, La Plantation has been successful in cooperating with chilies farmers. However, their scale remains small. Their annual demand for fresh chili is estimated to be 1.5-2 tons only<sup>28</sup>.

CSL Enterprise is considered the largest dried chili producer in Cambodia. CSL has been working with chilies farmers under contract farming. CSL requires farmers to follow GAP standards. Although there is a contract between CSL and farmers, the price of chilies is based on market price. Farmers prefer to sell chilies based on market price because the contract sets a stable price around KHR 2,500-3,000 per Kg for the entire season. The market price fluctuates, so the price could be lower or higher than the contract price<sup>29</sup>.

This study identified one agricultural cooperative called “Chhean Lerng Chamroeun Phal Cooperative” producing organic Cayenne chili. This cooperative was created by farmers in An Lung Village, Chhean Lerng Commune, Samaki Meanchey District, Kampong Chhang Province. Another chili cooperative is “Strey Kdei Sang Khoeum Treng Tror Yoeng Cooperative” producing Hawaii variety. This cooperative was created by farmers in Derm Phteak Village, Treng Tror Yoeng Commune, Treng Tror Yoeng District, Kampong Speu Province. However, the size of a chili farm is only 0.5 ha<sup>30</sup>.

## **Extension Service**

The guidelines on chili planting and harvest for the farmer have been developed by GDA and NGOs. However, the dissemination activities of these guidelines to farmers are not found. The General Department of Agriculture published a guideline on chili production techniques for farmers in 2015. The guideline covers techniques for preparing the soil, seeding chili, planting chili seedlings, managing chili farms, harvesting, and post-harvesting. However, chili variety and processing techniques are not covered by this guideline<sup>31</sup>. Asian Vegetables Research and Development Center (AVRDC) in 2012<sup>32</sup> and USAID Harvest Project<sup>33</sup> in 2013 published a technical bulletin on chili post-harvest techniques, including harvesting, cleaning, grading, packaging, transporting, and storing.

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<sup>28</sup> Interview with representative of La Plantation.

<sup>29</sup> Interview with representative of CSL Enterprise.

<sup>30</sup> Interview with representative of Strey Kdei Sang Khoeum Treng Tror Yoeng Cooperative.

<sup>31</sup> MAFF-GDA. “Guideline on chili production technique for farmers”. Phnom Penh: (2015).

<sup>32</sup> Acedo Jr, Antonio L. “Postharvest technology for fresh chili pepper in Cambodia, Laos, and Vietnam.” Tainan: Asian Vegetables Research and Development Center (2012).

<sup>33</sup> USAID HARVEST. “Technical advises on chili harvest and post-harvest. Phnom Penh: (2013).

### 3.3 PROCESSING

#### STAKEHOLDER

**Table 9: Stakeholders Related To The Processing Of Chili Processing**

N	Name	Involvement
<b>Government Institutions</b>		
1	MAFF-Department of Agro-Industry (DAI)	<ul style="list-style-type: none"> <li>Works on policy and projects related to basic processing activities by farmers.</li> </ul>
2	MISTI-General Department of SME and Handicraft	<ul style="list-style-type: none"> <li>Develops policy to strengthen SMEs and issue certificates for processing enterprises.</li> </ul>
3	MISTI-Institute of Standards of Cambodia	<ul style="list-style-type: none"> <li>Develops and enforces relevant standards for processing SMEs.</li> </ul>
4	Agricultural and Rural Development Bank	<ul style="list-style-type: none"> <li>Provides loans to agro-processing firms.</li> </ul>
5	MEF-Khmer Enterprise (KE)	<ul style="list-style-type: none"> <li>Encourages and promotes growth in the agro-processing sector.</li> </ul>
<b>Private Institutions</b>		
6	La Plantation	<ul style="list-style-type: none"> <li>Produces and packages dried chilies.</li> </ul>
7	CSL Enterprise	<ul style="list-style-type: none"> <li>Produces and packages dried chilies and chili paste.</li> </ul>
8	Rural Support C.A.P	<ul style="list-style-type: none"> <li>Produces and packaged dried chilies.</li> </ul>
9	Cambodian Pepper and Spice Federation	<ul style="list-style-type: none"> <li>Is planning to expand the scope to processed chili products.</li> </ul>
10	Rari Handicraft	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce and chili paste.</li> </ul>
11	Leang Leng Enterprise	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce.</li> </ul>
12	E Che Ngov Heng Food Production of Kampot	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce.</li> </ul>
13	Chamkar Daung Enterprise (Camfood)	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce.</li> </ul>
14	Phnom Mean Enterprise	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce.</li> </ul>
15	Reaksmey Kongkea Handicraft	<ul style="list-style-type: none"> <li>Produces and packaged chili sauce.</li> </ul>

16	Kheng Yary Development and Investment Co., Ltd	<ul style="list-style-type: none"> <li>• Produces and packaged dried chilies.</li> </ul>
17	Phnom Pich Bun Khea Enterprise	<ul style="list-style-type: none"> <li>• Produces and packaged chili sauce.</li> </ul>
<b>Donor/Development Partner/NGO</b>		
18	GIZ	<ul style="list-style-type: none"> <li>• Manages and implements Agrinovation Fund, which supports agro-processing sector/</li> </ul>
19	UNIDO	<ul style="list-style-type: none"> <li>• Promotes development of SMEs, including agro-processing SMEs.</li> </ul>
20	CAVAC	<ul style="list-style-type: none"> <li>• CAVAC has previously worked on the chili value chain. Currently, CAVAC conducted a study, which includes the assessment of export markets of chilies.</li> </ul>
21	HARVEST II	<ul style="list-style-type: none"> <li>• Has projects on post-harvest and processing of horticulture sector.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

## OPPORTUNITY AND CHALLENGE

**Table 10: Opportunities And Challenges In Processing Stage**

Opportunity	Challenge
<ul style="list-style-type: none"> <li>• Dried sweet chilies are popular as an ingredient in Cambodian cuisine.</li> <li>• Red cayenne chilies are highly demanded by dried chili and chili sauce makers due to their size and color.</li> <li>• None of the chili processors produce chili oil, which might require more sophisticated technology and facilities.</li> <li>• The combination of sundry method and dehydrating machine reduces the electricity cost for producing dried chili.</li> <li>• The solar dry machine is the potential for achieving good moisture and hygiene.</li> <li>• Pepper processors have existing operations and facilities, which can be used to process dried chili products.</li> </ul>	<ul style="list-style-type: none"> <li>• There are concerns about high chemical residual and poor hygiene of chilies dried by farmers.</li> <li>• Cash flow constraint limits purchasing capacity of the processor to source fresh chili during the chili season.</li> <li>• Electricity cost is very high if processors rely entirely on drying and dehydrating machines to dry fresh chilies to dried chilies.</li> </ul>

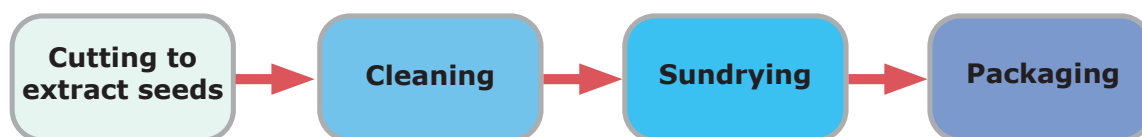
Source: Authors' Synthesis from desk research and stakeholder consultations

The chili processing sector is relatively small as indicated by the presence of several small and medium processing enterprises. This study found that dried chili and chili sauce are the two most popular products of processed chili in Cambodia.

Dried chilies can be naturally sundried or dehydrated in a hot air circulation machine. Dried chilies are produced in different forms, such as whole, crushed flakes, and ground powder. Crushed or ground chilies can be produced with or without seeds. The standards

for dried chilies have been set by international organizations, such as UNECE FAO and ASEAN, which covers minimum requirements, moisture content, classes, color, sizing, packaging, and labeling. To expand the market, producing the dried chilies to meet these standards is crucial<sup>34</sup>.

**Figure 11: Farmer's Processing Method Of Dried Chili**



Source: Authors' Synthesis from desk research and stakeholder consultations

The dried sweet chilies are popular in Cambodian markets. Villager's bought fresh sweet chili at the price of KHR 2,800-3,000 per kg. They started the process by cutting fresh sweet chilies to extract the seeds, boiling the sweet chilies in water, and arranging the sweet chilies on a bamboo board for sundry. The price of dried sweet chilies was KHR 20,000 KHR at the villager's house in March 2021. Cambodian households use dried sweet chilies as spice and color in many types of dishes, such as red curry and stew beef. Farmers mentioned that this type of dried chili is popular in neighboring countries too. Many buyers from neighboring countries frequently came to collect dried and smoked sweet chilies from farmers<sup>35</sup>.

**Figure 12: Villagers Are Sorting And Cutting Sweet Chilies In Kampong Chhnang Province**



Source: Koh Santepheap Daily Report on 15 March 2021<sup>36</sup>

<sup>34</sup> CAVAC. "Markets for Cambodian Crops with Promising Prospects". Year: 2020

<sup>35</sup> Source: <https://kohsantepheapdaily.com.kh/article/1284351.html>

<sup>36</sup> Koh Santepheap Daily Report on 15 March 2021:

Link: <https://kohsantepheapdaily.com.kh/article/1284351.html>



**Figure 13: Villager Is Boiling Sweet Chilies In Kampong Chhnang**



Source: Koh Santepheap Daily Report on 15 March 2021<sup>37</sup>

**Figure 14: Workers Are Preparing Sweet Red Chilies For Sundry**



Source: Koh Santepheap Daily Report on 15 March 2021<sup>38</sup>

**Figure 15: Sweet Red Chilies Are Dried Under Sunlight And Uncontrolled Environment**



Source: Koh Santepheap Daily Report on 15 March 2021<sup>39</sup>

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<sup>37</sup> Koh Santepheap Daily Report on 15 March 2021:  
Link: <https://kohsantepheapdaily.com.kh/article/1284351.html>

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.



The demand for dried cayenne chilies is small but increasing because the chili processing sector has been growing. Many villagers process their fresh chili by sundry them around their house for three to four days depending on the level of sunlight. The dried cayenne chilies are then sold to a collector for distribution to markets around Cambodia or processors for further processing and packaging<sup>40</sup>.

**Figure 16: Chilies Are Dried Under Sunlight In Tboung Khmum Province**



Source: Tboung Khmum Department of Agriculture <sup>41</sup>, Forestry, and Fisheries

The processing and packaging methods of many villagers are traditional without the adoption of any hygiene and manufacturing standards. The hygiene level in each step, from cleaning, arranging, and dryings, of farmers is a serious concern. In addition to the high level of chemical residual, processing enterprises found dried chilies of some farmers contained a lot of dirt. Therefore, they could not use those dried chilies for processing to be their final products<sup>42</sup>.

Relying on farmers to sundry chilies is very important for small and medium chilies processing enterprises. For one reason, sun-drying chilies help to reduce the electricity cost. The second reason, processor noticed the taste of sundried chilies is better than the taste of entirely machine-dried chilies. Third, sun drying requires a large space. Most processors are located near an urban area, where space is limited due to high prices<sup>43</sup>. Thus, it is challenging for processors to dry chilies by sunlight by themselves.

Based on the above findings, improving farmers' awareness and capacity about hygiene practices for drying chilies is critical for supporting the growth of the chili processing sector. Stakeholders should explore and research to introduce sundry equipment, which allows farmers to maintain good hygiene in producing dried chilies.

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<sup>40</sup> Ibid.

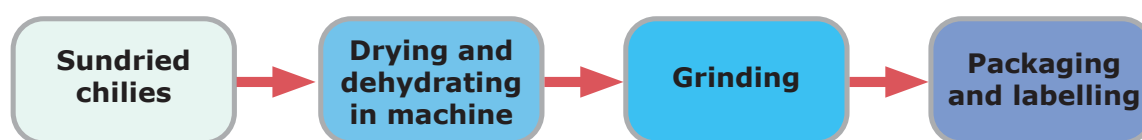
<sup>41</sup> MAFF's Tboung Khmum Provincial Department. Year 2020.

Link: <https://www.tbongkhmum.maff.gov.kh/post/5e5f14bc623b1>

<sup>42</sup> Interview with representative of Rural Support C.A.P

<sup>43</sup> Ibid.

**Figure 17: Enterprise's Processing Method Of Dried Chili**



Source: Authors' Synthesis from desk research and stakeholder consultations

Good raw material requires direct involvement with farmers. La Plantation, a producer of well-known Kampot Pepper, has produced organic dried chili for sale in a supermarket in Cambodia and the international market in the past few years. To control the quality of fresh chili to meet the organic standard, La Plantation works directly with smallholder farmers via contract farming. Farmers under La Plantation's scheme are allowed to use only natural fertilizer and herbicide. At first, it was challenging to convince farmers to adopt and follow the organic guideline strictly because organic chili farm is very labor-intensive<sup>44</sup>. Similarly, CSL Enterprise has spent a lot of effort working with farmers to grow chilies based on GAP standards. The chilies sourced from the market contain too high chemical residual, which is not safe for their customers, so CSL Enterprise prefers to purchase fresh chilies from farmers growing based on GAP standard<sup>45</sup>.

Large-quality producers, such as CSL Enterprise, need a lot of capital to source local fresh chilies from farmers because fresh chilies are only available in one season. Payment must be made to farmers after fresh chilies are delivered to the processor. The capital constraint for sourcing chilies has limited the capacity of CSL Enterprise to produce more chili products for the market. If processor, like CSL Enterprise, has access to good finance, they will be able to afford to produce more processed chili products<sup>46</sup>.

Electricity consumption for producing dried chilies is very high if the processor only uses a drying and dehydrating machine to transfer from fresh chilies to dried chili. La Plantation dries their fresh chilies entirely with drying and dehydrating machine to achieve a high level of hygiene. The drying temperature is 50 oC. La Plantation's method takes 20 hours to process from fresh chili to dried chilies<sup>47</sup>. To reduce the electricity consumption for drying chili, CSL Enterprise and Rural Support C.A.P combine the sundry method with the machine method. Due to space constrain in their site, they only sundry a small proportion of their total production. They instruct farmers to sundry chilies at their individual spaces for three to four days. The two companies purchase sundried chilies and process them further in the drying and dehydrating machine for three to four hours to reach the moisture level for each type of dried chili product<sup>48</sup>.

For the ground chilies or chili powder, the environment of the production room is uncomfortable for workers. The chili grinding machine can create a lot of chilies particles to fly inside the room. This environment is uncomfortable for workers. Good facilities are required to reduce this effect; however, it also requires capital investment<sup>49</sup>.

<sup>44</sup> Interview with representative of La Plantation.

<sup>45</sup> Interview with representative of CSL Enterprise.

<sup>46</sup> Ibid.

<sup>47</sup> Interview with representative of La Plantation.

<sup>48</sup> Interviews with representative of CSL Enterprise and Rural Support C.A.P

<sup>49</sup> Interviews with representative of Rural Support C.A.P

The chili sauce productions are mostly under the business umbrella of sauce-making companies. This study found eight enterprises making chili sauce in Cambodia from a survey of several supermarkets in Phnom Penh. Besides Rari Handicraft, the other 7 enterprises' main businesses are fish sauce. Chili sauce is only a small section of their business. This type of food processing firm has received supports from international organizations to improve their productions to meet standards such as Good Manufacturing Practice (GMP), Good Hygiene Practice (GHP), and Hazard Analysis Critical Control Point (HACCP)<sup>50</sup>. In addition, there are many informal chili sauce makers in Cambodia; however, most are categorized as handicraft enterprises or SMEs. According to the data provided by the Department of SME of MISTI, 13 chili sauce handicrafts are registered as makers of chili sauce, fish sauce, and soy sauce for local markets<sup>51</sup>.

### 3.4 MARKET AND EXPORT

#### STAKEHOLDER

**Table 11: Stakeholders Related To Market And Export**

N	Name	Involvement
<b>Government Institutions</b>		
1	MoC-General Department of Trade Promotion (GDTP)	<ul style="list-style-type: none"> <li>Promotes chili products and develop markets for chili products</li> </ul>
2	MAFF-GDA	<ul style="list-style-type: none"> <li>Issues Phytosanitary Certificate for export of agricultural products</li> </ul>
3	MEF-Khmer Enterprise (KE)	<ul style="list-style-type: none"> <li>Encourages and promotes growth in the agro-processing sector.</li> </ul>
<b>Private Institutions</b>		
4	La Plantation	<ul style="list-style-type: none"> <li>Already exports dried chilies</li> </ul>
5	CSL Enterprise	<ul style="list-style-type: none"> <li>Is planning to export chili products.</li> </ul>
6	Rural Support C.A.P	<ul style="list-style-type: none"> <li>Is planning to export chili products.</li> </ul>
7	Cambodian Pepper and Spice Federation	<ul style="list-style-type: none"> <li>Is planning to expand the scope to processed chili products.</li> </ul>
8	Pepper Exporters	<ul style="list-style-type: none"> <li>Have buyers and channels for export.</li> </ul>
<b>Donor/Development Partner/NGO</b>		
9	GIZ	<ul style="list-style-type: none"> <li>Promotes development of chili value chain, including export of chili products.</li> </ul>
10	CAVAC	<ul style="list-style-type: none"> <li>CAVAC has previously worked on the chili value chain. Currently, CAVAC conducted a study, which includes the assessment of export markets of chilies.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

## OPPORTUNITY AND CHALLENGE

**Table 12: Opportunities And Challenges In Market And Export**

Opportunity	Challenge
<ul style="list-style-type: none"><li>• Thailand imported more than 70,000 tons of Vietnamese fresh chilies from Cambodia. If Cambodian farmers can produce a similar chili variety at a competitive price,</li><li>• Dried chili products are potential because the requirements of buyers are mainly on the technical and physical aspects and standards.</li><li>• Exporters of pepper products are potential exporters of dried chili products because they already have buyers and channels.</li><li>• However, the communities of Cambodians living in other countries are the potential export market for chili sauce products.</li></ul>	<ul style="list-style-type: none"><li>• There are concerns about high chemical residuals for export markets such as Europe and the USA.</li><li>• The export of chili sauce requires an understanding of the taste preference of people in export markets.</li><li>• Competition from chili section in neighboring countries</li></ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

Thailand is the largest market of fresh chili in the Mekong Sub-Region. According to MAFF, 70,546 tons of fresh chili were exported to Thailand in 2020. This export volume was 27% higher than the volume in 2019 . However, the fresh chilies grown in Cambodia shared only a small proportion of the total export volume. MAFF officials investigated and found that most chilies were imported from Vietnam and then re-exported to Thailand. Stakeholders, especially farmers and collectors, mentioned that the Thai market prefers chilies with bright colors, less seed, and longer storage life. Vietnamese farmers were able to grow chilies to meet these preferences and the volume of demand in Thailand. Cambodia has the opportunity to increase chili export to Thailand if the grown-in-Cambodia chilies meet these market preferences and have competitive prices.

The potential chili products for export are the dried chili products, such as dried chili, chili flake, chili ring, chili powder, and chili oil. These products are less subjective to the local context or preference of these countries, unlike chili paste, chili sauce, and pickled chili, all of which require manufacturers to understand the taste preference of people in the export markets. In addition, these semi-processed chili products can serve consumers directly or be used as raw materials in the food processing industry.

This study found no information indicating that Cambodian chili sauce products have been officially exported to the international market on large scale. However, there are small-scale exports of Cambodia chili sauce via travelers to the Cambodian communities living in other countries such as Australia, New Zealand, the USA, Canada, and European countries .

A high level of chemical residual found in fresh chili challenges the export of dried chili products to develop markets such as Europe, the USA, or Japan. Food safety is a primary concern for most buyers who aim to ensure that their customers are safe from consuming their dried chili products. Buyers frequently requested and well-recognized food safety management systems such as IFC, BRC, SQF, and FSSC22000, which are

beyond GMP, GHP, and HACCP. The export of dried chili to Muslim countries will require HALAL certification too . Therefore, speeding up the adoption of CAM-GAP among chili farmers is the foundation for the export of processed chili products.

### 3.5 DIGITAL SOLUTION

#### STAKEHOLDER

**Table 13: Stakeholders Related To Digital Solution**

N	Name	Involvement
<b>Government Institutions</b>		
1	MAFF's ArDOC	<ul style="list-style-type: none"> <li>Have a Youtube channel with videos on techniques to grow crops.</li> </ul>
2	MoC-General Department of Trade Promotion (GDTP)	<ul style="list-style-type: none"> <li>Promotes chili products and develop markets for chili products via their website</li> </ul>
3	MEF-Khmer Enterprise (KE)	<ul style="list-style-type: none"> <li>Develops Khmer Agricultural Suite (KAS), which is an open digital platform for agricultural value chains to address main challenges in productivity and distribution.</li> <li>Conducts a study on digitalization of agricultural ecosystem.</li> </ul>
<b>Private Institutions</b>		
4	AMK Tonel Sap App	<ul style="list-style-type: none"> <li>Implement E-Farmer Support App Activity' through Tonle Sap App. The Tonlesap App objective is to provide agricultural technical knowledge and agricultural market information, key techniques in farming, livestock, and information in agricultural inputs as well as loans for business expansion.</li> </ul>
5	SPIEN	<ul style="list-style-type: none"> <li>Improve the agriculture supply chain in Cambodia. It focuses on connecting agricultural products to consumers and wholesales shops through the products display on the website.</li> </ul>
6	Agribuddy	<ul style="list-style-type: none"> <li>Work on coordination to provide agricultural services and inputs to the farmers in the rural community through rural credit for improving their income generation and livelihood.</li> </ul>
7	Agribee	<ul style="list-style-type: none"> <li>Develops an eco-system for the rice value chain, which has potential replication to the chili value chain.</li> </ul>
8	Money Transfer Agents	<ul style="list-style-type: none"> <li>Wing, TrueMoney, eMoney, SmartLuy, Dara Pay, PayGo, Asia Weiluy</li> </ul>

9	AMRU	<ul style="list-style-type: none"> <li>Improves traceability of rice value chain by using blockchain technology.</li> </ul>
<b>Donor/Development Partner/NGO</b>		
10	GIZ	<ul style="list-style-type: none"> <li>Promotes development of chili value chain, including export of chili products.</li> </ul>
11	CAVAC	<ul style="list-style-type: none"> <li>Introducing new payment systems for rural communities without access to banking facilities in partnership with financial institutions.</li> </ul>
12	Feed the Future of Cambodia HARVEST II	<ul style="list-style-type: none"> <li>Provide co-funding support to AMK Microfinance Institution Plc. for the operation of E-Farmer Support App Activity' through Tonle Sap App.</li> </ul>
13	IFAD	<ul style="list-style-type: none"> <li>Provide fund through the government to modernize the agricultural value chain in Cambodia</li> </ul>
14	Oxfam	<ul style="list-style-type: none"> <li>Launched BlockChain For Livelihoods From Organic Cambodian Rice (BlocRice) Project (introduce cashless payments to many farmers. Payments into bank accounts enable electronic verification of payment by the buyer to a farmer, being a correct and timely (according to the contract) payment or not.</li> </ul>
15	Konrad Adeneuer Stiftung	<ul style="list-style-type: none"> <li>Implementing digitization of economy program with different research projects, currently launch research on E-government in Cambodia</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

## OPPORTUNITY AND CHALLENGE

**Table 14: Opportunities And Challenges In Market And Export**

Opportunity	Challenge
<ul style="list-style-type: none"> <li>A growing number of farmers use social media (Facebook) and streaming websites (Youtube). Creating a page/group and channel specifically focus on the chili value chain might be able to attract the attention of stakeholders in the value chain.</li> <li>The existing platform/technology of AgriBuddy or AgriBee has the potential to be replicated to the chili value chain.</li> </ul>	<ul style="list-style-type: none"> <li>No digital solution or platform is dedicated to the chili value chain.</li> <li>Digital literacy among chili farmers are still weak, so the adopt of digital solution will be a challenge.</li> <li>Development of digital solutions, such as App or websites, is difficult; however, the operation and maintenance are more difficult.</li> </ul>

Source: Authors' Synthesis from desk research and stakeholder consultations

Adopting new technology and digitalization adoption requires an enabling environment and capable human resources to embrace the potential benefits.

The Tonlesap App of AMK, for instance, requires high-speed internet through smartphones. However, only a small number of farmers use the App because many cannot afford high-speed internet. AMK also experiences other challenges, such as limited quality information to update in the App, lack of understanding of the App's benefits among agricultural input suppliers, and limited human resources to promote the App to broader target markets in Cambodia. Other challenges are the expensive operation cost to run the App and limited local experts for the development and promotion of the App.

Agribuddy supports the agricultural value chain through its e-buddy wallet app. One of their critical challenges is that farmers have limited digital capacity to use smartphones and an e-buddy wallet system and lack of trust in digital payments. However, Agribuddy said farmers' trust in digital payment is gradually improved. Another critical challenge for Agribuddy is the difficulty in transporting products from AIS to farmers, who make orders through the digital system of Agribuddy. The third challenge is the slow internet speed that discourages farmers from using the digital agricultural value chain system managed by Agribuddy.

HARVEST II program mentioned that key challenges are more with farmers as they have limited capacity to afford a smartphone. The key informant also added that farmers have weak digital knowledge and low trust in the digital payment system. Internet speed and coverage to a rural area are also highlighted as one of the challenges to implement e-commerce and digital payment transactions.

Some stakeholders have already used the social media platform and streaming website to promote work on the chili value chain. This study found a private Facebook group with 31 members of chili growers in Cambodia. Due to their privacy setting, our researchers could not assess if their contents are relevant to chili. On the other hand, all the dried chili processors and some of the chili sauce makers have already created Facebook pages to promote their work and products.

The video streaming website, Youtube, also shows many useful videos related to the chili value chain when the researcher searched about chili in the Khmer language. There are videos about seeding techniques and planting techniques. In addition, a TV channel conducted several interviews and documents about chili farmers in provinces such as Kandal and Kampong Cham.

## **4. EXPORT READINESS OF DRIED CHILI COMPANIES**

Based on the context of the Cambodia chili sector as described in previous sections, this study identifies dried chili products are the most promising export commodity among all processed chili products. Based on the context of the Cambodia chili sector as described in previous sections, this study identifies dried chili products are the most promising export commodity among all processed chili products. In this section, the export readiness of four dried chili processors are assessed based on five factors, including 1) Motivation to export, 2) Raw material's quality and quantity, 3) Production's quantity and standard, 4) Product's varieties and quality, and 5) Market access.



## LA PLANTATION

Table 15: Readiness Assessment

Factor	Assessment	Explanation
Motivation	Ready	Already export processed chilies products
Raw Material	Ready	Collaborate with farmers to grow organic chilies.
Production	Ready	La Plantation is certified «Producteur Artisan de Qualité» by the Collège Culinaire de France.
Product	Ready	La Plantation produces four types of dried chilies, including Smoked Sweet Long Chili Powder, Whole Smoked Bird's eye Chili, Whole Smoked Bird's eye Chili, and Whole Dried Bird's eye Chili, with the total production capacity of 2 tons fresh chilies or 400 Kg dried chilies. Packaging and labeling of products are well designed
Market	Ready	These products are sold in supermarkets in Cambodia and exported to Europe.

Source: Authors' Synthesis from desk research and stakeholder consultations

Figure 18: Smoked Sweet Long Chili Powder



Source: [www.kampotpepper.com](http://www.kampotpepper.com)

Figure 19: Whole Smoked Bird's Eye Chili



Source: [www.kampotpepper.com](http://www.kampotpepper.com)

Figure 20: Whole Smoked Bird's Eye Chili



Source: [www.kampotpepper.com](http://www.kampotpepper.com)

Figure 21: Whole Dried Bird's Eye Chili In Paper Box



Source: [www.kampotpepper.com](http://www.kampotpepper.com)

Figure 22: Bird's Eye Chili Whole Dried In Paper Bag



Source: [www.kampotpepper.com](http://www.kampotpepper.com)

**Table 16: Readiness Assessment**

Factor	Assessment	Explanation
Motivation	Ready	The management team has strong motivation to bring their products to export markets.
Raw Material	Ready	CSL has already developed a partnership with chili farmers to supply 20 tons of chili with GAP standards to them. However, there is a cash flow constraint to purchase a large number of fresh chilies in the chili season.
Production	Ready	CSL processed 20 tons of fresh chilies or 5 tons of dried chilies. They received an order from international buyers, but their management of production and price setting is not ready to accept large orders.
Product	Ready	Have varieties of processed chili products such as whole dried chilies and grounded chilies. However, packaging and labeling need improvement for international markets.
Market	Ready	Already supply in the local supermarket. They have a connection with international brokers. However, they lack a direct connection with international buyers.

Source: Authors' Synthesis from desk research and stakeholder consultations

**Figure 23: Whole Dried Cayenne Chilies**


Source: Authors' Found from Online Source

**Figure 24: Whole Dried Sweet Chilies**


Source: Authors' Found from Online Source

**Figure 25: Grounded Chilies**



Source: Authors' Found from Online Source

## RURAL SUPPORT C.A.P

**Table 17: Readiness Assessment**

Factor	Assessment	Explanation
Motivation	Ready	The owner has strong motivation to bring products to the export market.
Raw Material	Not Ready	Have not collaborated with farmers on the production of fresh chilies.
Production	Not Ready	Not received GMP, GHP, HACCP
Product	Not Ready	Only have crushed dried chilies packaged in a glass bottle, which is ready to serve.
Market	Ready	Already supply in the local supermarket. This company has studied the demand for dried chili in different markets and communicated with some buyers.

Source: Authors' Synthesis from desk research and stakeholder consultations

**Figure 26: Crushed Dried Chilies**



Source: Authors' Found from Online Source

**Table 18: Readiness Assessment**

Factor	Assessment	Explanation
Motivation	Not Ready	No plan to export in near future.
Raw Material	Not Ready	Purchases directly from farmers without any form of contract or collaboration more than seller-buyer.
Production	Not Ready	The current processing method entirely relies on sundry without any dehydrating machine. And, they are planning to improve the production.
Product	Not Ready	Only produce sundried chilies. And, they are planning to improve the products.
Market	Not Ready	Supply to the wholesale market in Takeo Province. The next step is to expand to other provinces in Cambodia.

Source: Authors' Synthesis from desk research and stakeholder consultations

## 5. CONCLUSION AND RECOMMENDATION

This section covers the summary of the findings of this study and suggests recommendations for the stakeholders to consider for the improvement of the chili value chain in Cambodia.

### 5.1 SUMMARY OF KEY FINDINGS

#### SEEDING

- Bird's eye, Cayenne (Lady's Finger), and Hawaii (Sweet) are the three most grown chili varieties in Cambodia. Cayenne variety is the most potential because it is highly demanded by chili processing firms (Dried Chilies and Chili Sauce) and buyers in Thailand.
- Most chili seeds sold by agricultural input suppliers are imported seeds from Thailand and Vietnam. It is uncertain if these imported seeds suit Cambodia's local climatic and soil conditions. Therefore, growing chilies from these imported seeds in Cambodia might not produce optimal yield.
- Previously, no stakeholder has bred any chili variety to produce chili seeds in Cambodia due to the lack of priority and funding. Breeding chili locally is an important task to produce high-quality seeds, which are suitable to grow healthy in local climatic and soil conditions. GDA's breeding stations and CARDI have technical capabilities and facilities to carry out chili breeding projects, but priority and budget are not allocated for the chili value chain yet.



## **PRODUCTION**

- There is a seasonality challenge of chili production in Cambodia. Fresh chilies are tremendously available in the dry season, which caused the drop in chili prices. In the rainy season, fresh chili supply is limited.
- Due to incorrect use of pesticides and herbicides, fresh chilies supplied by many farmers are found to contain a high level of chemical residual. The high chemical residual in chili fruits is unhealthy for consumers and acceptable by markets with high standards. In addition, there is a low adoption rate of GAP standards among chili farmers.
- Transforming from regular buy-sale practice to contract farming between chili farmers and processors is currently challenging. Many chili farmers still prefer to sell their fresh chilies based on market price rather than the contract price.

## **PROCESSING**

- Dried chilies and chili sauce are the two main processed chili products in Cambodia. Chili sauce production is under the business of sauce-making companies. Many registered sauce-making companies have earned standards such as GMP, GHP, HACCP, and ISO. There is a growing interest of private companies in the production of dried chilies for sale in the local and international markets. Dried chili companies can be improved with the adoption of international standards for their production, packaging, and labeling.
- Capital constraint limits purchasing capacity of the processor to source a large number of fresh chilies during the chili season. In the low season, fresh chili price is very high, which is uncompetitive for the processor. As a result, dried chili processors hesitate to accept large orders from international buyers.
- Lack of hygiene practice for the semi-dried chilies made by farmers is a major concern for processors. If the semi-dried chilies supplied by farmers are found to be contaminated by dirt or other substance, processors have to throw away or resell the semi-dried chilies to the local wholesale market.

## **MARKET AND EXPORT**

- There is strong competition from Vietnam for the supply of cayenne chili. Vietnam has exported around 70,000 tons of fresh cayenne chilies to Thailand through Cambodia. Any attempt to boost the production of cayenne chilies in Cambodia should be assessed carefully about the impact of supply-demand and price of cayenne chilies.
- The potential chili products for export are the dried chili products, such as dried chili, chili flake, chili ring, chili powder, and chili oil. In addition, these semi-processed chili products can serve consumers directly or be used as raw materials in the food processing industry.
- This study found no information indicating that Cambodian chili sauce products have been officially exported to the international market on large scale. However, there are small-scale exports of Cambodia chili sauce via travelers to the Cambodian communities living in other countries such as Australia, New Zealand, the USA, Canada, and European countries.



## **DIGITAL SOLUTION**

- There is not any official digital system or platform dedicating to disseminated information or improve the productivity of the chili value chain in Cambodia. One private Facebook group of chili growers is found; however, their content is not accessible by our researchers.
- Digital literacy among chili farmers is still relatively weak, so there might be difficult to increase the adoption of digital solutions with some sophistication.
- Development of digital solutions, such as apps or Websites, is difficult; however, the operation and maintenance are more difficult.

## **5.2 RECOMMENDATIONS**

The following recommendations should be taken into considerations for the improvement of the chili value chain in Cambodia:

### **SEEDING: Competitive Variety and High-Quality Seeds**

- This study recommends stakeholders pay attention to the breeding of Cayenne Chili (Lady Finger) because this variety is a potential with good demand by the local chili processing sector and export market.
- GDA and CARDI should be funded to carry out a project to breed selected chili varieties. The target of the breeding project should consider the preference of buyers in Thailand and local processors. Stakeholders, especially farmers and collectors, mentioned that the Thai market prefers chilies with bright colors, less seed, and longer storage life.
- Private seed-producing companies should be engaged to scale up the productions of the newly-bred chili seeds. Agricultural cooperatives and agriculture inputs suppliers are potential channels to distribute seeds from newly-bred varieties to farmers.

### **PRODUCTION: Add One Season and Improve Safety**

- Stakeholders should collaborate to conduct the two experiments, including 1) to grow chili in the non-flooded region during the rainy season and 2) to grow chili in the net house or greenhouse. The purposes of these experiments are 1) to explore if chili could be grown profitably during the rainy season and 2) to see the impact of net house and greenhouse in improving yield and reducing chemical residual levels. If the experiment is successful, scaling up chili plantations in the rainy season can address the seasonality issue of fresh chili supply.
- MAFF's Chili Farmer Guideline should be improved with the adoption of newly-bred chili seeds and CAM-GAP standards. The content of the Chili Farmer Guideline should include activities in the seeding stage, production stage, and harvest and post-harvest stage. After the guideline is improved, a training of trainers from agricultural cooperative should be conducted.
- Stakeholders should create funds for some committed trainers to create model chili farms to demonstrate to farmers the chili planting technique and technology.

The selection of the trainers should be based on criteria, such as commitment and geographical location.

- Stakeholders should collaborate to involve more agricultural cooperatives to grow chilies and facilitate the contract farming with chili processors and Cambodia Pepper and Spice Federation. CAM-GAP standard should be an important factor of contract farming.
- Fund the experiment of chili farms in the non-flood area with the purpose to solve the seasonality issue.

### **PROCESSING: Improve Hygiene, Increase Producers, and Strengthen Capacity**

- The farmer's awareness and capacity about hygiene for drying chilies should be raised. The enforcement of standards by the collectors or processors might be the most effective in change the practice of farmers. In addition, new equipment, such as solar dry machines, might help farmers to improve hygiene and the result of their drying process. In addition, in-person training or video presentation on the internet platform might be useful for farmers to keep learning.
- Cambodian Pepper and Spice Federation encourage their members, who are pepper producers, to expand the business line to produce dried chilies because they have existing operation and facilities, which might be applicable to produce dried chilies. In addition, they already have international buyers, who might be interested to source dried chilies from Cambodia too.
- The capacity of dried chili processors should be strengthened on several topics as below:
  - Training/workshop about the available supports from the government such as access to finance with ARDB and SME Bank, credit guarantee with CGCC, financial support from Khmer Enterprise. Donor/DP/NGO also provides numerous supports. For example, GIZ has Agrinovation Fund, which is a matching grant for private firms in the agricultural sector to invest in new technology and solution.
  - Training about the creation of contract farming with agricultural cooperatives or farmers. Dried chili processors are young enterprises without experience in contract farming. They also mentioned the challenge to create contract farming successfully with farmers. Therefore, this training will be very helpful for dried chili processors.

### **MARKET AND EXPORT: Focus on dried chili products.**

- Processors' export skills should be strengthened by providing training about quality infrastructure, the export process, and selling on the international e-commerce platform. CAVAC's recent study<sup>56</sup> describes standard requirements for dried chilies

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<sup>56</sup> CAVAC. "Markets for Cambodian Crops with Promising Prospects". Year: 2020.

for some countries. This information should be disseminated to processors, who are interested to export their products.

### **DIGITAL SOLUTION: Leverage existing platforms**

- Stakeholders should collaborate to create and moderate a Facebook page, Facebook group, Telegram Group, and Youtube channel for sharing content and initiate discussion about the chili value chain in Cambodia. Instead of developing App or Website, which is challenging to operate and acquire users, Facebook pages, Facebook groups, and Youtube channels are simpler and more feasible. In addition, many Cambodian farmers and processors already have some knowledge of how to use these digital technologies.
- After the chili value chain is larger, stakeholders should consider the replication and adoption of digital solutions from other value chains, such as BlocRice of AMRU and the rice eco-system of AgriBee.

## REFERENCE

Australian Embassy Video: Interview with chili (Cayenne) farmer Vann Sokhorn. Year: 2017.

Link: [https://www.youtube.com/watch?v=a97zxsy9\\_5U](https://www.youtube.com/watch?v=a97zxsy9_5U)

AVRDC. "Creation and management of small-scale vegetable packaging house for linking farmers with the market". Year: 2016.

AVRDC. "Post-harvest technique for vegetables". Year: 2010.

AVRDC. "Postharvest Technology for Fresh Chili Pepper in Cambodia, Laos, and Vietnam".

BTV Report: Chili (Cayenne variety) planting under Boosting Food Production Program in Kampong Cham province. Year: 2020

Link: <https://www.youtube.com/watch?v=RnshjuKgyg4>

BTV TV Program: Interview chili (Bird's eye Variety) farmer Touch Pun in Prek Koy Commune, S' Ang District, Kandal Province. Year: 2017

Link: <https://www.youtube.com/watch?v=oD-YBOF6OeU>

BTV TV Program: Interview with chili (Hawaii variety) farmer Chy Meng Seak in Kampong Siem District, Kampong Cham Province. Year: 2016

Link: <https://www.youtube.com/watch?v=W7Uo9BL1oho>

CAVAC. "Markets for Cambodian Crops with Promising Prospects". Year: 2020.

CARDI. "Postharvest value chain of chili". Year: 2007.

Dr. Vivian Ku and Sok Bunna. "Mapping chili supply chain from Kompong Cham province to Cambodia-Thai border, Pailin". Year: 2017.

FAO and WHO. "Conclusion of the in-session working group on the regional standard for chili sauce". Year: 2010.

Interview with chili (Bird's eye Variety) farmer in Muk Kampol District, Kandal Province. Year: 2020

Link: <https://www.youtube.com/watch?v=T7uAoYUj85U>

Institute of Standard of Cambodia. "Presentation on quality infrastructure for food processing sector and its roles in the creation of a standard for the export market". Year: 2019.

MAFF AiDOC. "Hawaii chili farmer guide". Year: 2019.

Link: <https://www.youtube.com/watch?v=IRlxLO4pHKw>

MAFF. "Chili farmer manual". Year: 2012.

SNV-CHAIN. "Major diseases for eggplant, tomato, and chilies".

Theoun News: Interview with Farmer Sokun in Sangkat Sambo Meal, Krung Kampong Cham, Kampong Cham Province. Year 2021

Link: <https://www.youtube.com/watch?v=saem7mIPIn0>

USAID. "An analysis of three commodity value chains in Cambodia". Year: 2015.

USAID. "Bulletin No 94 on harvest and post-harvest technique for chili". Year: 2013.

USAID. "Cambodia agriculture competitiveness opportunity assessment". Year: 2019.





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