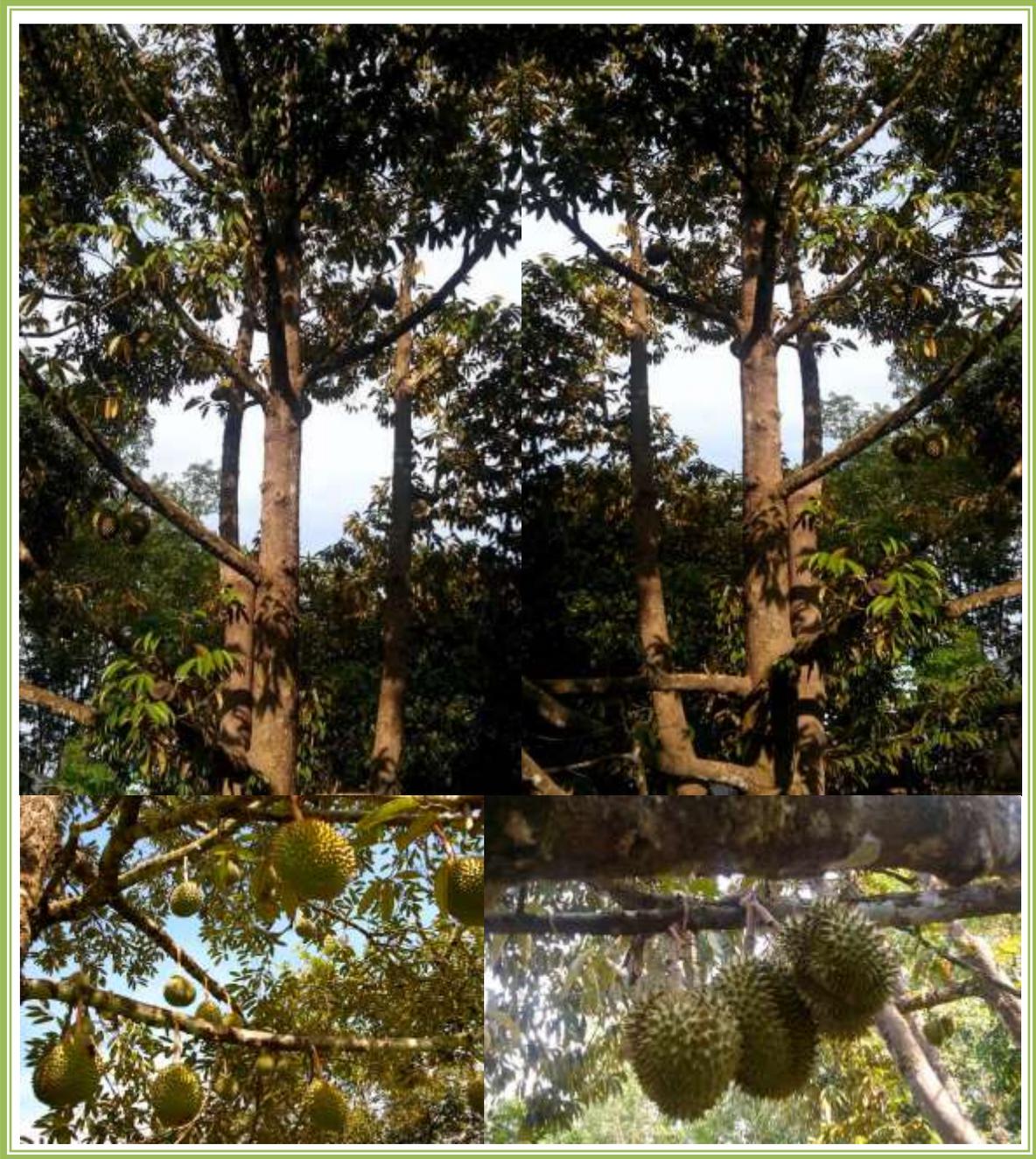


**REPORT OF ASSESSMENT OF IMPACT OF COVID-19  
ON VALUE CHAINS OF DURIAN IN KAWKAREIK AND  
THANTAUNGYI TOWNSHIPS OF MYANMAR**

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October 2020

## EXECUTIVE SUMMARY

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### 1. Background and Methodology

The Coronavirus disease 2019 (COVID-19) crisis has severely disrupted agricultural value chains and markets and has a significant impact on the economic performance of the agricultural sector. In order to effectively respond to the crisis, to mitigate negative impacts and contribute to economic recovery by the projects with funding support from the International Fund for Agriculture Development (IFAD), it is necessary to know the scope of the disruption, its direct and indirect consequences and potential areas/anchor points for interventions. For the above reasons, the Value Chain Capacity Building Network (VCB-N) proposes to conduct country-based assessments of the consequences of the COVID-19 crises.

EMPOWER Consultancy Limited is commissioned to carry out this assessment with an overall objective of providing IFAD and its stakeholders impact of the COVID-19 crises on the economic and social performance of Durian value chains in Kawkareik and Thantaunggyi Townships of IFAD's Eastern State project and formulating recommendations for short and mid-term level responses to mitigate negative impacts and contribute to recovery of these value chains.

In order to meet the overall objectives, the specific objectives are set to:

- (1). examine the impact of affected chain performance such as income, poverty, food security and employment taking into account immediate and mid-term perspectives;
- (2). assess changes in trade arrangements, transaction costs and trade volumes and related economic consequences for chain actors; and
- (3). provide recommendations on potential responses to mitigate identified impact through immediate actions and to recover operations and performance of value chains through mid or longer-term interventions.

In line with the study objectives, this assessment employed qualitative data collection methods consisting of In-Depth Interviews (IDI), Key Informant Interviews (KII) and a document review. 28 farmers, 9 output traders, 1 trader of propagation materials, 2 fertilizer traders, 3 value adding processors, 1 officer of Township Cooperative Department (TCD) that provides financial service and 1 officer of Township Department of Agriculture (DOA) participated in the assessment.

The study findings were not representative to all value chain actors of Durian in two townships due to inherent limitations of qualitative data collection methods. Some value chain actors that this assessment approached did not participate in the study, which constrained data triangulation. Many study participants did not have proper documentation of farm and trade activities and data, which required these participants rely on recall of their memory to reveal information, thereby resulting recall bias.

### 2. Key Findings

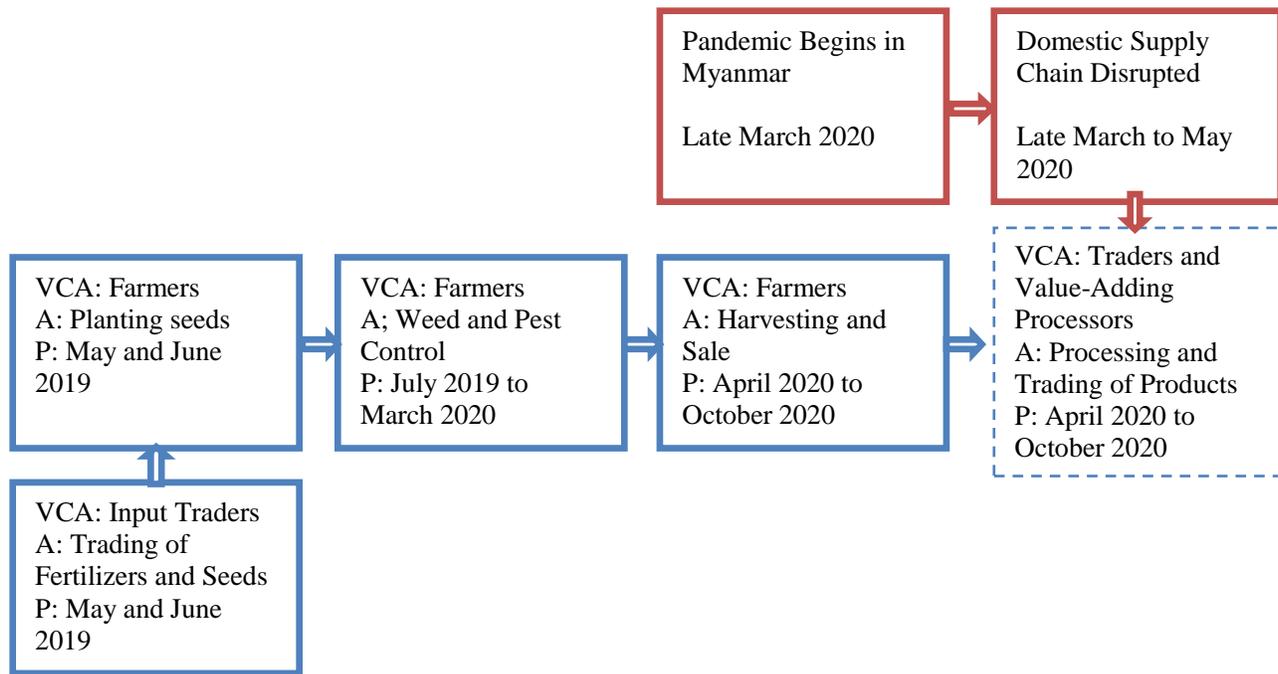
#### 2.1 Time Relationship between COVID-19 Pandemic and Durian Season and Value Chain Maps

The Durian harvesting period in Kawkareik is during April and September and in Thantaunggyi is during April to October. Farmers sell mature fruits to town level traders who in turn sell fruits to Yangon's Thirimingalar wholesale market, which distributes fruits to retailers throughout the country during the same period.

The COVID-19 outbreak began in the last week of March 2020 in Myanmar and the Myanmar government exerted stringent control measures during the last week of March, April and May 2020 when the spread of virus intensified. During June, July and August, the severity of control measures and degree of fear wanes in accord with reduction of the domestic transmission. In September, there is a resurgence

of outbreak at the higher severity than that of March, April and May, which requires resumption of stricter control measures again. The duration of the pandemic period coincides with the period of harvesting and trading of the 2019-2020 crop season, which explains why almost all value chain actors face negative impact on their business (See Diagram 1, 2 and 3).

Two value chain maps are also presented for readers to capture how value chain actors interact for production and sale of fruits from two townships. Four and three patterns are identified for Thantaunggyi and Karkareik Townships, respectively.



**Diagram 1. Schematic Diagram to Illustrate Time Relationship between Pandemic and Value Chain Steps and Actors**

\*Remark: Value Chain Assessment (VCA) in each text box denotes Value Chain Actor, A means Value Chain Activity and P represents period.

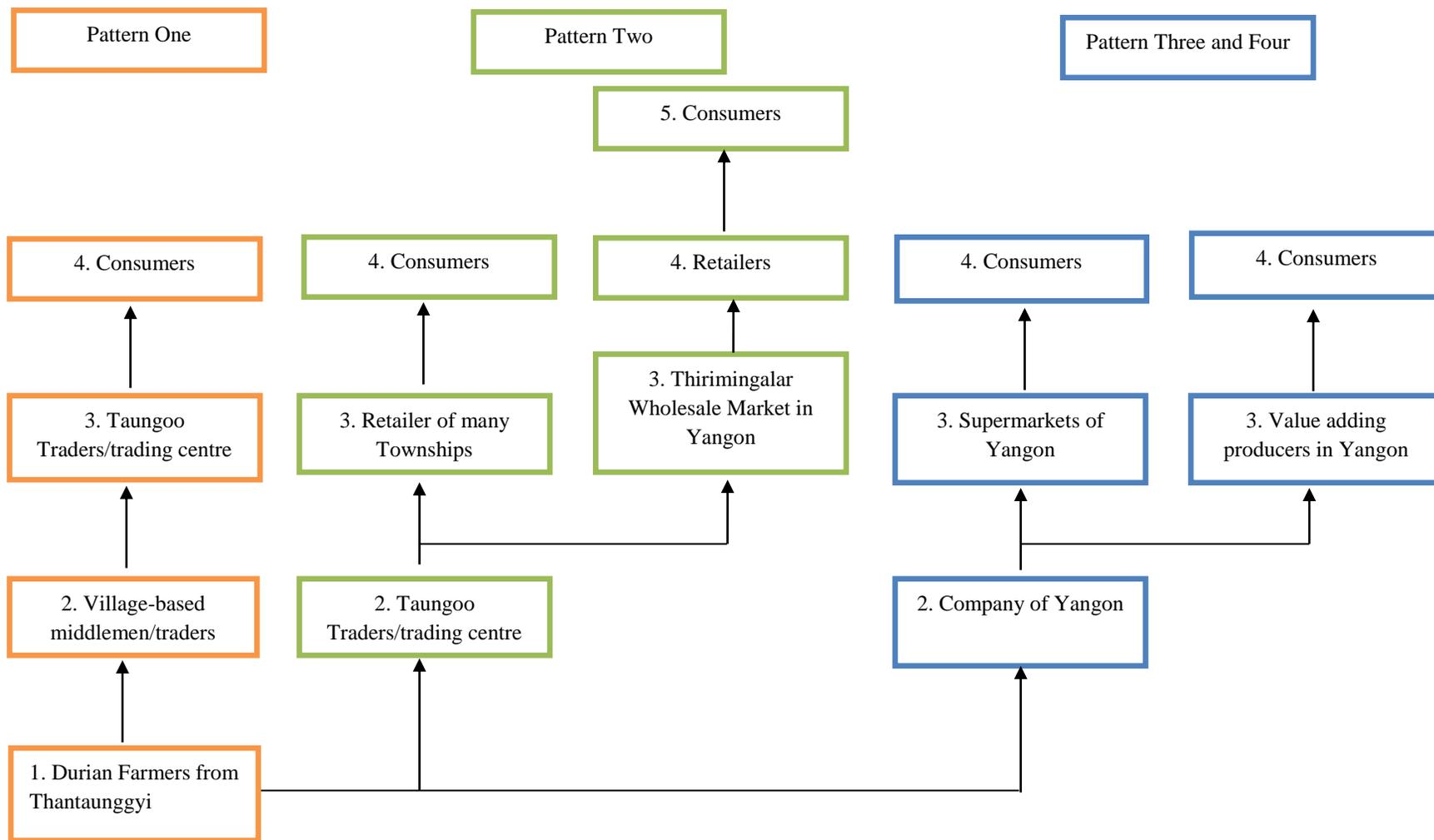


Diagram 2. Value Chain Map of Durian from Thandaunggyi Township

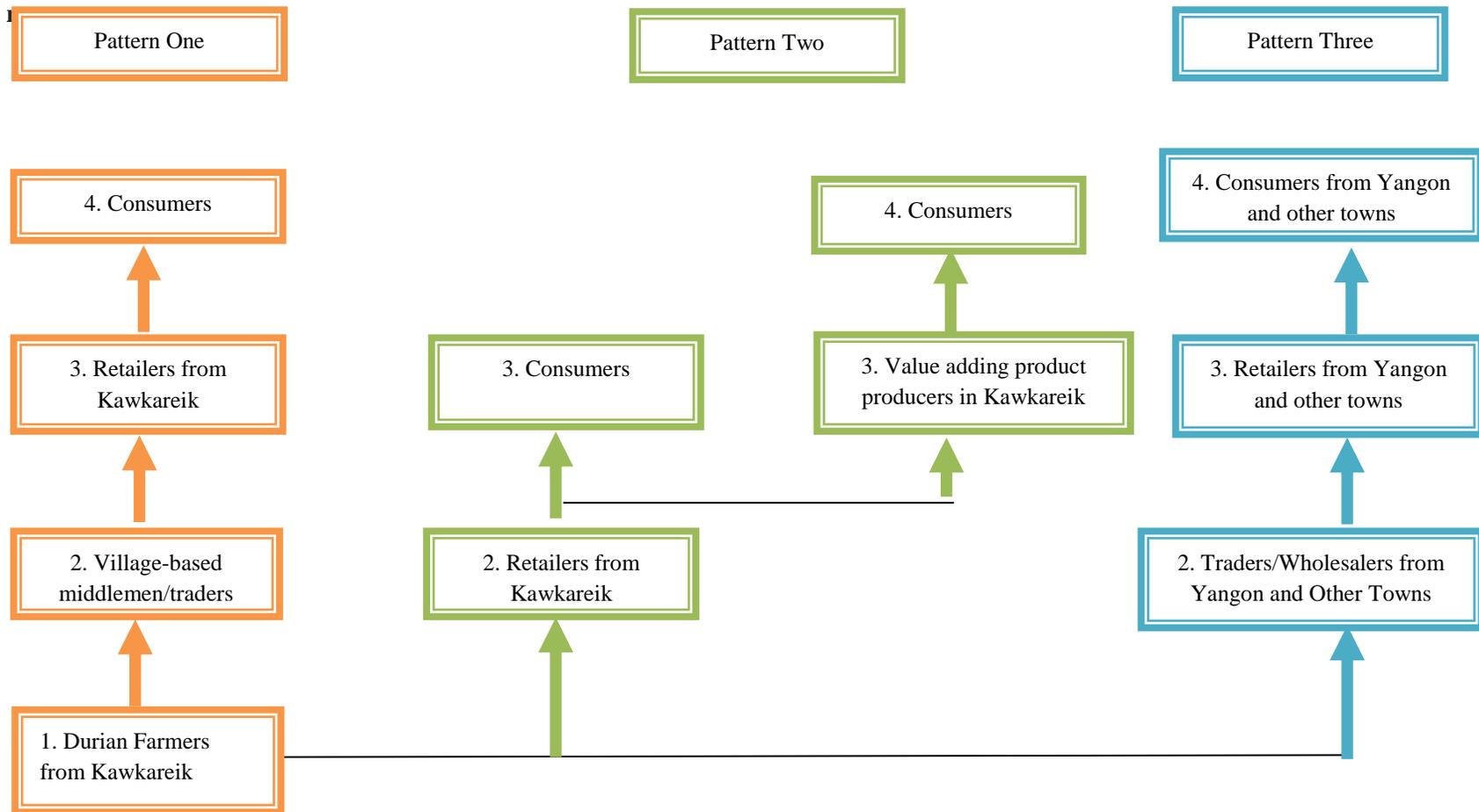


Diagram3. Value Chain Map of Durian from Kawkareik Township

## 2.2 Impact on Farmers

The assessment discovers that five factors trigger implications on farm business of Durian farmers in Kawkareik and Thandaunggyi Townships. First, a sanction on entry of outsiders into Durian producing villages prevents traders from buying fruits in April and May. Second, worry on contracting the virus discourages traders to travel to Durian producing villages to purchase fruits. Third, Myanmar tourists visit Thailand via Kawkareik and Myawaddy Asian Highway in the previous years, and they buy Durian from Kawkareik on the way back to their home. During March and May 2020, restriction on travel and halting of the operations of highway passenger buses inhibit domestic tourists from visiting Thailand. Fourth, a famous religious festival held during March is one of the major avenues for sale of fruits by farmers. A ban on the gathering of people cancels this festival. Finally, order of Durian from Kawkareik by the regular buyers from Kyaikkaw area drops by half. These circumstances collectively contribute to fall in the price of fruits and in the sale volume during the trading season, which in turn causes shrinking of farmers' revenues. More detail discussions are presented below.

First, Durian from Kawkareik Township of Kayin State is available from April to August, which coincides with the period in which the highest level of restriction measures against spread of the COVID-19 virus are put in place and there is the presence of the highest degree of fear among people. A prohibition on entry of non-local outsiders and fearfulness of contracting the virus impede purchase of fruits from Durian orchards in Kawkareik Township, which causes plunging of the price of fruit in April and May 2020 by half of the price during the same period in 2019.

Second, Myanmar tourists who travel to Thailand via Kawkareik and Myawaddy Asian Highway constitute one of the major buyers of Durian from Kawkareik Township. These tourists stop and buy fruits from retail shops set up along the Asian Highway. During March and May 2020, restriction on travel and the absence of highway passenger buses prohibit domestic tourists from visiting Thailand, which leads to dropping of sale volume of fruits drastically. Third, farmers sell considerable volume of fruits at a famous religious festival held during March. A ban on the gathering of people leads to cancellation of this festival. Fourth, the major buyer of Durian from Kawkareik is traders from Kyaikkaw area, whose order tumbles by half.

Decline of the purchase volume from these major buyers makes large stocks of fruits stranded in the hands of farmers and retailers. Farmers and traders respond to this problem by selling fruits at the discount price but they still cannot sell all fruits. They process these unsold fresh fruits that have to be discarded otherwise into Durian jam. By doing so, they earn 40,227 Myanmar Kyat (MMK) less than the amount that they can get from selling fresh fruits for every viss of Durian jam produced.

With respect to impact on farmers from Thandaunggyi Township, many farmers from Bawgali Sub-Township of Thandaunggyi Township of Kayin State perceive that this pandemic and its negative effects can last for a longer period. On the other hand, they are in dire need of income to cover the household expense in May 2020. These circumstances prompt farmers to harvest all fruits regardless of ripeness and sell them as much as possible. Trading centres in Taungoo town and other traders in Yangon reject unripe fruits, which results in loss of harvesting and transportation costs by farmers. Furthermore, they miss an opportunity to sell ripe fruits at the higher price in August and September when the price is usually higher than that of May.

Besides, many farmers from Leik Tho Sub-Township of Thandaunggyi Township face significant decline of income from Durian and other crops such as Mangosteen and Lychees. Durian harvest season begins in May and reaches its peak in June and July in this area. Barring of outsiders' entry into these villages and anxiety to contract the virus prohibit traders from buying Durian in May and June 2020. In addition, trading centres of Taungoo town which are the main buyer of Durian from Thandaunggyi Township buy

much less volume of the fruits. The price of Durian in May 2020 for the small size one is 33.3 per cent, for the medium size one is 40.0 per cent and for the large size one is 50.0 per cent of the corresponding price of May 2019. The price of Durian in June and July 2020 for the small size one is 50.0 per cent, for the medium size one is 50.0 per cent and for the large size one is 60.0 per cent of the corresponding price of June and July 2019. Both the dipping price and sale volume slash revenue of Durian farmers substantially.

### **2.3 Impact on Input Traders**

Input traders are not the exception from the impact of the pandemic either. Sale volume of fertilizer traders from Kawkareik Township shrinks markedly during April and July 2020, which results in shrinking of their revenue by as much as 60 per cent of the normal period. Some vegetable farmers grow much less volume because they cannot sell their products to other villages. Restriction on travel impedes marketing of traders. These two factors collectively cause decline of sale volume of fertilizers.

### **2.4 Impact on Output Traders**

The pandemic does not spare traders from Kawkareik from its negative effects either. Kayin National Union (KNU) sets up a check point at Ywar Thit Kone village of Kawkareik Township to forbid entry of outsiders into the Durian producing villages as part of control measures against the COVID-19 pandemic. Consequently, farmers have to carry fruits from their farms to this check-point using a locally assembled truck and traders transport fruits from this check-point to their trading centres in Kawkareik. These two steps transportation raises transportation and labour costs almost double. Bad concerned road, the absence of shock absorbers in the locally assembled truck and loading and unloading of fruits two times collectively cause damage to fruits while being loaded and transported.

Durian from Kawkareik is also sold in Yangon market. During April and May 2020, the number of cargoes running from Kawkareik to Yangon plummeted to 10 per cent of the normal period, which cause remarkable fall in trading volume of Durian and other goods. Traders respond to this situation by selling fruits to local consumers at the discount rate of 40 per cent and processing unsold fruits into Durian jam. To get 1 viss of Durian jam, 10 to 12 pieces of fruits are needed. The sale price of Durian jam is 8,000 to 10,000 MMK while 10 pieces of fruits are worth 20,000 MMK. One viss of charcoal and small amount of eatable oil have to be used as well. Hence, traders earn 11,000 MMK less than the amount of money that they can get from selling fresh fruits for every viss of jam.

Negative impact of the COVID-19 pandemic on Durian traders in Yangon seems to vary from one trader to another. Some large wholesalers from Thiriminglar fruits and vegetable markets, one of the largest wholesale markets in Myanmar, do not appear to face impact of the pandemic despite the presence of negative effects from restrictions by the government. For instance, one wholesaler participating in the assessment does not encounter drop of purchase volume from retailers except one value-adding processor who reduces purchase. Emergence of more on-line trading of food as part of the coping mechanism of the pandemic seems to offset decline of order from value-adding processors.

The wholesaler participating in the assessment forms a partnership with some trading centres from Myeik, Palaw, Ye, Taungoo and Kawkareik Townships to source fruits. This wholesaler pays transportation and labour costs first and deducts these costs from sale income later and charges 10 per cent commission fees to partner trading centres. A partnership is also established with retailers from various regions of Myanmar.

These wholesalers are assessed to have a higher degree of leverage than other value chain players in Durian value chains. Supply sources and demand sources are diversified extensively. Decline of fruit supply from one production area can be compensated with supply from other areas. The 10 per cent

commission fees system makes them less vulnerable to loss from the rise and fall of price of fruits. Equally important is that they can offset decline of demand from one type of buyer with rising demand from another type of buyer. This unique strategic position helps them hold more economic power than other value chain actors, and consequently, they can escape from marked impact during the COVID-19 pandemic,

In comparison, one trading company that buys and sells fresh Durian from Thandaunggyi farmers experiences significant loss from his business. This company sells Durian to some of the largest supermarkets of Myanmar such as City Mart and Capital. Partner farmers supply unripe fruits, which leads to rejection of the vast majority of fruits by partner supermarkets. Sale of Durian to these supermarkets is stopped after May 2020 when this company can no longer source quality fruits from farmers reliably in order to prevent its reputation. Service fees of cargoes to carry goods from Thandaunggyi to Yangon and labour wage go up during April and May 2020 too. This trading company loses a total of 4 million MMK that consists of transportation cost, labour cost and half of investment made for purchase of fresh fruits from farmers. Besides, the initiative to explore potential export of Durian to China in the early part of 2020 has to be abandoned due to the pandemic.

### **2.5 Impact on Value Adding Processors**

Durian value-adding producers are also vulnerable. One producer of Durian pillow from Yangon, a snack consisting of cake with Durian cream inside, witnesses marked fall in sale volume due to closure of snack shops and falling consumption of consumers. On the other hand, despite of soaring production cost, this producer cannot raise the sale price of one piece of Durian pillow from the previous price of 600 MMK, which diminishes profit. Similarly, another Durian pillow producer from Kawkareik faces shrinking sale volume and revenue.

### **2.6 Impact on Household Income and Basic Needs**

Some farmers and village-based traders from Leik Tho Sub-Township of Thandaunggyi Township adopt a coping mechanism to overcome this shock through carrying fruits to and selling them in Taungoo, Loikaw, Mandalay and Muse towns in May and June 2020. These farmers and traders have to shoulder transportation cost and labour cost in doing so. The cost of harvesting is 100 to 200 MMK per piece of fruit, transportation of the fruits from orchards to their village ranges from 50 to 100 MMK while transportation of one piece of the fruit from their villages to Taungoo is between 100 to 150 MMK. The total cost of harvesting and marketing ranges from 250 to 400 MMK per piece.

By contrast, the purchasing price of one piece of Durian by Taungoo trading centres in May, June and July are 500 for a small size one, 1,000 for a medium size one and 1,500 for a large size one. This gives rise to the Gross Margin of 100 to 250 for one piece of a small one, 600 to 750 for one piece of a medium one and 1,100 to 1,250 for one piece of a large one. The decline of price, higher cost of marketing and plummeting production cost collectively cut down revenue from Durian by nearly two thirds. Similar dip in income from other major crops that are harvested in the same period such as Lychees and Mangosteen contributes to decline of the household income by as much as two thirds of the previous year.

In-depth analysis of consequences on household food security, health, education and availability of resources for the investment of their fruit orchards during 2021-2023 explains that these famers have mitigation measures and household resilience that minimize severe consequences. First, many farmers from Leik Tho Sub-Township of Thandaunggyi Township work as daily wagers and sell banana from their orchards to compensate for reduction of household income from Durian. Besides, farmers grow vegetable and raise chicken and pigs for their own consumption and sale when they encounter the shortfall of income to meet household expenses. In addition, they possess wooden house, motorcycle, orchard and some household assets, which make them resilient to cope with severe impact.

Income from working as daily wagers and selling banana, vegetable, chicken and pigs help these farmers to cope with the falling revenues from Durian. As a result, they can continue to support their children to enrol in schools and they do not have to reduce the basic food consumption,

Farmers from Kawkareik are found to be relatively more affluent than farmers from Thantaunggyi. They receive remittance from their family members who have been working in Thailand for many years, which enable them to accumulate wealth through building concrete houses and buying motorcycles and household assets. Amassing these assets makes them resilient to the shock. In addition, they grow pineapple and Mangosteen alongside Durian in their fruit orchards, from which they earn income. They also grow vegetable for own consumption. Income from selling pineapple and Mangosteen injects income to mitigate the falling revenues from Durian. On the other hand, consumption of own vegetable can reduce household expenses for food and address food insecurity. Consequently, they can continue to support their children to continue schooling and they do not have to reduce amount of food consumption,

Durian trees are set up many years ago in both townships and the recurrent investment per year comprising labour cost for harvesting fruits is small. Therefore, farmers from two townships do not have problems in maintaining their Durian orchards in the coming years. Farmers who plant new seedlings will use own seeds with no cost, which explains why they do not have to reduce number of new seedlings in the following years.

## 2.7 Importance of Long Term Challenges on Sector Development

Additional long term challenges that are not directly related to the COVID pandemic further constrain the economy of this sector. Pests and diseases appear to pose imminent threat on the sector development because many existing Durian plants die during the previous few years. Equally important but beyond the control is climate change factor. Less rainfall, irregular timing of rain and higher temperature collectively create an unfavourable climate for Durian in Kawkareik and Thandaunggyi with resultant dying of trees and regression of yield. Majority of farmers do not adopt appropriate cultivation practices, particularly lack of irrigation and canopy management, which undermine yield and quality of fruits.

Furthermore, there is the absence of comprehensive policy, strategy and plan for the Durian sector development. This assessment identifies that there is no quality assurance mechanism, quality standard and standard price for fruits across value chain actors, which often result in supply of low quality fruits and a non transparent price setting. This situation contributes to loss of businesses opportunities for most value chain actors. Although consumers have to pay high price, they often cannot get quality fruits. These long term challenges warrant a comprehensive intervention alongside the short term measures to tackle the impact of the COVID-19 pandemic.

## 3. Recommendations

In light of the study findings, the following recommendations are made.

Interventions	Stakeholders
<b>Short-Term and Urgent Intervention (Timeline: October 2020 to September 2021)</b>	
(1). Value chain actors should be mobilized to establish Durian clusters or associations in Kawkareik and Thantaunggyi and technical support and managerial backstopping should be rendered to these clusters to strengthen their institutional capacity. This intervention should be given the first priority and undertaken urgently because these associations should lead other short, medium and long term interventions.	Ministry of Agriculture, Livestock and Irrigation (MOALI), MFVP and IFAD
(2). A comprehensive disaster preparedness plan of the Durian sector consisting	MOALI, Ministry of Trade

of strategy and plan should be developed with meaningful involvement of farmers, output traders, input traders and value adding processors. Relevant Non Governmental Organizations (NGO), donors and government departments such as Department of Agriculture (DOA), Department of Rural Development (DRD) and Department of Cooperative (DOC) should also be involved. This plan will steer stakeholders to implement other short term intervention measures, which collectively will help value chain players to mitigate the impact in the harvesting and trading season of 2021.	and Commerce (MOTC), Myanmar Fruit, Flower and Vegetable Producer and Exporter Association (MFVP), Durian Associations of Kawkareik and Thantaunggyi and IFAD
(3). Travel restriction and barriers for transportation of Durian from Kawkareik and Thantaunggyi to Yangon and other major destinations should be lifted temporarily during the harvesting and trading period from April 2021 to September 2021. The government should ensure that supply chain system will operate optimally during this season to facilitate the trade as normally as possible. People involved in this process should be enforced to adhere to rules such as putting on masks and social distancing to prevent spread of the virus.	MOALI, MOTC, Ministry of Health and Sports (MOHS), Ministry of Home Affairs (MHA), central and state/regional COVID-19 control committees and IFAD
(4). Loans with affordable interest rates of 1 per cent per month and duration of at least 1 year should be made available to farmers, traders and other value chain actors immediately. Technical support regarding how to apply for and manage loans and their businesses should be provided by the mentioned parties.	Myanmar Agriculture Development Bank (MADB), MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, institutions with interest in contract farming and IFAD
(5). Direct sale of fruits by farmers to consumers in places with high demand such as Yangon and Mandalay should be arranged. MFVP can help farmers to sell fruits to consumers directly through mobile market and online marketing.	MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(6). Market diversification and linkages with markets that offer a stable price should be done for farmers and local traders. A comprehensive market promotion and penetration plan and strategies should be developed to this end.	MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(7). The existing value adding processors from Kawkareik and Thantaunggyi should be provided with technical, managerial and financial support to upgrade the quality of products, expand their production and sale and diversify their markets. Farmers should also be equipped with capacity and resources to produce more profitable value added products. This intervention will mitigate loss from unsold fruits if supply chain system is disrupted in the forthcoming season.	Small and Medium Enterprise (SME) departments of Ministry of Planning and Finance (MOPF), MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
<b>Medium-Term and Long-Term Intervention (Timeline: October 2021 to September 2025)</b>	
(1). A comprehensive package of the Durian sector development consisting of policy, strategy and plan should be developed with meaningful involvement of farmers, output traders, input traders and value adding processors. Relevant Non Governmental Organizations (NGO), donors and government departments such as Department of Agriculture (DOA), Department of Rural Development (DRD) and Department of Cooperative (DOC) should also be involved.	MOALI, MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(2). The standard price, the quality standard and the quality assurance system should be established, and enforcement should be done to adhere to these standards. This action will ensure that consumers will get the quality fruits at a reasonable price and farmers and other value chain players will derive stable Gross Margin.	MOALI, MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD

<p>(3). Comprehensive capacity building for various value chain actors should be planned, implemented and monitored and evaluated. The following issues should be covered for farmers: (a). how to set up a nursery; (b). how to produce and apply organic fertilizers; (c). how to control pests and diseases; (d). how to set up an irrigation system; (e). how to produce quality seedling and how to do proper grafting using quality variety; (f). how to do canopy management; and (g). how to develop and implement a business plan for farms. Traders and value adding processors should be trained on how to draw and implement a business plan.</p>	<p>MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, IFAD, experts from Thailand, farmers and other value chain actors</p>
<p>(4). More rigorous research should be undertaken for the following areas: (a). types and doses of fertilizers and their effects on the growth of Durian trees; (b). types, magnitude of destruction and ways of controlling the most prevalent pests and diseases; (c). yield, investment, income and profit of the standard size farms; and (d). irrigation system and canopy management.</p>	<p>MOALI, Department of Agriculture Research (DAR), MFVP, Durian Associations of Kawkareik and Thantaunggyi, farmers and IFAD</p>
<p>(5). Access to loans with affordable interest rates should be rendered for the long term development of the sector. To this end, farmers should be supported to obtain the land title number seven and seek loan from the Myanmar Agriculture Development Bank (MADB), TCD and Mya Sein Yaung project of the DRD. The prospective Durian cluster or association should develop and implement a comprehensive resource mobilization plan to make use of potential resources. Farmers should also be coached to manage investment, income and loan effectively. Other value chain actors should be supported to get access to loans from the Small and Medium Enterprise (SME) and commercial banks with no requirement for use of immovable property as collateral.</p>	<p>Myanmar Agriculture Development Bank (MADB), MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, institutions with interest in contract farming and IFAD</p>
<p>(6). Farmers should be encouraged and supported to set up specific farms for production of propagation materials. This measure will help farmers not only to get access to quality materials but also to reduce cost of production. Indigenous Durian varieties that produce quality fruits should be identified, and propagation materials from these varieties should be produced and distributed to farmers. This measure will help the farmers to produce quality fruits at the economic scale in the future.</p>	<p>MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, farmers and IFAD</p>

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## LIST OF ACRONYMS

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COVID-19	Coronavirus disease 2019
DALMS	Department of Agricultural Land Management and Statistics
DOA	Department of Agriculture
DRD	Department of Rural Development
EFY	Elephant Foot Yam
GAP	Good Agriculture Practice
HS	Harmonized System
IDI	In-Depth Interviews
IFAD	International Fund for Agriculture Development
ITC	International Trade Centre
KII	Key Informant Interviews
KNU	Kayin National Union
MADB	Myanmar Agriculture Development Bank
MFI	Microfinance Institute
MFVP	Myanmar Fruit Flower and Vegetable Producer and Exporter Association
MMK	Myanmar Kyat
PLS	Plain Language Statement
RHC	Rural Health Centre
TCD	Township Cooperative Department
TOR	Term of Reference
USD	United State Dollar
VCA	Value Chain Assessment
VCB-N	Value Chain Capacity Building Network

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## **CHAPTER ONE: INTRODUCTION**

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The COVID-19 crisis has severely disrupted agricultural value chains and markets and has a significant impact on the economic performance of the agricultural sector. Indirectly the COVID crisis also has a broader impact on the agricultural sector in terms of its contribution to income and labour generation or food security. In order to effectively respond to the crisis, to mitigate negative impacts and contribute to economic recovery, it is necessary to know the scope of the disruption, its direct and indirect consequences and potential areas/anchor points for interventions. For development projects engaging with the agricultural sector, like many IFAD financed projects, assessments could be starting point in reformulating intervention strategies that effectively respond to the changed context. For the above reasons the VCB-N proposes to conduct country-based assessments of the consequences of the COVID-19 crises in India, Bangladesh, China, Indonesia, Vietnam and Laos and eventually additional countries if requested by IFAD.

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## **CHAPTER TWO: METHODOLOGY**

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### **2.1 Objectives**

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This assessment investigated the changes in market and value chain dynamics due to the COVID-19 pandemic with an overall objective of providing IFAD and its stakeholders impact of the COVID-19 crises on the economic and social performance of Elephant Foot Yam (EFY) and Durian value chains in selected target areas of IFAD's Western State and Eastern State projects and formulating recommendations for short and mid-term level responses to mitigate negative impacts and contribute to recovery of these value chains.

In order to meet the overall objectives, the specific objectives are set to:

- (1). Examine the impact of affected chain performance such as income, poverty, food security and employment taking into account immediate and mid-term perspectives;
- (2). Assess changes in trade arrangements, transaction costs and trade volumes and related economic consequences for chain actors; and
- (3). Provide recommendations on potential responses to mitigate identified impact through immediate actions and to recover operations and performance of value chains through mid or longer-term interventions.

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### **2.2 Scope**

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This assessment examined value chain actors of Durian in Kawkareik and Thandaunggyi Townships of Kayin State. These townships were chosen in consultation with the IFAD country representative to Myanmar. The IFAD has been implementing two value chain development projects, Western State and Eastern State, since 2020. Eastern State projects plans to undertake a VCA for Durian and use findings of an assessment to strengthen key value chains. These

circumstances set the cornerstone for the rationale of selection of Durian and Kawkareik and Thandaunggyi Townships.

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## **2.3 Selection of Value Chains**

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The coordinator of VCB-N Myanmar, the IFAD representative to Myanmar, the representatives of DRD and EMPOWER Consultancy Limited held a meeting to discuss and select EFY and Durian value chains as primary foci of the proposed assessment. The IFAD's Western State and Eastern State projects have a plan to carry out VCAs and using findings of these assessments to upgrade these value chains. As such this assessment would derive benefits to IFAD and its key stakeholders.

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## **2.4 Secondary Literature Review**

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This assessment was conducted through three phases:

- (1). inception phase;
- (2). data collection, management and analysis phase; and
- (3). utilization of analysis for future programming phase.

During the inception phase, three consultation meetings with relevant staff members of VCB-N, IFAD's projects, DRD and Myanmar Fruit Flower and Vegetable Producer and Exporter Association (MFVP) were organized to discuss and seek inputs for an assessment design and plan, sources of secondary data and reports, the existing data source and report of IFAD and MFVP and a list of value chain actors of EFY and Durian from MFVP. The assessment team also requested IFAD, DRD and MFVP to introduce the team to value chain actors that they have been collaborating with in order to prepare for an interview during the implementation phase.

Second, a document review was conducted in two-phased approach, and a first step of a document review was conducted during an inception phase to identify value chain actors that should be included in an assessment and their contacts and analyse information pertinent to normal situation of value chains and situation of value chains during and after the COVID-19 pandemic.

These two means enabled an assessment team to finalize an inception report that highlighted study design, research questions, methodology, sample size and sampling method, guidelines for KII and IDI and a detailed work-plan for data collection, management and analysis and reporting.

The Term of Reference (TOR) of VCB-N for this assessment sets the following guiding questions for the assessment:

- (1). What is the normal volume of production and sales?
- (2). Did you notice any changes in volume of production and sales?

- (3). Did you notice any changes in price setting as compared to regular pricing in other years?
- (4). How did the above affect your overall income from the crop?
- (5). How has reduction in income affected your livelihood?
- (6). Are you planning to produce in next year/season's production cycle?
- (7). Will you be able to invest in inputs (seeds, chemicals, labour)?
- (8). If not, how will you manage to start up production?
- (9). What other challenges in production and sales do you face due to the COVID-19 crisis?
- (10). What would you say is your most urgent need at this moment to cope with the crisis?
- (11). Are there any other coping mechanisms you (can) apply to mitigate the impact of the crisis?

The assessment team consulted with the IFAD and VCB-N to finalize detailed guidelines that were prepared based on these research questions during the inception phase.

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## **2.5 Primary Investigation**

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### **2.5.1 Method**

In line with the TOR, this VCA employed qualitative data collection methods consisting of IDI, KII and a document review. This assessment ensured that data triangulation would take place at three levels/dimensions to enhance validity, reliability and utility of this assessment: (a). using multiple data sources; (b). applying more than one qualitative data collection method; and (c). analysing data through involvement of at least 2 consultants and verifying a report with key stakeholders.

The secondary literature review enabled the assessment team to define information gaps and further validation requirements. KIIs and IDIs were facilitated by trained investigators and field researchers through using telephone interviews and face-to-face interviews.

### **2.5.2 Interview Protocol**

The following steps were carried out by the assessment team members for primary data collection:

- (1). Appointments were sought from potential study participants through telephone or email;
- (2). The Plain Language Statement (PLS) was used to explain the key issues of the assessment to potential study participants and seek their informed consent;
- (3). KII or IDI were conducted via telephone or in person depending on the availability of study participants; and

(4). Provide necessary assistance to study participants such as contact information to seek assistance for their business or referring to government or non-governmental organizations for assistance.

### 2.5.3 Sample Size and Geographical Location

Study participants who were involved in the study and geographical location of the assessment are illustrated in the following table.

**Table 2.1 Value Chain Actors Participating in Assessment**

Place	Method, Type of Participant and Sample Size
<b>Durian in Kawkareik</b>	
Kawkareik township	IDIs with 23 farmers in Naung Ta Lar, Ka Mawt Ka Tu and Hpar Kya villages of Laung Kaing village Tract
	KII with 1 trader from Kawkareik town and 3 retailers from Koe Taing village
	KII with 1 Durian snack producer, 1 financial service provider, 1 seedling dealer and 2 fertilizer dealers
	KII with Township DOA
<b>Durian in Thandaunggyi</b>	
Thandaunggyi township	IDI with 5 farmers
	KII with 3 traders from Taungoo town
<b>Durian in Yangon</b>	
Yangon city	KII with 2 wholesalers and retailers
	KII with 2 bakeries and confectioneries

### 2.5.4 Sample Identification

A list of potential study participants was drawn from the IFAD's project and MFVP. EMPOWER and MFVP have established a long term partnership agreement for various business issues, including VCA and strengthening, since 2014, which facilitated identification of potential study participants. Furthermore, snowball sampling strategy of the purposive sampling method was employed to recruit study participants. A sampling quota of at least 2 was set for each type of participant per location for data triangulation.

### 2.5.5 Data Analysis and Reporting

Qualitative data analysis followed a sequential and iterative process and sought to classify analysis by theme and question. The study team kept a field record during data collection that contained key points of interest made by participants, comments raised, facilitators' spontaneous interpretations, emerging trends and themes, probing questions, and notes for new issues to be explored in further interviews. Trained and experienced study team members took notes of IDIs, KIIs and consultation meetings. Folders were constructed to keep an electronic record of IDIS, KIIs and consultation meetings. Qualitative data analysis was conducted in three phases as below.

**Table 2.2 Three Steps of Qualitative Data Analysis**

Preliminary analysis	Lead facilitators and note takers each recorded spontaneous interpretation during the interview and catalogued emergent trends and themes.
Secondary analysis	Lead facilitators and note takers met for a debrief session after each interview to discuss initial interpretation, recall points of interest and compare records of themes and trends. A written summary of each interview was produced.

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Final analysis	<p>Study team members re-read field notes and familiarized themselves with the content and to capture overall themes.</p> <p>KII/IDI guidelines and recall of emergent themes were used to develop codes. The total number of codes did not exceed 15.</p> <p>Study team members put codes, sorted categories according to codes, defined codes, and produced quotes of each category.</p> <p>Study team members read each category thoroughly and wrote a detailed description (thick description). These descriptions were then being triangulated across KIIs/IDIs. Sub-categories were then developed, and links between these sub-categories were identified. The team also reviewed own field notes to compare the first and the second phase analyses performed during and after semi-structured interviews with the interpretation at this stage.</p> <p>Study team members revisited original KII/IDI notes to contextualize findings, through which interpretation was made.</p> <p>Study team members described and explained findings and translated direct quotes into English to illuminate findings and interpretations.</p>
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## 2.6 Study Limitation

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This assessment employed qualitative data collection methods, and hence, the study findings were not representative to all value chain actors of Durian in two townships. Some value chain actors that this assessment intended to include in the study declined to participate in the study, which prevented the study from triangulating data. Many study participants did not have proper documentation of farm and trade activities and data. As a result, these participants had to rely on recall of their memory to reveal information, which likely to cause recall bias.

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## CHAPTER THREE: KEY FINDINGS

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This chapter presents findings of the primary data of this assessment for Kawkareik and Thandaunggyi Townships of Kayin State. Impact on Durian sector by the COVID-19 pandemic is discussed in this chapter whereas two related sections such as normal value chain situation and global market situation are portrayed in Chapter Six..

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### 3.1 Time Relationship between Occurrence of Pandemic and Value Chain Steps

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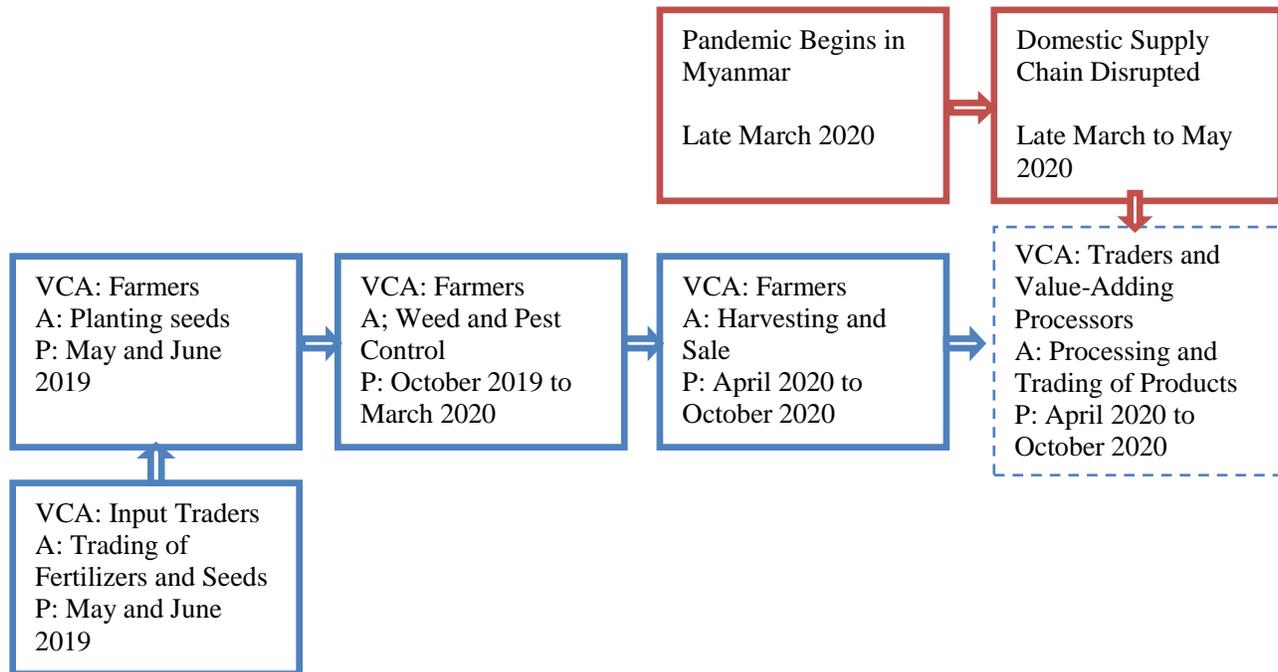
The following diagram is presented to highlight time relationship between the beginning of the occurrence of the COVID-19 pandemic in Myanmar and seasonality of Durian in Kawkareik and Thandaunggyi. This time relationship explains how and why specific value chain steps and value chain actors are affected by the pandemic which will be further elaborated in the following sections.

The Durian harvesting period in Kawkareik is during April and September and in Thandaunggyi is during April to October. Farmers sell mature fruits to town level traders who in turn sell fruits to Yangon market during the same period. Yangon's Thirimingalar wholesale market distributes fruits to retailers throughout the country during the same period.

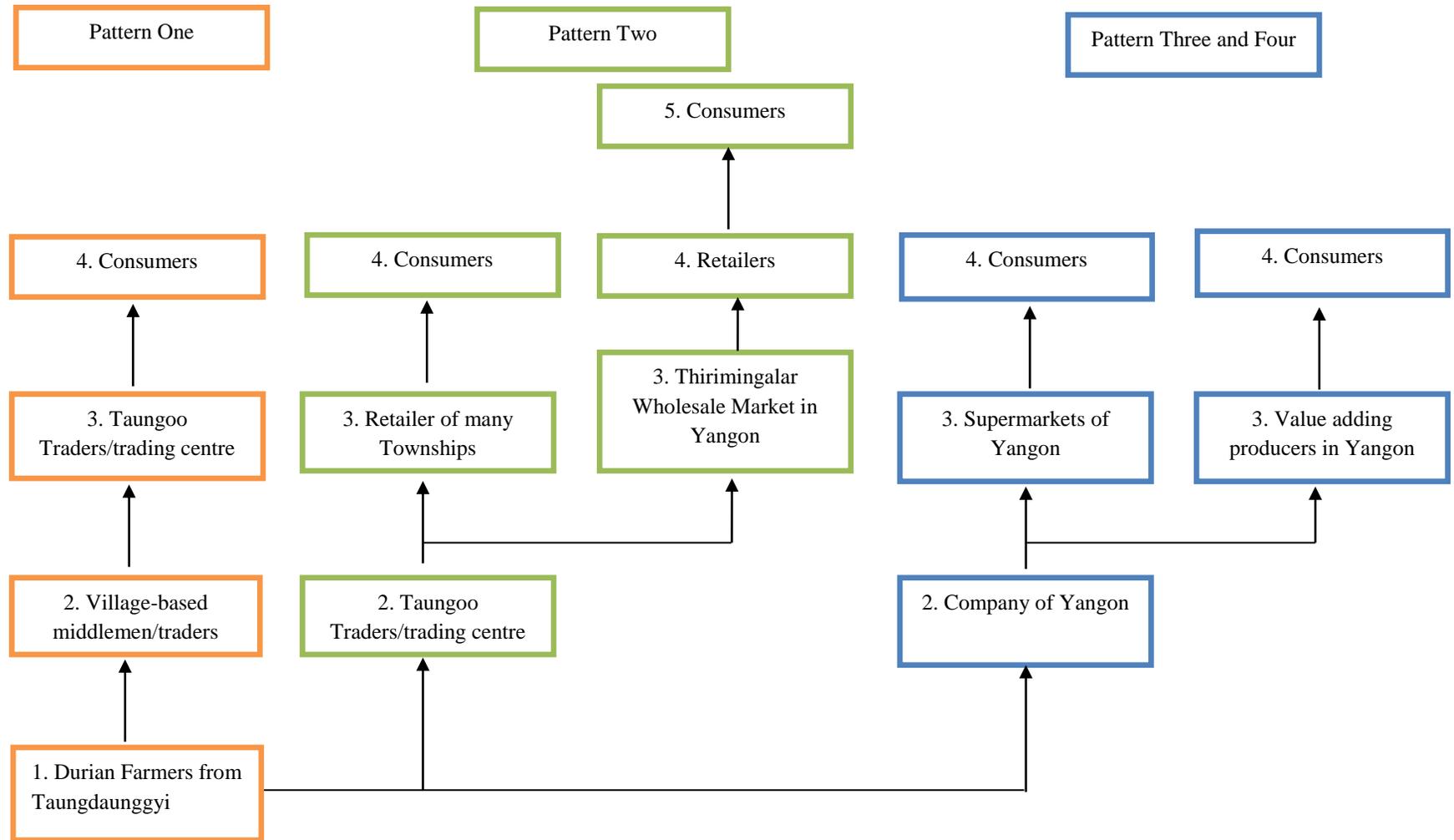
The COVID-19 outbreak began in later part of March 2020 in Myanmar and control measures imposed by the Myanmar government is more intense during the last week of March, April and

May 2020 when the spread of virus is high. During June, July and August, since the domestic transmission slows down, and the intensity of control measures and degree of fear wanes correspondingly. In September, the domestic transmission resurges at the higher intensity than that of March, April and May, and control measures are brought back to the higher-level intensity. The duration of the pandemic period coincides with the period of harvesting and trading of the 2019-2020 crop season

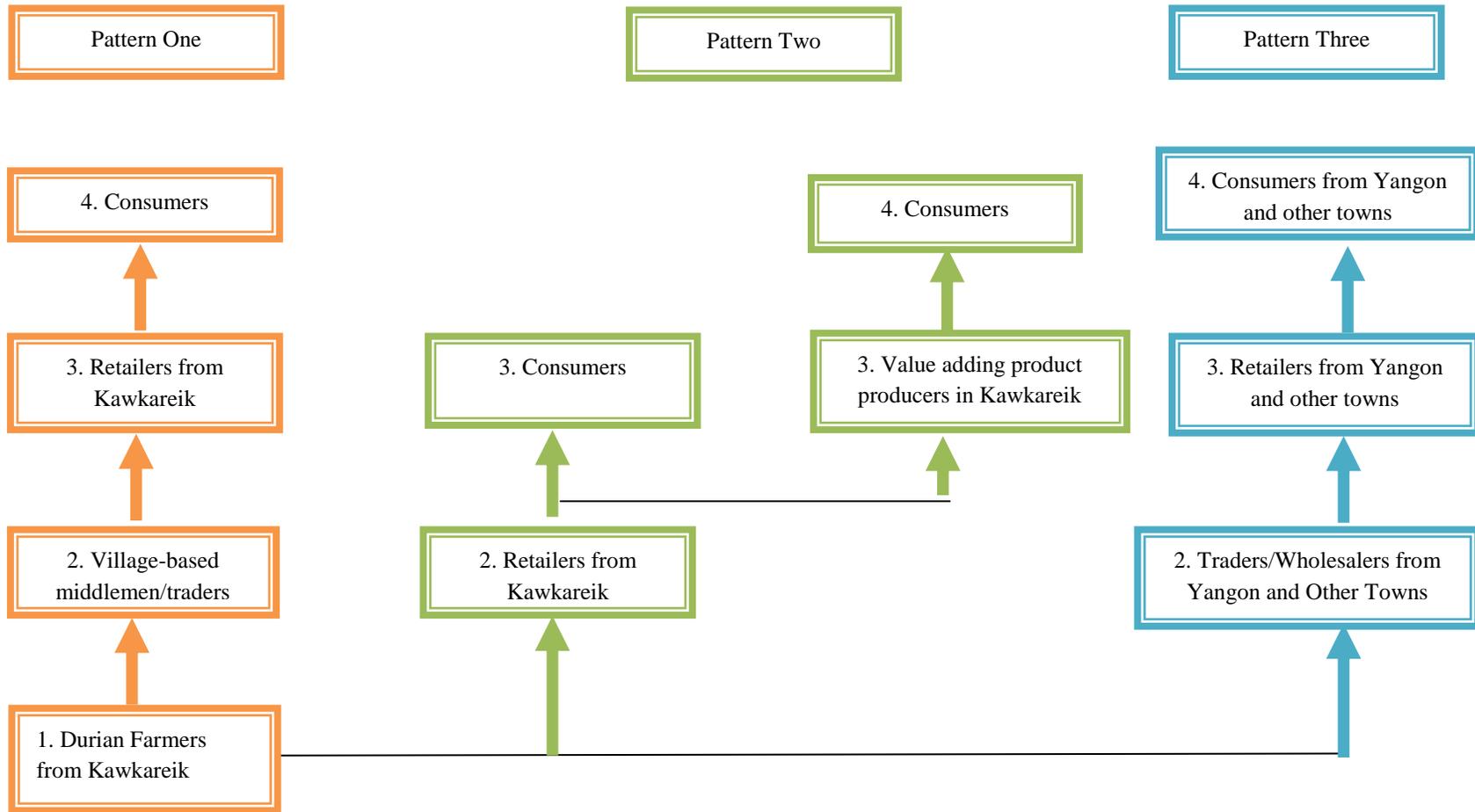
VCA in each text box denotes Value Chain Actor, A means Value Chain Activity and P represents period.



**Diagram 3.1 Schematic Diagram to Illustrate Time Relationship between Pandemic and Value Chain Steps and Actors**



**Diagram 3.2 Value Chain Map of Durian from Thandaunggyi Township**



**Diagram 3.3 Value Chain Map of Durian from Kawkareik Township**

### 3.2 Factors Contributing to Impact

Five factors are assessed as having implications on farm business of Durian farmers in Kawkareik and Thandaunggyi Townships. First, a sanction on entry of outsiders into Durian producing villages prevents traders from buying fruits in April and May. Second, anxiety to get the virus discourages traders to travel to Durian producing villages to purchase fruits. Third, Myanmar tourists visit Thailand via Kawkareik and Myawaddy Asian Highway in the previous years, and they buy Durian from Kawkareik on the way back to their home. During March and May 2020, restriction on travel and halting of highway passenger buses prevents domestic tourists from visiting Thailand. Fourth, a famous religious festival is held during March, in which farmers sell fruits. A ban on the gathering of people leads to cancellation of this festival. Finally, order of Durian from Kawkareik by the regular buyers from Kyaikkaw area drops by half. These circumstances lead to fall in the price of fruits and in the sale volume during the trading season, which contributes to loss of farmers. Detailed discussions are presented in the following sections.

### 3.3 Impact of COVID-19 on Durian Farmers

Durian farmers are vulnerable to negative impacts of the virus. First, Durian from Kawkareik Township of Kayin State is available from April to July, which coincides with the COVID-19 pandemic period in which the highest level of restriction measures against spread of the virus are put in place and the presence of the highest degree of fear in people. A ban on entry of non-local residents and fearfulness of contracting the virus prohibit traders from collecting fruits from Durian orchards in Kawkareik Township. As a result, the price of one piece of fruit in April and May 2020 falls down to the half of the price during the same period in 2019 (See Table 3.1 and 3.2).

**Table 3.1 Comparison of Price of Durian Reported by Farmers from Ka Mot Ka Thu village of Kawkareik**

Weight of Fruit	2019-2020 Season		2018-2019 Season	
	Month	Price (MMK)	Month	Price (MMK)
2 to 3 viss or 3.2 to 4.8 kilograms	April and May	3,000	April and May	5,000
1 viss or 1.6 kilograms	April and May	1,500	April and May	3,000
50 ticals or 0.8 kilograms	April and May	500	April and May	-
3 viss or 4.8 kilograms	June, July and August	7,000	June, July and August	5,000
1.5 viss or 2.5 kilograms	June, July and August	3,300	June, July and August	3,000

One of the major buyers of Durian from Kawkareik Township is Myanmar tourists who travel to Thailand via Kawkareik and Myawaddy Asian Highway. These tourists stop and buy the fruits from retail shops that are set up along the Asian Highway. During March and May 2020, restriction on travel and cessation of highway passenger buses prohibit domestic tourists from visiting Thailand. As a result, sale of the fruits to domestic tourists declines dramatically. Another avenue for sale of fruits is a famous religious festival held during March, in which farmers sell fruits. A ban on the gathering of people leads to cancellation of this festival. Third, the major buyer of Durian from Kawkareik is traders from Kyaikkaw area, and the order from these traders drops by half.

Decline of the purchase from these major buyers leads to the large stocks of fruits in the hands of farmers and retailers. Farmers and traders respond to this problem by selling fruits at the discount price. They also transform unsold fresh fruits, which would otherwise be discarded, into Durian jam. 16 pieces of fruits are needed to get one viss of Durian jam, which is worth 10,000 MMK. It implies that they obtain 40,227 MMK less for every 16 pieces of fruits by producing Durian Jam than selling them as fresh fruits.

**Table 3.2 Cost of Production of Durian Jam 2020-2021 Season**

Cost Categories	Cost of Production			Net Amount Price (MMK)
	Price (MMK)	Quantity	Amount (MMK)	
Sale income from selling 1 viss of Durian Jam	0	1 viss		10,000
<b>Cost of Raw Materials</b>				
Durian	3,000	16 fruits	47,727	
Sugar	500	1 pack	500	
Cooking oil	1,000	1 bottle	1,000	
Charcoal	1,000	1 viss	1,000	
Total cost of raw material				(50,227)
Gross Loss				(40,227)

**Table 3.3 Comparison of Production of Durian Jam between 2019-2020 and 2020-2021 Season**

Type of Trader in Koe Taing Village	2019		2020	
	Number of Durian (Pieces)	Production of Durian Jam (Viss)	Number of Durian (Pieces)	Production of Durian Jam (Viss)
Retailer One	200	10	500	70
Retailer Two	100	5	1,000	50
Wholesaler One	400	20	2,000	100

Second, many farmers from Bawgali Sub-Township of Thandaunggyi Township of Kayin State perceive that this pandemic and its negative effects may be protracted for a longer period, and they are in need of income to cover the household expense in May 2020. They pick up all fruits, both mature and immature, and sell them as much as possible. When they sell young fruits to trading centres in Taungoo town and other traders in Yangon, these traders reject their fruits. As a result, farmers lose cost of harvesting and transportation. Furthermore, they lose opportunity to sell mature fruits at the higher price in August and September when the price is higher than the price in May.

Third, many farmers from Leik Tho Sub-Township of Thandaunggyi Township face significant decline of income from Durian and other crops such as Mangosteen and Lychees. Durian harvest season begins in May and reaches its peak in June and July in this area. A ban of entry of outsiders to villages and fear of contracting the virus in April and May stop traders from buying Durian in May and June 2020. In addition, trading centres of Taungoo town which are the main buyer of Durian from Thandaunggyi Township buy much less volume of the fruits. As illustrated in Table 3.4, the price of Durian in May 2020 for the small size one is 33.3 per cent, for the medium size one is 40.0 per cent and for the large size one is 50.0 per cent of the corresponding price of May 2019. The price of Durian in June and July 2020 for the small size one is 50.0 per cent, for the medium size one is 50.0 per cent and for the large size one is 60.0 per cent of the

corresponding price of June and July 2019. Both the price decline and the falling sale volume slash revenue of Durian farmers substantially.

**Table 3.4 Price Trend of Durian Variety from Thandaunggyi Township of Kayin State**

	May	June	July	August
<b>2018-2019 season</b>				
Small size	1,500	1,200 to 1,000	1,200 to 1,000	1,500
Medium size	2,500	2,200 to 2,000	2,200 to 2,000	2,500
Large size	3,000	2,700 to 2,500	2,700 to 2,500	3,000
<b>2019-2020 season</b>				
Small size	500	500	500	1,500
Medium size	1,000	1,000	1,000	2,000
Large size	1,500	1,500	1,500	3,000

\* Small size is 1 kilogram, medium size is 1.5 kilogram and large size is more than 1.5 kilogram.



**Photograph 3.1 Fruit from Ka Mawt Ka Tu Village (1.6) Kilogram of Kawkareik**



**Photograph 3.2 Fruit from Koe Taing Village of Kawkareik Township**

### **3.4 Impact of COVID-19 on Output and Input Traders**

The assessment discovers that sale volume of fertilizer traders from Kawkareik Township decline noticeably and some traders report as much as 60 per cent fall of revenue during April and July 2020. Restriction on travel prevents these traders from selling fertilizers. Some vegetable farmers grow much less volume because they cannot sell their products to other villages. These circumstances lead to decline of sale volume of fertilizers.

These traders encounter other problems too. Service fees of cargoes rise from 1,110 to 1,350 MMK per bag of fertilizers while service fees of porters increase from 150 to 200 MMK per bag. Many farmers from villages come to buy fertilizers from Kawkareik town at a two-week interval at the same time, which causes shortage of stocks. Thailand put more restrictions on entry of cargoes and other vehicles from Myanmar and consequently, traders have to pay higher price to importers of fertilizers from Thailand.

#### **Direct Quote from One Fertilizer Trader**

*All villages do not allow outsiders to enter into their villages in April and May 2020. I can sell fertilizers worth 500,000 MMK per day normally but the sale value is just 200,000 MMK per day during this crisis period. Cargoes charge 1,110 MMK {per bag} in 2019 and 1,350 MMK {per bag} in 2020. Labour cost also increases to 200 MMK in 2020 from 150 MMK in 2019.*

Traders from Kawkareik also encounter some negative effects. KNU sets up a check point at Ywar Thit Kone village of Kawkareik Township to bar entry of outsiders into the Durian producing villages as part of control measures against the COVID-19 pandemic. As a result, farmers have to carry fruits from their farms to this check-point using a locally assembled truck. Traders have to fetch fruits from this check-point to their trading centres in Kawkareik. Transportation cost and labour cost rises almost double because fruits have to be transported in two steps. As a road is bad, a locally assembled truck does not have shock absorbers and loading and unloading have to be done two times, many fruits are damaged while being transported.

The number of cargoes commuting between Kawkareik and Yangon dwindles to 10 per cent of the normal time during April and May, and consequently, trading of Durian and other goods is reduced drastically. Traders responded to this situation by selling fruits to local consumers at the discount rate of 40 per cent and producing Durian jam. To get 1 viss of Durian jam, 10 to 12 pieces of fruits are needed. The sale price of Durian jam is 8,000 to 10,000 MMK while 10 pieces of fruits are worth 20,000 MMK. One viss of charcoal and small amount of eatable oil have to be used as well. Hence, producing Durian Jam leads to loss of 11,000 MMK per one viss.

The assessment discovers that negative impact of the COVID-19 pandemic on Durian traders in Yangon seems to vary from one trader to another. Some large wholesalers from Thiriminglar fruits and vegetable markets do not appear to face impact of the pandemic despite the presence of negative effects from restrictions by the government to respond to the pandemic. For instance, one wholesaler participating in the assessment does not encounter drop of purchase volume from retailers except one value-adding producer who reduces purchase. Neither does this trader face higher transportation cost and labour cost. Service fees for one truck from Ye town to Yangon during April and July remains the same as the normal period at 250,000 MMK. Emergence of more on-line trading of food as part of the coping mechanism of the pandemic seems to offset decline of order from value-adding processors.

#### **Direct Quote from Trader of Thirimingalar Wholesale Market**

*My business during March to August 2020 {during the COVID-19 pandemic period} is running as usual {before the pandemic period}. Income and profit of my business is the same as that of the normal period. However, I observe two changes during the pandemic. A curfew prohibiting people and vehicles from going out between 22:00 and 4:00 forces cargoes to change their schedules in April and May 2020. Truckers that usually drive during the night and enter the market early in the morning operate during the day time and enter the market before 22:00. Service fees of cargoes do not change during this period either. Buyers who purchase fruits and vegetable during 24:00 to 4:00 have to change their working time to after 4:00.*

*One regular customer of me who produces Durian pillow {cake with stuffed Durian cream inside} reduces the purchased volume. This customer sells the desert in the Yangon university campus, and closure of the schools and universities causes the drop in demand. On the other hand, I can sell more pieces of Durian to on-line retailers because more on-line shops open up and the new and existing operators can boost their sale volumes during this pandemic period.*

The wholesaler participating in the assessment forms a partnership with some trading centres from Myeik, Palaw, Ye, Taungoo and Kawkareik Townships. Advanced money of 15 million

MMK per one partner is issued before the harvesting season without charging any interest, and each partner returns advanced payment at the end of season. These partner trading centres dispatch fruits through light trucks. The wholesaler pays transportation cost and labour cost first and deducts these costs from sale income later. 10 per cent commission fees are charged to partner trading centres by this wholesaler. This wholesaler also establishes a partnership with retailers from various regions of Myanmar. Two payment systems are used, cash down payment and making a payment only after selling fruits by the partner retailers.

It is apparent that these wholesalers manage the most strategic part of Durian value chains. When supply of fruits from one production area falls down, they can continue to run their businesses with supply from other areas. As they charge 10 per cent commission fees, rise and fall of price of fruits do not trigger impact on their income. Furthermore, decline of demand from one type of buyer can be offset with rising demand from another type of buyer. This unique strategic position enables them to hold more economic power than other value chain actors, which in turn, help them avoid facing marked impact during the period with severe shock such as the COVID-19 pandemic,

In comparison, one trading company that buys and sells fresh Durian from Thandaunggyi farmers face significant loss from his business. This company sells Durian to some of the largest supermarkets of Myanmar such as City Mart and Capital. Partner farmers supply immature fruits as discussed in impact on farmer section, which leads to rejection of the vast majority of fruits by partner supermarkets. The company makes a decision to stop supplying Durian to two supermarkets after May 2020 because the company cannot ensure that fruit supply will meet the quality standard and continued supply will diminish its reputation.

During April and May, service fees of cargoes that carry goods from Thandaunggyi to Yangon climbs up to 150 MMK per kilogram from 75 MMK per kilogram in the normal period. Similarly, labour wage goes up between 6,000 and 8,000 MMK per person per day from 5,000 MMK per person per day during the normal period. It implies that operations cost of trading soars. This trading company loses transportation cost, labour cost and half of investment made for purchase of fresh fruits from farmers, which accounts for the total loss of 4 million MMK. Besides, although this company initiates a dialogue with the Chinese embassy in Yangon to explore potential export of Durian to China in the early part of 2020, this initiative has to be abandoned due to the pandemic.

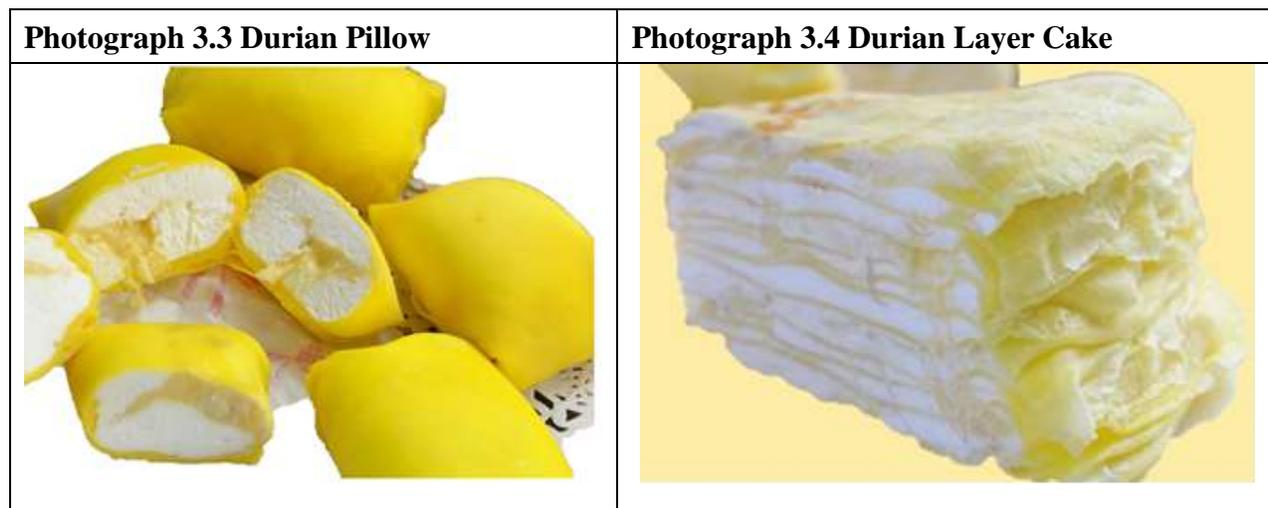
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### **3.5 Impact of COVID-19 on Value Adding Processors**

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Durian value-adding producers are not spared from negative effects of the pandemic. One producer of Durian pillow from Yangon, which is a cake with Durian cream inside, faces marked fall in sale volume due to closure of snack shops and falling consumption of consumers. On the other hand, this producer faces rise in production cost. First, cargoes enter into Thirimingalar wholesale market at the same time after 4:00, which causes a traffic jam. This in turn raises taxi fare to buy fresh fruits from the market by 2,000 MMK per trip. Second, labour charges to carry fruits in this market rise from 500 to 2,000 MMK. Third, there is a shortage of raw materials such as cream and refined sugar in the domestic market, which raises the price in March and April 2020 by 200 MMK. This price continues to remain the same during May and August 2020

although the supply chain returns to normal. This producer has to sell one piece of Durian pillow at the same price of 600 MMK despite higher cost of production, which diminishes profit.



Although this producer intends to expand this business before the pandemic, he abandons this plan due to the pandemic and the presence of low quality of fresh Durian supply, which is caused by plucking and selling of unripe fruits. This processor owes 500,000 MMK loan to one wholesaler from Yangon from whom fresh fruits are bought. Similarly, another Durian pillow producer from Kawkareik faces shrinking sale volume and revenue. But the cost of production for this producer does not increase.

### **3.6 Impact on Revenue and Family Economy of Farmers and Town Level Traders**

Some farmers and village-based traders from Leik Tho Sub-Township of Thandaunggyi Township adopt a coping mechanism to overcome this shock through carrying fruits to and selling them in Taungoo, Loikaw, Mandalay and Muse towns in May and June 2020. These farmers and traders have to shoulder transportation cost and labour cost in doing so. The cost of harvesting is 100 to 200 MMK per piece of fruit, transportation of the fruits from orchards to their village ranges from 50 to 100 MMK while transportation of one piece of the fruit from their villages to Taungoo is between 100 to 150 MMK. The total cost of harvesting and marketing ranges from 250 to 400 MMK per piece.

By contrast, the purchasing price of one piece of Durian by Taungoo trading centres in May, June and July are 500 for a small size one, 1,000 for a medium size one and 1,500 for a large size one. This gives rise to the Gross Margin of 100 to 250 for one piece of a small one, 600 to 750 for one piece of a medium one and 1,100 to 1,250 for one piece of a large one. The decline of price, higher cost of marketing and plummeting production cost collectively slash revenue from Durian by nearly two thirds. Similar decline from other major crops that are harvested in the same period such as Lychees and Mangosteen contributes to decline of the household income by as much as two thirds of the previous year.

**Table 3.5 Comparison of Revenue from Durian and Lychee of One Farmer from Thandaunggyi Township**

Number of Fruits	Price	Total Income	Cost of Harvest and Marketing	Gross Margin
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<b>Durian</b>					
2018-2019 season	500	2,500	1,250,000	125,000	1,125,000
2019-2020 season	300	1,500	450,000	75,000	375,000
Gross Margin of 2019-2020 as per cent of 2018-2019					33.3 per cent
<b>Lychee</b>					
2018-2019 season			500,000		
2019-2020 season			175,000		
Income of 2019-2020 as per cent of 2018-2019				35.0 per cent	

Majority of farmers from Kawkareik also experience decline of revenue, which results in lower profit. Low production volume as a result of hot weather and falling price as a consequence of the COVID-19 pandemic collectively contribute to decline of income. One of the major means of household income of many Durian farmers and other villagers of Kawkareik Township is remittance sent back by their family members who are working in Thailand. The COVID-19 pandemic causes shutdown of many factories and businesses in Thailand, which results in loss of jobs of Myanmar migrant workers. Loss of income from family members who are migrant workers leads to decreased household income with resultant economic hardship. Consequences of plummeting household income are discussed in section 3.7.

**Table 3.6 Comparison of Revenue from Durian of Four Farmer from Kawkareik Township**

		<b>2019-2020</b>		<b>2018-2019</b>	
		<b>Categories</b>	<b>Amount in MMK</b>	<b>Categories</b>	<b>Amount in MMK</b>
Farmer One	Income		300,000	Income	350,000
	Investment				
	Weed control		27,000	Weed control	30,000
	<b>Profit</b>		<b>270,000</b>	<b>Profit</b>	<b>320,000</b>
Farmer Two	Income		2,200,000	Income	2,500,000
	Investment		204,500	Investment	608,000
	Weed control by manual method		150,000	Weed control by machine	150,000
	Fertilizer		54,500	Potassium Fertilizer	33,000
				Phosphorus Fertilizer	25,000
				Cost for collection and transportation of fruits	400,000
	<b>Profit</b>		<b>1,995,500</b>	<b>Profit</b>	<b>1,892,000</b>
Farmer Three	Income		300,000	Income	400,000
	Investment		174,000	Investment	128,000
	Weed control by manual method		128,000		
	Organic fertilizer (2 bags of bat dung x 23,000 MMK per bag)		46,000		
	<b>Profit</b>		<b>126,000</b>	<b>Profit</b>	<b>272,000</b>

Farmer Four	Income	2,600,000	Income	3,200,000
	Investment	1,196,000	Investment	1,166,000
	Weed Control	500,000	Weed Control	500,000
	Gasoline cost for irrigation (10 gallons x 3,000 MMK per gallon)	30,000	Gasoline cost for irrigation (10 gallons x 3000 MMK)	30,000
	Pipe cost for irrigation	250,000	Pipe cost for irrigation	250,000
	Cost for chemical insecticide	86,000	Cost for chemical insecticide	86,000
	10 bags of salt to correct soil PH (10viss per bag)	50,000		
	Labour cost for spraying chemical insecticide for 3 infected trees	30,000		
	Transportation Cost	250,000	Transportation cost	300,000
	<b>Profit</b>	<b>1,404,000</b>	<b>Profit</b>	<b>2,034,000</b>

Profit of Durian traders from Kawkareik Township is reportedly declined due to the COVID-19 control measures and the pandemic along with fall in Durian production volume. For instance, the profit of the largest trading centre in 2017-2018 is 20 million MMK, in 2018-2019 is 15 million MMK and in 2019-2020 is 3 million MMK. Similarly, profit of Durian retailers from Kawkareik Township dwindles due to the pandemic. Reduction of purchase from buyers leads to massive stock-piling of fruits in their hands, and fruits become rotten after few days.

#### Direct Quote from One Retailer of Kawkareik

*I can sell fewer fruits this year. However, I cannot stop buying fruits from farmers. There is a large volume of fruits in my hands that become sour after a while. The sale revenue is 200,000 to 500,000 MMK per day in 2017, 2018 and 2019 but only 30,000 to 100,000 MMK per day in 2020.*

#### Direct Quote from Another Retailer of Kawkareik

*During 2017 and 2019, I invested 1.5 million and got 2.3 million incomes. This year, I lose 900,000 at the end of Durian season. My sale income is 100,000 MMK per day in 2017, 2018 and 2019 but only 20,000 to 80,000 MMK per day in 2020.*

**Table 3.7 Comparison of Revenue of Durian Retailers and Wholesaler from Koe Taing village of Kawkareik Township**

Trader	2019-2020			2018-2019		
	Income	Expense	Gross Margin	Income	Expense	Gross Margin
Retailer One	1,500,000	1,500,000	0	4,000,000	2,000,000	2,000,000
Retailer Two	1,500,000	2,400,000	Minus 900,000	2,300,000	1,500,000	800,000
Wholesaler One	5,000,000	13,000,000	Minus 8,000,000	15,000,000	10,000,000	5,000,000

Profit of Durian traders from Taungoo town, which is the trading hub of Durian from Thandaunggyi Township, reportedly declines due to the COVID-19 control measures and the pandemic.

#### Direct Quote from One Trader of Taungoo

*I have to use unsold fruits to produce Durian Jam. The profit from selling fruits to Yangon this year {2020} is low, and I even lose for some batches. The investment per one shipment is 2.2 million and I get 2.3 million incomes for some shipments but 1.8 million for the other shipments.*

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### **3.7 Adoption of Coping Strategies to Minimize Impact**

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#### **3.7.1 Farmers**

This assessment ascertains the following coping strategies adopted by farmers.

(1). Investigation of consequences on household food security, health, education and availability of resources for the investment of their fruit orchards during 2021-2023 reveals that these farmers have mitigation measures and household resilience that prevent them from facing severe consequences. First, many farmers from Leik Tho Sub-Township of Thandaunggyi Township resort to working as daily wagers and selling banana from their orchards to compensate for reduction of household income from Durian.

Second, farmers grow vegetable and raise chicken and pigs for their own consumption and sale in the situation where they face shortfall of household income to meet household expenses. This measure helps them to meet household food needs in this crisis. In addition, they possess wooden house, motorcycle, orchard and some household assets, which make them resilient to withstand the impact.

Income from working as daily wagers and selling banana, vegetable, chicken and pigs help these farmers to cope with the falling household revenues. As such, they do not have to take their children out from schools and reduce amount of food consumption,

Farmers from Kawkareik are relatively more affluent than farmers from Thandaunggyi. First, they possess concrete house, motorcycle, orchard and some household assets. As some of their family members have been working in Thailand as migrant workers for many years, they are able to amass saving over this period. This long term accumulation of wealth makes them resilient to this setback. Second, they grow pineapple and Mangosteen in addition to Durian, which help them earn income. They also grow vegetable for own consumption,

Income from selling pineapple, Mangosteen and consumption of own vegetable helps these farmers to cope with the falling household revenues from Durian. Consequently, they can support their children to continue schooling and do not have to reduce amount of food consumption,

Besides, Durian trees are planted many years ago in both townships and the recurrent investment per year consisting of labour cost for harvesting fruits is meagre. Therefore, farmers from two townships do not have problems in maintaining their Durian orchards in the coming years. Farmers who plant new seedlings use own seeds with no cost and they do not have to reduce number of new seedlings in the following years.

(2). Farmers from Kawkareik and Thandaunggyi Townships do not borrow loan because interest rate charged by private loan sharks from their own villages is staggering 60 to 120 per cent per year and loan sharks only lend money to villagers whom they have good relationship and trust.

They also reduce household expenditure and sell vegetable grown in Durian orchards to deal with decrease in income.

(3). Farmers do not have to reduce the number of farm workers because they use family members for Durian orchards.

(4). Farmers cannot reduce the salary of workers. Rather, the daily wage of farm workers rises to 7,000 MMK per day in August 2020 from 5,000 MMK per day in August 2019.

(5). Farmers do not cut down operations cost, and it is difficult for farmers to cut down the cost of production due to rising cost of inputs.

(6). Majority of farmers does not know how to search new markets for fruits and some farmers from Kawkareik does not perceive that they have to look for new markets because regular traders continue to purchase fruits from them.

(7). Farmers do not change the type of business.

(8). Farmers do not sell orchards.

### **3.7.2 Traders**

The following coping strategies of traders are uncovered.

(1). Traders from Kawkareik do not borrow loan for Durian trading and use own investment for Durian trading. Decline of household income has two implications for retailers from Kawkareik. First, some retailers take 1 to 3 million MMK loan from one Micro Finance Institute (MFI) with an interest rate of 24 per cent per year and 900,000 to 5 million MMK with an interest rate of 60 to 96 per cent per year from relatives and friends. Second, some retailers have to cut down household expenses. For instance, one retailer can no longer support her son who is attending the 10<sup>th</sup> grade to enrol in a boarding tuition, which costs 2.5 million MMK per year. Rather this retailer sends her son to an ordinary tuition with lower cost.

#### **Direct Quote from One Retailer of Kawkareik**

*My business is not running well this year, and I have to borrow 3 million from Vision Fund at an interest rate of 2 per cent per month and 5 million from my relatives at an interest rate of 5 per cent per month. I invest the loan to set up a home grocery.*

(2). One trader from Kawkareik town reduces the number of workers because the trading volume declines and has concern on getting COVID infection. One trader from Ko Taing village reduces the number of workers but does not reduce the salary of workers. One retailer does not have to reduce the number of workers because this retailer uses family members to run the business whereas another retailer reduces the number of workers but not reduce the salary of the remaining workers.

(3). Retailers from Kawkareik produce Durian jam from fruits that cannot be sold. They lose significant amount of money from this process.

(4). Traders and farmers change ways of transporting fruits when a ban is imposed on entry of outsiders into Durian producing villages. They use telephone instead of meeting each other physically to discuss and reach a trade deal. Farmers send fruits to the checkpoint where traders pick up fruits and leave cash. Some fruits are damaged because these are carried by motorcycles and locally assembled trucks.

(5). Traders cannot cut down operations cost.

(6). Traders and retailers do not know how to search new markets for fruits and do not look for new markets. Exceptionally, one trader from Taungoo town starts to think about finding a new market when the recurrence of outbreak in late August 2020 causes disruption of transportation of goods to Yangon.

(7). Traders and retailers do not change the type of business. Some retailers trade other fruits and vegetable produced from their villages or set up a home grocery to offset the fall of revenue from Durian.

(8). One Durian trading company also trades mangoes, which is profitable during the pandemic period. More efforts are exerted to increase sale volume through export and on-line marketing avenues. Profit from mango trading offsets loss from Durian trading. As a result, this company does not have to reduce the number of workers, operations days and hours and salary of workers. Cargoes have to drive during the day time due to the curfew, which contributes to arrival of fruits in the evening as opposed to normal arrival in the morning. This does not cause any problem to the business.

(9). The wholesaler from Thirimingalar wholesale market of Yangon does not have to implement the following coping strategies because he does not face any serious impact: (a). does not reduce the number of farm workers; (b). does not reduce the salary of workers; (c). does not reduce the operations of his business; (d). does not cut down operations cost; (e). does not search new markets for fruits; (f). does not change the type of business; and (g). does not diversify business.

### **3.7.3 Initiatives of Township Cooperative Department**

TCD does not have any plan for relief and recovery of the COVID-19 pandemic. This department is implementing the following initiatives.

First, it has a plan to help interested farmers to form a cooperative for seed production. Second, this department will implement an initiative to provide a 100,000 MMK worth coupon to each member of the existing cooperative group or returning migrants from Thailand for purchase of inputs. Whether this coupon will be a loan or grant is not determined yet. Third, agriculture loan is provided to rubber farmers but not provided to Durian farmers. If Durian farmers have an interest in setting up cooperative groups, TCD can present the idea to their head office.

Fourth, loan from Exim Bank of China is used to set up cooperative groups since January 2014. A group of 5 members is formed to give a guarantee that all members will take the responsibility to repay loan if one member fails to return loan. The minimum and maximum amount of loan is set at 100,000 and 500,000 MMK per one term of 6 months. An interest rate of 2 per cent per month is collected from which 0.25 per cent is set aside as a revolving fund for the group. Each

member is required to save 10 per cent of loan per time until a member can save 50 per cent of the loan. Saving is re-utilized as loan for members with an interest rate of 2 per cent, of which 1.25 per cent is given to each member, 0.25 per cent is set aside for a revolving fund and 0.25 per cent for operations cost. The interest rate is reduced to 1.5 per cent per month for 3 months during the pandemic period.

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### **3.8 Future Plan and Support Needed to Recover from Negative Impact**

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#### **3.8.1 Farmers**

Health care workers from Rural Health Centres (RHC) have been carrying out health education regarding COVID-19 and erecting posters to beam prevention messages. Citizens are urged to wear facial masks, and body temperature is measured at check points. Majority of villagers have awareness on transmission and prevention measures of the virus. Hence, many farmers perceive that additional actions on educating citizens regarding COVID-19 are not needed. Testing of the virus among villagers is not carried out yet, and many farmers think that health screening and testing of COVID-19 for suspected cases are needed. Farmers from Naung Ta Lar village of Kawkareik Township want testing of the virus because they want to distinguish seasonal flu from the COVID-19 during the seasonal flu season.

Majority of farmers do not have access to loan with affordable interest rate, and private loan shark is the only source with 60 to 120 per cent per year interest rate. As farmers encounter decline of income and profit from Durian and other fruits this season, they are in need of loan with affordable interest rate to maintain operations of their Durian orchards. An affordable interest rate is between 1.5 and 2.0 per cent per month while the duration of loan is suggested at the minimum of one year. Some farmers have the land title number seven that can be used as collateral for loan. They want technical support for preparation of a loan application and capacity building regarding how to manage loan and investment, income and profit of business. Farmers from Naung Ta Lar village of Kawkareik Township do not need loan or grant, and they will use own resources for their fruit orchards.

Farmers express their desire to get support to strengthen the Durian sector. First, there is a need to link between markets with stable price and farmers. Lack of access to such markets is one of the most important factors that contributes to loss or low profitability of fruits. The price of Durian in Yangon Thirimingalar wholesale market is about 2 times higher than that of trading centres from Taungoo town during May and July 2020. If farmers from Thandaunggyi had access to Yangon market, their revenue and profit would not have been decreased.

Second, farmers believe that obtaining technical knowhow and other assistance for production of value added products is crucial for strengthening their livelihood in a long run. When farmers are further elucidated if only one support will be provided, which support is the most needed, they pick up support for value addition. Third, farmers perceive that policy, strategies and action plans should be drawn for the Durian sector development. Finally, there is no cluster or association of Durian farmers and value chain actors, and farmers want to set up a producer group and think that collective actions can upgrade the sector.

Farmers think that the existing restriction measures against COVID-19 no longer have negative implication on their livelihood, and thus, further easing of restrictions is not necessary. They are

not paying income tax and commercial tax at the time of assessment, and reduction or waiver of tax is not needed. Similarly, the supply chain management system returns to the normal situation at the time of assessment, and no further action is needed. Farmers from Naung Ta Lar village of Kawkareik Township do not want the government to lift the existing restrictions because they have concern that lifting of the restrictions will enhance spread of the virus.

One value adding processor perceives that the majority of people who work and come to Thirimoingalr wholesale market in Yangon does not wear a facial mask. As many residents of Yangon and people from other parts of Myanmar come to this market, spread of the virus to many people from many parts of the country can be happened in this market. This behaviour change should be enforced. Workers should also be tested for the presence of the virus.

This assessment discovers the following future plans of farmers.

- (1). They will continue to operate Durian orchards as the recurrent investment per year is miniscule, which is mainly labour cost for harvesting of fruits.
- (2). They will continue to grow the indigenous varieties, and do not want to grow varieties from Thailand because these varieties cannot withstand weather and pests and diseases.

### **3.8.2 Traders**

Three retailers from Kawkareik Township plan to expand their businesses in 2021 to compensate for loss incurred during the pandemic period. One retailer intends to expand the business through investing 2 million MMK in 2021 and 4 million in 2020. This retailer will seek a loan worth 1.5 million MMK from one MFI, Vision Fund. Another retailer plans to expand the business through seeking 20 million MMK loan while the other retailer will seek 5 million MMK. The interest of loan should be 2 per cent per month, the duration should be at least one year and collateral should not be required. Technical assistance for application of loan is needed. Health education and testing of the virus are not needed because no one is infected and the health department is implementing health education. Travel restrictions should be lifted to facilitate visits of domestic tourists, which will enable retailers to sell fruits. Some retailers perceive that they do not need a new market because they will continue to sell fruits to regular customers whereas some think that support is needed to link with new markets such as Hpa-an, Thahton and Yangon. Retailers do not have to pay income tax, and do not need waiver/reduction of tax. They do not need grant support either.

The largest trader from Kawkareik Township intends to maintain Durian trading at the same volume of 2020. This trader will plant EFY in lieu of the dying Durian trees because EFY can give rapid return of the investment and withstand weather, pests and diseases and mobilize Durian farmers to follow his suit.

Two traders from Taungoo also indicate that they are in need of getting loans. One trader invests 40 million MMK in 2020 and will raise investment to 50 million in 2021. This trader needs 10 million loan with an interest rate of 1 per cent per month and the duration of 1 year. This trader has established links with markets, and support for linking new markets is not needed. Technical assistance for application of loan is needed. Conditions of roads should be improved and service fees collected for using roads should be slashed. Technical support regarding appropriate

cultivation practices should be given to farmers in order to improve the quality of fresh Durian, and efforts should be made to stabilize the price, which will strengthen the Durian sector.

One fertilizer trader from Kawkareik Township wants loan with an interest rate of 2 per cent per month and the duration of 1 year. Input traders perceive that farmers should be taught how to apply fertilizers and insecticides. Acquisition of proper knowledge and skills by farmers will also enhance sale of fertilizers.

TCD of Kawkareik Township thinks that testing of government staff members, workers and travellers to find out the virus is needed. More intensive behaviour change communication should be implemented because majority of citizen do not put on facial masks even when masks are given to them free of charge. More stringent restrictions should be imposed to curb unnecessary travelling from one village to another and from one township to another. Income tax should be reduced because citizens are facing dwindling income. Farmers should be provided with quality seeds and taught appropriate cultivation practices. Migrants who come back from Thailand should be encouraged and supported to work in their native villages and towns. Returning migrants should be mobilized and trained to become farm workers to minimize the shortfall of farm labourers. New export markets should be ascertained for agriculture produce.

The wholesaler from Thirimingalar wholesale market of Yangon participating in the assessment does not need and want either grant or loan. This trader will use own resources to continue to run his business as he did before the pandemic. Assistance to link with the domestic market is neither needed.

The Durian trading company from Yangon intends to continue to trade Durian, black cardamom and other types of fruits from Thandaunggyi Township in the next 3 years as it is committed to development of farmers and community members of this township. Black cardamom will be exported to India. Besides, a value-added processing plant comprising two dryers and one solar dryer is being set up in Thandaunggyi in order to produce Durian jam, Durian dry chips and dried tomato, lychees and pine apples. Moreover, a trading centre will be set up to source various types of fruits. An advance payment will be given before the harvesting season to ensure that adequate supply can be obtained. In addition, technical support will be rendered to farmer to adopt appropriate cultivation practices. A marketing system will be set up to sell Durian value added products that are anticipated to be available in December 2020 and January 2021 in the domestic market in 2021. These products will be exported to China in the following years.

This company sets the sale target of 20,000 pieces of Thandaunggyi Durian per month that will be supplied to City Mart and Capital in 2021. It will continue to use own resource for domestic trading and seek loan from banks for export. An application for the COVID-19 loan from the Myanmar government is submitted to seek 50 million MMK. An interest rate of loan should be 1 per cent per month and the duration should be 2 years. This company gets a waiver for income tax for 7 years. A curfew creates a lot of problems for traders and should be cancelled.

A comprehensive policy and strategy for Durian sector development should be formulated. Valid and reliable data should be collected from farmers and other value chain players to feed proper analysis for the sector development plan. Price should also be set for various grades of fruits at farmer, trader and consumer levels, and close supervision should be carried out to ensure that

stakeholders adhere to the standard price. Various fees collected for use of roads should be examined and controlled in order to reduce unnecessary cost of production. It perceives that the government should ban import of Durian from Thailand during the Durian harvest period of domestic Durian. Durian value chain actors also need assistance for cold storage and Harmonized System (HS) coding in order to export fruits to Chinese markets.

### **3.8.3 Value Adding Processors**

The processor from Yangon plans to continue to run Durian pillow business in 2021. However, this producer has concerns that quality of fresh Durian supply may continue to be low as it happens in 2020. If this happens and consumption of consumers will be low, this business may be discontinued.

This producer uses own resources to operate the business and will seek loan from relatives without any interest to buy a mixer machine which is worth 1.8 million MMK. He does not want to borrow money from others because he has worry that he may not be able to return loan.

A plan for the Durian sector development is needed, and farmers should be trained in appropriate cultivation practices, which will enable value added producers to obtain quality fresh fruits.

Another Durian pillow producer from Kawkareik intends to expand the business in 2021. This producer wants to seek a loan of 3 million MMK at an interest rate of 1 per cent per month. However, if the loan will require submission of a business plan and collateral, this producer will not seek loan. He does not have a plan to change the business. Testing of the virus among workers who have close contacts with other people, support to link with stable markets and reduction of income tax are needed. Provision of health education and lifting of the existing restrictions are not needed.

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## **CHAPTER FOUR; CONCLUSION AND WAYS FORWARD**

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Five factors are assessed as having implications on farm business of Durian farmers in Kawkareik and Thandaunggyi Townships. First, a sanction on entry of outsiders into Durian producing villages prevents traders from buying fruits in April and May. Second, anxiety to get the virus discourages traders to travel to Durian producing villages to purchase fruits. Third, Myanmar tourists visit Thailand via Kawkareik and Myawaddy Asian Highway in the previous years, and they buy Durian from Kawkareik on the way back to their home. During March and May 2020, restriction on travel and halting of highway passenger buses prevents domestic tourists from visiting Thailand. Fourth, a famous religious festival is held during March, in which farmers sell fruits. A ban on the gathering of people leads to cancellation of this festival. Finally, order of Durian from Kawkareik by the regular buyers from Kyaikkaw area drops by half. These circumstances lead to fall in the price of fruits and in the sale volume during the trading season, which contributes to fall in revenue of farmers.

The pandemic causes considerable degree of impact to other value chain actors of Durian across Kawkareik, Thandaunggyi, Taungoo and Yangon as well. First, sale volume of fertilizer of fertilizer traders from Kawkareik Township decline noticeably and decline of revenue as much as 60 per cent during April and July 2020. Second, traders from Kawkareik lose from their businesses because restrictions imposed by KNU raises transportation costs and damage to fruits.

Furthermore, dwindling number of cargoes commuting between Kawkaeik and Yangon leads to drastic reduction of trade of Durian and other goods. Traders respond to this situation by selling fruits to local consumers at the discount rate of 40 per cent and producing Durian Jam. Production of Durian jam causes loss of 11,000 to 40,227 MMK per every viss of jam. Third, a large trading company from Yangon loses 4 million MMK from trading of Durian. Fourth, Durian value-adding producers are not spared from negative effects of the pandemic. One producer of Durian pillow from Yangon faces marked fall in sale volume due to closure of snack shops and falling consumption of consumers. On the other hand, this producer faces rise in production cost.

On the other hand, other long term challenges that are not directly related to the pandemic play crucial roles in constraining the development of Durian sector. First, pests and diseases appear to pose imminent threat on the sector development because many existing Durian plants die during the previous few years. Second, equally important but beyond the control is climate change factor. Less rainfall, irregular timing of rain and higher temperature collectively create an unfavourable climate for Durian in Kawkaeik and Thandaunggyi with resultant dying of trees and falling down of yield. Third, majority of farmers do not adopt appropriate cultivation practices, particularly lack of irrigation and canopy management, which undermine yield and quality of fruits.

Furthermore, there is the absence of comprehensive policy, strategy and plan for the Durian sector development. This assessment identifies that there is no quality assurance mechanism, quality standard and standard price for fruits across value chain actors, which often result in supply of low quality fruits. This situation also contributes to loss of businesses of many value chain players. Although consumers have to pay high price, they often cannot get quality fruits. These long term challenges warrant a comprehensive intervention alongside the short term measures to tackle the impact of the COVID-19 pandemic.

In light of the study findings, the following recommendations are made.

Interventions	Stakeholders
<b>Short-Term and Urgent Intervention (Timeline: October 2020 to September 2021)</b>	
(1). Value chain actors should be mobilized to establish Durian clusters or associations in Kawkaeik and Thantaunggyi and technical support and managerial backstopping should be rendered to these clusters to strengthen their institutional capacity. This intervention should be given the first priority and undertaken urgently because these associations should lead other short, medium and long term interventions.	Ministry of Agriculture, Livestock and Irrigation (MOALI), MFVP and IFAD
(2). A comprehensive disaster preparedness plan of the Durian sector consisting of strategy and plan should be developed with meaningful involvement of farmers, output traders, input traders and value adding processors. Relevant Non Governmental Organizations (NGO), donors and government departments such as Department of Agriculture (DOA), Department of Rural Development (DRD) and Department of Cooperative (DOC) should also be involved. This plan will steer stakeholders to implement other short term intervention measures, which collectively will help value chain players to mitigate the impact in the harvesting and trading season of 2021.	MOALI, Ministry of Trade and Commerce (MOTC), Myanmar Fruit, Flower and Vegetable Producer and Exporter Association (MFVP), Durian Associations of Kawkaeik and Thantaunggyi and IFAD
(3). Travel restriction and barriers for transportation of Durian from Kawkaeik	MOALI, MOTC, Ministry of

and Thantaunggyi to Yangon and other major destinations should be lifted temporarily during the harvesting and trading period from April 2021 to September 2021. The government should ensure that supply chain system will operate optimally during this season to facilitate the trade as normally as possible. People involved in this process should be enforced to adhere to rules such as putting on masks and social distancing to prevent spread of the virus.	Health and Sports (MOHS), Ministry of Home Affairs (MHA), central and state/regional COVID-19 control committees and IFAD
(4). Loans with affordable interest rates of 1 per cent per month and duration of at least 1 year should be made available to farmers, traders and other value chain actors immediately. Technical support regarding how to apply for and manage loans and their businesses should be provided by the mentioned parties.	Myanmar Agriculture Development Bank (MADB), MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, institutions with interest in contract farming and IFAD
(5). Direct sale of fruits by farmers to consumers in places with high demand such as Yangon and Mandalay should be arranged. MFVP can help farmers to sell fruits to consumers directly through mobile market and online marketing.	MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(6). Market diversification and linkages with markets that offer a stable price should be done for farmers and local traders. A comprehensive market promotion and penetration plan and strategies should be developed to this end.	MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(7). The existing value adding processors from Kawkareik and Thantaunggyi should be provided with technical, managerial and financial support to upgrade the quality of products, expand their production and sale and diversify their markets. Farmers should also be equipped with capacity and resources to produce more profitable value added products. This intervention will mitigate loss from unsold fruits if supply chain system is disrupted in the forthcoming season.	Small and Medium Enterprise (SME) departments of Ministry of Planning and Finance (MOPF), MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
<b>Medium-Term and Long-Term Intervention (Timeline: October 2021 to September 2025)</b>	
(1). A comprehensive package of the Durian sector development consisting of policy, strategy and plan should be developed with meaningful involvement of farmers, output traders, input traders and value adding processors. Relevant Non Governmental Organizations (NGO), donors and government departments such as Department of Agriculture (DOA), Department of Rural Development (DRD) and Department of Cooperative (DOC) should also be involved.	MOALI, MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(2). The standard price, the quality standard and the quality assurance system should be established, and enforcement should be done to adhere to these standards. This action will ensure that consumers will get the quality fruits at a reasonable price and farmers and other value chain players will derive stable Gross Margin.	MOALI, MOTC, MFVP, Durian Associations of Kawkareik and Thantaunggyi and IFAD
(3). Comprehensive capacity building for various value chain actors should be planned, implemented and monitored and evaluated. The following issues should be covered for farmers: (a). how to set up a nursery; (b). how to produce and apply organic fertilizers; (c). how to control pests and diseases; (d). how to set up an irrigation system; (e). how to produce quality seedling and how to do proper grafting using quality variety; (f). how to do canopy management; and (g). how to develop and implement a business plan for farms. Traders and value adding processors should be trained on how to draw and implement a business plan.	MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, IFAD, experts from Thailand, farmers and other value chain actors
(4). More rigorous research should be undertaken for the following areas: (a). types and doses of fertilizers and their effects on the growth of Durian trees; (b). types, magnitude of destruction and ways of controlling the most prevalent pests and diseases; (c). yield, investment, income and profit of the standard size farms;	MOALI, Department of Agriculture Research (DAR), MFVP, Durian Associations of Kawkareik and

and (d). irrigation system and canopy management.	Thantaunggyi, farmers and IFAD
(5). Access to loans with affordable interest rates should be rendered for the long term development of the sector. To this end, farmers should be supported to obtain the land title number seven and seek loan from the Myanmar Agriculture Development Bank (MADB), TCD and Mya Sein Yaung project of the DRD. The prospective Durian cluster or association should develop and implement a comprehensive resource mobilization plan to make use of potential resources. Farmers should also be coached to manage investment, income and loan effectively. Other value chain actors should be supported to get access to loans from the Small and Medium Enterprise (SME) and commercial banks with no requirement for use of immovable property as collateral.	Myanmar Agriculture Development Bank (MADB), MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, institutions with interest in contract farming and IFAD
(6). Farmers should be encouraged and supported to set up specific farms for production of propagation materials. This measure will help farmers not only to get access to quality materials but also to reduce cost of production. Indigenous Durian varieties that produce quality fruits should be identified, and propagation materials from these varieties should be produced and distributed to farmers. This measure will help the farmers to produce quality fruits at the economic scale in the future.	MOALI, MFVP, Durian Associations of Kawkareik and Thantaunggyi, farmers and IFAD

## CHAPTER FIVE; BIBLIOGRAPHY

<https://www.durianharvests.com/production/>

## CHAPTER SIX; ANNEX

### Annex 1. Normal Value Chain of Durian Products

#### 6.1 Durian Varieties of Myanmar

Durian produced from Thandaunggyi and Kawkareik Townships, as other varieties from Myeik and Palaw Townships of Tanintharyi Region and Ye Township of Mon State in Myanmar, are traded and consumed domestically. Harvesting and trading season of Durian is from March to October, which is about 8 months. Durian producing areas located closer to the equator or the southern parts of the country harvest mature Durian earlier than the areas further away from the equator. For examples, Myeik and Palaw Townships in Tanintharyi Region starts harvesting in March, Ye Township in Mon State and Kawkareik in Kayin State begin their harvest in April and Thandaunggyi Township in Kayin State begins its harvest in May. Each of major Durian producing location supplies ripe Durian for 4 to 6 months. It implies that varieties from each of the major production areas have its own market share due to seasonal availability.

#### 6.2 Characteristics of Durian Orchards

##### Thandaunggyi Township

Farmers report that three Durian varieties from Thandaunggyi Township are well known. Michaunggaung, Shwedingar and Ngwedingar have more or less the same taste. The best seller is Michaunggaung variety which has the following characteristics: (a). yellow colour flesh; (b). thick pulp; (c). elongated shape; (d). long spikes; and (e). one piece has the weight of at least 1.5 kilogram. The price of one piece is 7,000 to 8,000 MMK in Yangon and Mandalay markets and 10,000 in Muse market, a Chinese border trade centre.

Almost all farmers grow indigenous varieties for many generations, and some old trees have more than 100 years of age. Many farms also have younger plants with age ranging from 2 to 5 years. The indigenous varieties can start bearing fruits at the age of 9 years with 10 fruits per tree in the first year of production. The number of fruits per tree increases with the age. One tree of 70 to 80 years age can bear 500 to 800 fruits per season. One tree has the maximum height of 80 to 100 feet and the circumference of 7 to 8 feet, Indigenous trees can withstand pests and diseases.

Flower of indigenous variety begin to appear in January and continues to blossom until May. Flower turns into fruitlets in about one month, and mature fruits can be harvested about 5 months from the time of flowering. Mature fruits are available from May to September. Some trees produce two rounds of fruits in some season.

Some farmers began to grow seedlings originated from Thailand in 2008. This variety can give rise fruits at the age of 6 year. The height is 12 to 13 feet and the circumference is about 1 feet. This variety is highly vulnerable to pests and diseases, which contributes to a low survival rate. For instance, one farmer who grows 100 seedlings witnesses survival of only 10 trees.

### **Kawkareik Township**

Farmers from Kawkareik Township reportedly plant three Durian varieties such as Michaunggaung, Su Pyan and Su Seik. Michaunggaung variety is characterized by: (a). having long and big size spike; (b). thick pulp; (c). sweet; (d). elongated shape; and (e). one big piece has the weight of at least 3 kilograms. Su Pyan variety is characterized by: (a). having inner spikes; (b). big seed; (c). yellow colour flesh; (d). sweet and bitter; (e). rounded shape; and (f). one big piece has the weight of at least 2.5 kilograms. Su Seik variety is characterized by: (a). having dense spikes; (b). big seed; and (c). one big piece has the weight of at least 0.8 to 1.6 kilograms. The taste is so good that consumers who eat the fruit once like to eat again.

Almost all farmers grow indigenous varieties while few start to grow Durian varieties imported from Thailand as a trial. Majority of orchards have been set up for many years ranging from 40 to 100 years, and many of the existing Durian trees are believed to have the age between 40 to 100 years. Many farms also have younger plants with age ranging from 1 to 5 years and plant new seedlings every year in order to replace older, unproductive trees. The size of Durian orchards where majority of farmer plant Durian alongside Mangosteen, betel nut, pineapple and jengkol trees ranges from 1 to 5 acres or 0.40 to 2.02 hectares. One orchard has plants with varying age, total number of Durian trees ranges between 24 and 100 and number of trees with the same age is few from 2 to 40. Some trees already bear fruits whereas some do not. The indigenous varieties can start bearing fruits at the age of 10 years with 10 fruits per tree in the first year of production. Generally, the number of fruits per tree increases with the age. But some trees do not bear fruits although the age of these trees increases.

Flower of indigenous variety begin to appear in December and continues to blossom until May. Flower turns into fruitlets in about one and half to two months, and fruits can ripe within 4 to 5 months from the time of flowering. Mature fruits are available from April to October. Trees produce three rounds of fruits, which stretches availability of fruits from April to October. Few trees bear flowers in August, which turn into mature fruits in December sometimes.

Some farmers began to grow seedlings originated from Thailand recently. One year old seedling is sold at the price of 3,500 MMK, and the older is the age, the higher is the price. This variety is highly vulnerable to pests and diseases, which contributes to a low survival rate. Some farmers know that seedlings of Thai variety are sold by some farmers from Chaungngakwa village at the price of 8,000 MMK per one seedling with the size of one inch circumference.

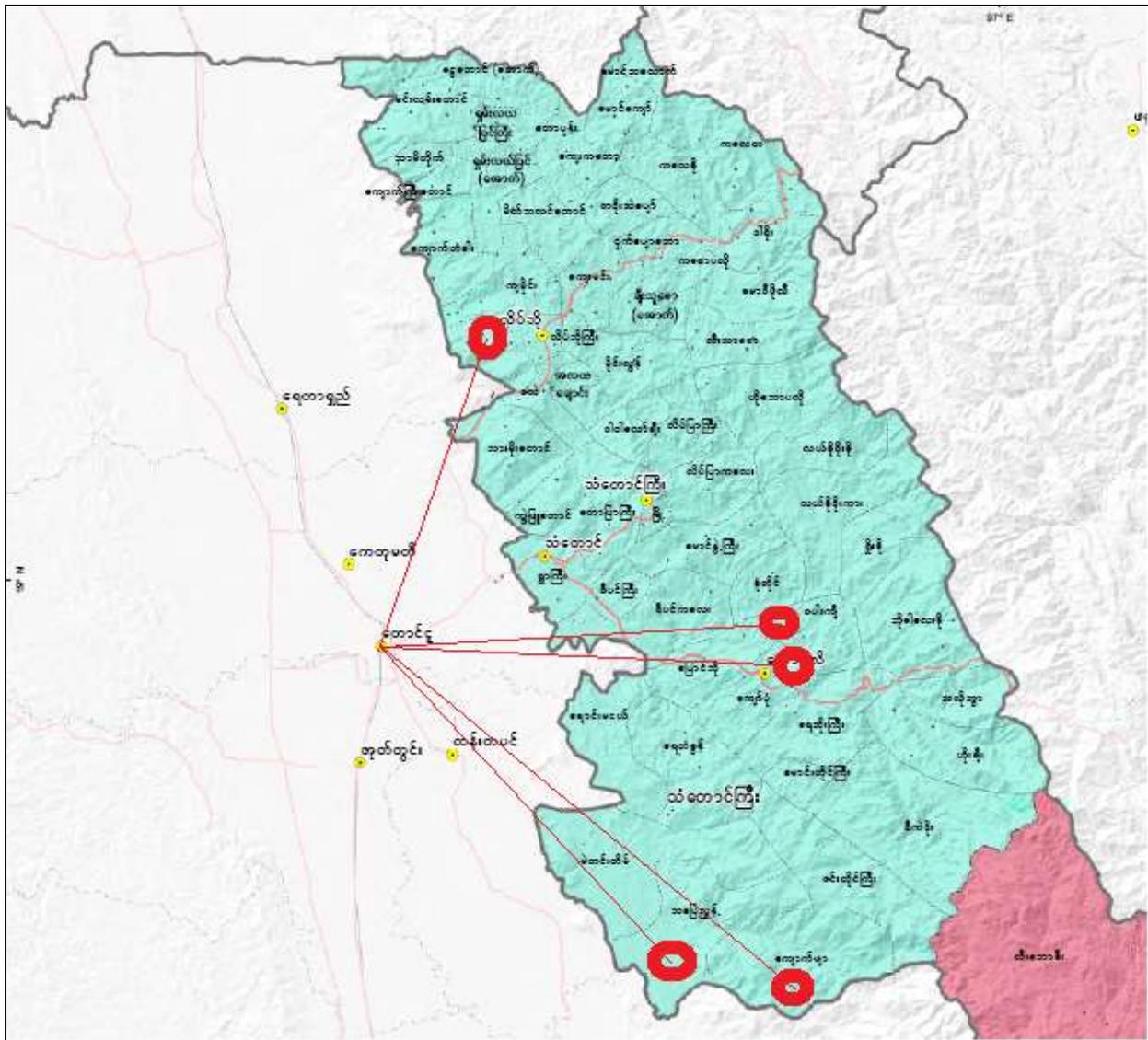
### **6.3 Production Areas**

#### **Thandaunggyi Township**

Kyamine village tract of Leik Tho Sub-Township and Tha Pyay Nyunt village tract of Thandaunggyi Township of Kayin State produces Durian. Name of villages in Leik Tho Sub-Township that produce Durian are Thin Baw Taw, Kyauk Hpyar, Kyauk Hpyar (Upper), Pin Thi Lar, Mya Thar Kone, Kyauk Shay Taung, Au Ne Hpo Li, Let Pan Kone, Myauk Hpei Hpo, Kya Maing, Thea Nu Kone, Pauk Tu Phat Hpo, Ta Maw Sein, Hta Mon (Upper), Hta Mon (Middle), Hta Mon (Lower) and Hta Maw Ngwe Taung. Farmers participating in the assessment believe that annual production volume from Kyamine village tract is 200,000 to 300,000 pieces. Durian from this area is called by traders as Kyauk Pyar fruit.

Bawgali Sub-Township of Thandaunggyi Township is another major production area. Trader from Taungoo participating in the assessment estimates that annual production volume from Bawgali sub-township is 300,000 pieces. Farmer from Tha Pyay Nyunt village tract estimated that annual production volume is 100,000 pieces.

One company that sells Durian to renowned supermarkets in Yangon prefer Kyauk Pyar fruits to Bawgali fruits because farmers pluck fruits manually, put them into a basket and descend a basket to the ground carefully in order to avoid any injury to fruits. In comparison, farmers from Bawgali detach fruits from trees to fall onto the ground, thereby causing injury to fruits.



**Map 6.1 Durian Production Areas in Thandaunggyi Township**

**Kawkareik Township**

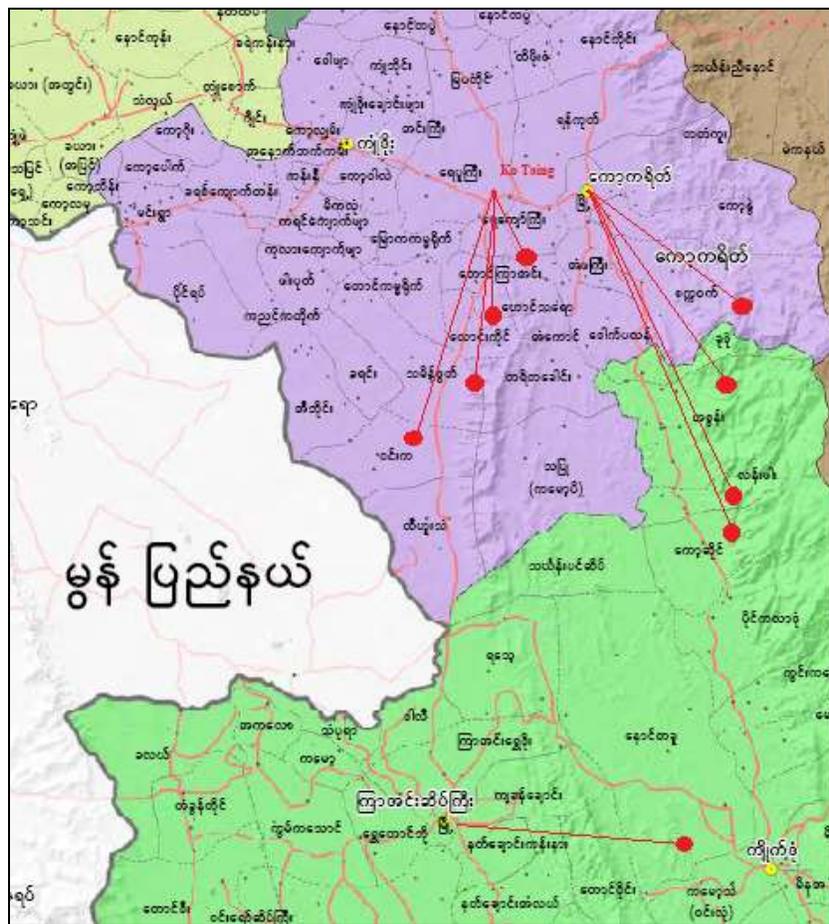
As shown in Table 6.1, the total number of Durian fruits produced by major production villages is small. This small production is largely due to few numbers of trees that each farmer grows, varying age of Durian trees and low yield per tree. Set Ka Wet village tract also produces Durian but participating farmers cannot estimate number of pieces because this village tract is far away from Laung Kaing village tract.

**Table 6.1 Durian Production Areas of Kawkareik Township**

Village Tract Name	Village Name	Number of Pieces Produced
Laung Kaing	Naung Ta Lar, Kawt Hpaung, Ka Mowt Ka Tu and Hpar Kya	100,000

Tha Mein Dut	Tha Mein Dut	50,000
Win Ka	Win Ka	40,000
Hti Hu Than	Hti Hu Than	2,000
Kyar In	Kyar In	3,000
Set Ka Wet	Set Ka Wet	
Ah Sun, Kawt Saing, Lan Hpar in Kyainseikgyi	Ah Sun, Kawt Saing, Lan Hpar	390,000
Khu Don in Kyainseikgyi*		
Total		585,000

\* Durian from Kyu Don village tract is sold to Kyainseikgyi town rather than Kawkareik due to better road connection between this village tract and Kyainseikgyi town.



Map 6.2 Durian Production Areas in Kawkareik Township

## 6.4 Production Trend and Yield per Tree

### Thandaungyi Township

The beginning of the harvesting period is May, production reaches its peak in June and July and production declines in August and September. Only small number of fruits is available in October. Production volume is believed to be in a declining trend during the 2017-2018, 2018-2019 and 2019-2020 crop season. Farmers cite climate change that causes fewer amounts of rain and soaring temperature as a culprit of this falling production volume. If rain falls in March

when fruitlets begin to appear, production volume is good, farmers reported. During the previous 3 years, rain does not fall at this time, which causes decline of production. Yield per tree is low, which ranges from 10 to 350 pieces. Some farmers report that an average yield is 100 pieces. The size ranges from 1.6 kilograms to 4.8 kilograms.

### Kawkareik Township

The beginning of the harvesting period is April, production reaches its peak in May and June and production declines in July, August, September and October. Sometimes, some trees produce ripe fruits in December. Production volume is believed to be in a declining trend during the 2017-2018, 2018-2019, and 2019-2020 crop season. Farmers perceive that depletion of the forest leads to the spread of pests and diseases from the hardwood trees to Durian trees and decrease in the retention of underground water. As a result, Durian trees do not get enough water, which results in decline of production. Besides, moles which previously rely on wild trees from forests turn to Durian trees for their food. Yield per tree is low, which ranges from 10 to 100 pieces. Some farmers report that an average number is 40 to 50 pieces. The size ranges from 0.6 kilograms to 4.8 kilograms.

As shown in Table 6.2, the total number of Durian fruits produced has been plummeting during 2015-2016 and 2019-2020. The number of fruits produced in 2018-2019 is 32.2 per cent and 2019-2020 is 14.4 per cent of the production volume of 2015-2016. The reason for this drastic decline of the production volume is dying of Durian trees, which is believed to be caused by some diseases and high temperature, which favours proliferation of insects and diseases. High temperature in the 2020 summer causes dying of many trees and destruction of flowers and fruitlets, which in turn contribute to 45.8 per cent fall in production volume in 2019-2020 from the production volume of 2018-2019.

**Table 6.2 Durian Production Volume Trend from Set Ka Wet, Ah Sun, Kawt Saing and Lan Hpar Village Tract during 2015-2016 and 2019-2020**

Season	Production per Day					Production per Month					Total
	April	May	June	July	Aug	April	May	June	July	Aug	
2015-16	10,000	10,000	30,000	30,000	10,000	300,000	300,000	900,000	900,000	300,000	2,700,000
2017-18	5,000	5,000	20,000	20,000	5,000	150,000	150,000	600,000	600,000	150,000	1,650,000
2018-19	3,000	3,000	10,000	10,000	3,000	90,000	90,000	300,000	300,000	90,000	870,000
2019-20	1,000	1,000	5,000	5,000	1,000	30,000	30,000	150,000	150,000	30,000	390,000

\* Primary data of a trader from Kawkareik Township.

There is no survey on Durian cultivation and production in Kawkareik Township yet. Township DOA of Kawkareik estimates that total cultivation area is 3,171 acres, of which 1,437 acres are producing 7,311,786 pieces of fruits in the 2019-2020 season. One Durian tree produces an average of 110 pieces of fruits per season. If plants are grown at the interval of 30 feet and 30 feet, 48 trees can be grown in one acre, and with an average of 110 pieces of fruits, one acre can produce 5,280 pieces of fruits.

## 6.5 Practices on Cultivation Steps

The assessment discovers that majority of farmers from Kawkareik and Thandaunggyi Townships do not adopt appropriate cultivation methods, and cultivation practices in the 2019-2020 crop season, which coincides with the COVID-19 pandemic period, do not differ from those of the 2018-2019 crop season. Majority of Durian farms from both townships adopt traditional cultivation methods whereas there are few farms with the size of 0.25 acres that cultivate Durian variety from Thailand systematically in Laukaing village tract of Kawkareik Township.

### **A. Nursery**

#### **Thandaunggyi Township**

Some farmers put seeds of fruits from own orchards into plastic bags to grow seedlings whereas some farmers grow the seeds directly through putting seeds into 9 inch-depth hole. They do not use any fertilizer for seedlings and put soil and seed into plastic bag. They carry out this process in June. Average number of new seedling sown per year is 50. After growing seedling, seedlings survive if rain falls but seedlings die if rain does not fall and temperature is high.

#### **Kawkareik Township**

All farmers put seeds of fruits from own orchards into plastic bags to grow seedlings.

### **B. Transplanting**

#### **Thandaunggyi Township**

When a seedling reaches the age of 1 year with the height of one and half feet, farmers transplant seedlings in an orchard. A hole with the size of one and half inches length, two inches width and one inch depth is dug, in which a seedling is planted. Seedlings are not grown in an appropriate interval. Rather, seedlings are planted in the vacant space. Farmers know that the interval between two adjacent trees should be 15 to 20 feet apart.

#### **Kawkareik Township**

When a seedling reaches the age of 1 or 3 years, farmers transplant seedlings in an orchard. Farmers have a belief that growing 2 years old seedlings will lead to dying of seedlings, and consequently, they do not plant a two-year-old seedling. A hole with the size of one inch width, one inch length and one inch depth is dug, in which a seedling is planted. Seedlings are not grown in an appropriate interval. Rather, seedlings are planted in the space created by dying plants. Although farmers know that the interval between two adjacent trees should be 20 to 30 feet apart, they grow seedlings at an interval of 3 feet intentionally because they want to get some plants left if some plants will die.

### **C. Weed Control Measures**

#### **Thandaunggyi Township**

Farmers carry out weed control measures three times in May, August and December. Previously, farm workers use hoes and hands to take out weeds but recently, they use a machine-propelled weed cutter. One worker takes 2 to 3 days to finish the weed control measure for one acre of orchard. A farm worker charges 50,000 MMK per time, and additional cost is gasoline for a weed cutter machine and food for a farm worker. Farmers neither carry out mulching nor dump dead weeds at the base of trees.

### **Kawkareik Township**

Farmers undertake weed control measures one to two times, in July and September, per crop season. Farm workers use hands and hoe to take out weeds or alternatively, use a weed cutter machine. The number of workers that farmers employ depends on the size of orchards. For instance, one farm with the size of 20 acres needs 5 farm workers for 6 days per time. It implies that one acre needs 1.5 worker-days. At the rate of 8,000 MMK per day in the 2020-2021 crop season, one acre will cost 12,000 MMK per time. A farm owner has to provide a weed cutting machine and gasoline. Employment of farm worker, including a weed cutting machine and gasoline, costs 17,000 MMK per day per acre. Farmers do not cover the bottom of Durian trees with dead weeds despite of having knowledge of the benefits of mulching. Some also learn from the Township DOA that banana trees should be grown to give shade to Durian trees or banana leaves should be used to cover the bottom of Durian trees, and they plan to adopt this practice in the 2021-2022 crop season.

### **D. Prevention of Water Logging and Canopy Management**

#### **Thandaunggyi Township**

Farmers do not set up a system to take out water from the surrounding area of tree roots to prevent roots from being waterlogged. Neither do farmers pruning properly nor remove dead, broken or diseased branches and water shoots. As a result, free circulation of air is impeded, and branches of one tree do not get plenty of sunlight. It is possible that absence of canopy management is one of the factors that causes low yield. Another implication is that trees tend to be very tall, which makes the harvesting and pest and disease control difficult.

#### **Kawkareik Township**

Farmers do not set up a system to prevent the roots of the tree from being waterlogged because Durian trees are planted at the hillside where stagnation of water does not take place. Heavy rain carries debris to the base of Durian trees planted near the creek. If debris is not removed, heat produced from debris that is exposed to sunlight causes the death of roots. None of the farmers from the villages that the assessment team interviewed carry out pruning of branches properly. Farmers only cut the branches that are attacked by pests and cover the stunt with a plastic sheet. As a result, free circulation of air is impeded, and branches of one tree do not get plenty of sunlight. It is possible that absence of canopy management is one of the factors that cause low yield. Another implication is that trees tend to be very tall, which makes the harvesting and pest and disease control difficult.

### **E. Pest and Diseases Management**

#### **Thandaunggyi Township**

Majority of farmers do not undertake proper pest and disease control measures. One farmer from Tha Pyay Nyunt village tract reports that he uses Laung 25 fungicide with the price of 7,500 MMK per bottle to prevent the death of Durian tree. Farmers report that Durian trees are subject to diseases. First, the colour of some trees becomes yellow and trees die eventually. There is a hollow inside these trees, in which some insects stay. These symptoms look similar to Durian Stem Borer disease. Second, there is the presence of sores on the bark of tree from which brownish-red colour gum oozes out, and trees die within 2 to 3 years. These symptoms appear to be *Phytophthora palmivora*, which is a dreaded fungus disease of Durian trees in Southeast Asia.

The organism is a primary parasite of Durian roots, which can result in complete girdling and subsequent death of the tree.

#### **Kawkareik Township**

Three groups of symptoms are discovered. First, there is a hole in the stem of Durian tree from which brownish sap oozes, and affected tree does not die. If the entire circumference of the bark is destroyed, the tree dies. These symptoms appear to be *Phytophthora palmivora*, which is a dreaded fungus disease of durian trees in Southeast Asia. Second, powder of flesh of stem comes out from a hole in the stem and a tree dies eventually. These symptoms look similar to Durian Stem Borer disease. Third, leaves of young plants become dried, which leads to dying.

To respond to these pests and diseases, farmers apply Cypermethrin insecticide imported from Thailand, which is locally called as A Yoe Khaung, to the affected area. Alternatively, they take out the affected area, which they believe can heal the wounds of trees. Farmers also pour Cypermethrin insecticide into the hole in the stem and seal the hole with mud, which can prevent the tree from dying. Some farmers cut the dead branches.

#### **F. Destruction by Animals**

##### **Thandaunggyi Township**

Squirrel and parrots destroy fruits. Farmers use a trap and sell them. Squirrels are killed by using a catapult.

##### **Kawkareik Township**

Squirrel, bat, woodpecker bird and rats destroy fruits. Farmers use a trap or chemical bait to kill rats and a catapult to kill squirrels. One pack of rat bait cost 500 MMK whereas a rat trap cost 1,000 MMK.

#### **G. Application of Fertilizer**

##### **Thandaunggyi Township**

Fertilizers, either organic or chemical, are not applied to Durian farms.

##### **Kawkareik Township**

Only 3 of 23 participating farmers apply fertilizers. Type and dose of fertilizers applied by farmers varies from one farmer to another. Some farmers apply one third the size of condensed milk can Pale fertilizer, which is Nitrogen containing chemical fertilizer, to 2 years old plant in either June or July. In addition, some provide 4 cans of compound fertilizer that contains Nitrogen, Potassium and Phosphorous at the ratio of 15 each to the plant at the time the tree bear fruits in August or September. Fertilizers made from Thailand are used. 5 pye or 13 kilograms of Nitrogen costs 5,000 MMK and 50 kilogram bag of compound is bought at 45,000 MMK. 2 farm workers are employed for one day at the cost of 8,000 MMK per day for application of fertilizers. Hence, total cost of application of fertilizer is 66,000 MMK for 60 trees.

Second, some farmers use 3 cans of organic fertilizer per one tree, which is believed to contain bat dung. One bag is bought at the price of 23,000 MMK, and 2 bags are used for 24 trees. Third, some farmers apply salt to make pH of soil in equilibrium. 2 cans are applied per one tree two

times in July and September. One bag with 10 viss weight is bought at 5,000 MMK for the total cost of 35,000 MMK for 100 trees. Labour cost in 2020 is 8,000 MMK per day, which is 2,000 MMK per day higher than that of 2019. Every year, labour wage rises by 1,000 or 2,000 MMK, and this is not caused by COVID-19.

Some farmers apply fertilizer after harvesting Durian fruits in May and June for the first time and in September to October for the second time. Nevertheless, majority of farmers rarely use fertilizers for indigenous Durian varieties and those who use them apply only small amount. They use chemical fertilizers, Potash and compound fertilizer that contains Nitrogen, Potassium and Phosphorous at the ratio of 15 each, and pesticides for Durian varieties from Thailand regularly. Furadan is used for Stem Borers of old Durian trees and leafhopper of young plants. Furadan is sprayed on the side of the graft to prevent infection.

Input traders give advice to farmers who ask their advice regarding the utilization of chemical compound for Durian. If the input traders could not solve the problems of farmers, farmers seek advices from Township DOA and companies which sell chemical compound to farmers.

## **H. Irrigation**

### **Thandaunggyi Township**

To maximize flower and fruit production, Durian trees need the dry period of 3 to 4 week followed by irrigation of farms. When blossoms are formed, water should be deliberately withheld to enhance flowering. Farmers plant Durian along with Mangosteen, Lychee, betel nut and rubber and construct an irrigation canal to draw water from nearby streams. As approximately 10 farmers have to share one canal, each farmer can get water for 2 to 3 days per month. Two circumstances prevent farmers from carrying out a timely irrigation of Durian farms as required above. First, farmers have to wait for their turn to get water. Second, as other trees planted along with Durian need water, farmers do not withhold water for Durian at the time trees should be devoid of water. Micro-sprinkler or drip irrigation is not used.

### **Kawkareik Township**

Only one of 23 participating farmers gives water to Durian trees whereas the remaining farmers rely on rain water. This farmer propels water using a water pump to flow through water pipes to provide water to Durian trees. The amount of water given is just enough to wet the soil of the surrounding of trees. Irrigation is undertaken once per day, either in the morning or at night during March and April when flowers come out. This farmer who starts adopting this practice in 2020 summer, which is assessed to be an appropriate irrigation practice, notices that trees produce more fruits than before. The total cost consisting of water pipes and pump is 600,000 MMK and 2 family members carry out watering for 20 acres of orchards, in which 100 Durian trees and Mangosteen, rubber and betel nut are grown.

## **I. Harvesting**

### **Thandaunggyi Township**

Mature fruits that fall down to the ground naturally have better taste than fruits that are plucked from the tree. Naturally fallen down fruits can be eaten within 1 to 2 days and have a shelf life of 3 days. In comparison, fruits that are plucked from the tree can be eaten within 7 to 8 days and has a shelf life of 10 days. Some workers from Bawgali Sub-township use a bamboo pole to

detach the stalk so that fruits fall down to the ground. In comparison, farmers from Tha Pyay Nyunt village tract does not pluck Durian fruit and sells the fruits that are naturally fallen down.

Service fee for harvesting of one piece of Durian is 100 to 200 MMK. Quality of the fruits depends on skills of labourers who harvest fruits. If mature fruits are plucked selectively, fruits will be ripe at the same time and quality is consistent. Some trees have flowering only one time per season, which makes maturity of fruits consistent and the task of plucking easy because workers can distinguish mature fruits from immature fruits easily. On the other hand, some trees have flowering two times per season, which makes it hard to differentiate mature fruits from immature fruits. Workers use hands to pluck fruits, put them into a basket and use a rope to descend a basket to the ground. Some workers intentionally pick up immature fruits in an attempt to get more number of fruits and higher wage. This circumstance lowers the quality of fruits sold to the market. When fruits with different maturity stages are plucked, fruits are ripe within 1 to 8 days. If one fruit does not ripe after 8 days, it cannot be sold because this fruit is immature. Percent of immature fruits can be as high as 10 in each round of harvest.

#### **Kawkareik Township**

Farmers usually sell ripe fruits that drop to the ground naturally. They pluck fruits in the situation where squirrels likely to destroy fruits. Service fee for harvesting of one piece of Durian is 200 MMK if a worker has to pluck many fruits and 300 MMK if a worker has to pluck fewer numbers of fruits. Workers use hands to pluck fruits, put them into a basket and use a rope to descend a basket to the ground. Farmers observe the appearance of fruits to judge whether they should harvest fruits or not. For instance, a stalk of a fruit becomes hard in consistency and the colour changes from green to brown when a fruits reaches maturity.

A naturally fallen down fruit can be eaten within 1 to 2 days and will become rotten within 4 to 5 days. Some farmers sell fruits at their farms while some carry fruits to their houses through either using own motorcycles or renting a motorcycle that charges 500 MMK per piece. Major problems that farmer face in this step are: (a). strong wind that makes land fall of fruits; and (b). small fruits are offered a low price, which does not meet the cost of harvesting.

#### **J. Marketing**

##### **Thandaunggyi Township**

Farmer from Tha Pyay Nyunt village tract sells Durian fruits to traders who come to buy fruits at their farms.

##### **Kawkareik Township**

Some farmers sell Durian fruits to traders who come to buy fruits at their farms. Farmers report that the price offered by some of these traders, which is usually 3,000 MMK per piece on an average, is lower than the sale price to consumers directly. Some farmers retail fruits directly to consumers at the price of 5,000 MMK per piece. They set up a small retail shop at the roadside of Kyonedoe-Kyainseikgyi to sell fruits. These farmers give a warranty to consumers, and replace the low quality one with the good one. There are estimated 20 village-level traders from Ko Dine and Kyar Inn village who come to buy fruits from farms and sell them in Ko Dine village. Consumers from Myawaddy, Hpa-an, Mawlamyine and Kyonedoe towns buy Durian from Laung Kaing village tract. By contrast, trading centres of Kawkareik town usually trade

Durian from Sakawet village tract. Problems of farmers from Hpar Kya, Naung Ta Lar and Ka Mot Ka Thu villages are: (a). destruction by insects and diseases; (b). death of Durian trees; (c). lack of knowledge on insect and disease control measures and proper cultivation methods; and (d). not getting enough water for Durian plants.

## **6.6 Capacity Building of Farmers**

Neither farmers from Thandaunggyi nor farmers from Kawkareik receive any specific training regarding cultivation methods of Durian. Some farmers from Kawkareik receive education sessions on how to apply fertilizers and how to control pests and diseases for rubber and Durian. Farmers from Tha Pyay Nyunt village tract who participates in this study disclose that Township DOA of Thandaunggyi Township provides education sessions on how to control pests and diseases for Durian.

Township DOA of Kawkareik Township organizes Durian Good Agriculture Practice (GAP) training sessions 2 to 3 times per year and field demonstration 2 to 3 times per year. Each training session lasts one day, and Township DOA provides lunch, refreshment and travelling allowance to farmers. 50 farmers attend each training session. Education sessions are also organized in the morning or evening, in which 80 to 100 farmers participate. Issues covered in each GAP training session are: (a). how to apply fertilizers; (b). how to control pests and diseases; (c). importance of reducing chemical compounds and using organic fertilizer; and (d). demonstration of how to control Stem Borer and the disease that cause dried stem and branch.

Two farmers from Laung Kaing and Hpar Kya villages of Kawkareik Township seek test of soil pH, and the results show that pH is low. Township DOA advises these farmers to apply gypsum or lime or salt to correct soil pH. Township DOA also advises farmers to clean the base of the tree and do mulching one feet radius away from the base of the tree.

## **6.7 Lack of Certificates for Value Addition**

### **Thandaunggyi Township**

Majority of farmers from Thandaunggyi Township do not apply any chemical fertilizer or insecticide to Durian trees. Despite of having opportunities to register their farms as being organic or GAP, farmers have yet to apply for any organic or GAP certification. Lack of such certification deprives farmers of an opportunity to add value to their products.

### **Kawkareik Township**

Farmers from Kawkareik Township do not seek a GAP certificate. Some farmers apply chemical fertilizers and chemical insecticides to Durian trees, which can impede them to claim fruits as being organic products.

## **6.8 Lack of Value Addition to Durian**

### **Thandaunggyi Township**

Farmers do not produce any value added products from Durian due to lack of technical knowhow. Some farmers use pulp of fruits that cannot be sold as fresh ones to make Durian jam. The pulp is mixed with sugar or palm sugar, water and eatable oil. This mixture is simmered with low heat. Farmers use this Durian sweet as a present to relatives and friends.

### **Kawkareik Township**

Farmers from Kawkareik Township use pulp of broken fruits that cannot be sold as fresh ones to make Durian Jam. The pulp is mixed with eatable oil. The mixture is stirred with low heat for 4 hours to get 1 viss of Durian jam using charcoal fuel. 12 pieces of fruits with thick pulp are needed to produce 1 viss of jam. Farmers sell 1 viss of Durian jam at the price of 20,000 MMK. Durian jam is bought by tourists from Yangon and Myawaddy as presents and some local residents who send jam to their relatives living in Bangkok.

#### **6.9 Lack of Access to Loan with Affordable Interest Rate**

Farmers from Thandaunggyi and Kawkareik do not have access to loans from the Cooperative Department or Mya Sein Yaung livelihood revolving fund of the DRD or MADB. Farmers from Kawkareik do not possess the land title number 7, which prevent them from borrowing loan from the MADB.

Some farmers from Thandaunggyi Township take loans from private loan sharks with 24 to 36 per cent interest rate per year. Some farmers from Tha Pyay Nyunt village tract of Thandaunggyi Township take loans from private loan sharks with 120 per cent interest rate per month. Loan sharks issue loan without asking collateral from people whom they have trust but require collateral for people whom they do not have trust.

Some retailers from Kawkareik Township take loan from Vision Fund, which is a MFI, at the interest rate of 24 per cent per year. Loan amount of 500,000 to 1 million is issued to one member. This MFI examines the viability of the business of an applicant of loan before issuing loan. Members are required to save money and form a group of 5 members to guarantee that all members will return loan if one member fails to do so.

#### **6.10 Lack of Producer Institutions**

Durian producer group is yet to be set up in Kawkareik and Thandaunggyi.

#### **6.11 Lack of Research**

There is no research regarding indigenous Durian varieties in both townships. Michaungkaung, Su Kyae and Su Seik are local names, and no scientific name is given to any local variety. There is no proper recording of size and production volume of Durian farms by Township DOA.

#### **6.12 Suggestion for Strengthening of Value Chains**

Farmers from Kawkareik want to set up a producer group to establish a trading mechanism to buy fruits from farmers at the stable price and sell them to consumers. Farmers also want to learn how to prevent trees from dying, how to produce high yield and how to control pests and diseases. Farmers want trainers to organize training sessions lasting one to two days at their villages.

Township DOA of Kawkareik provides the following suggestions to develop Durian sector: (a). set up demonstration farms; (b). carry out demonstration of cultivation methods 3 times per season; (c). organize training sessions according to the crop cycle and during summer when farmers are not occupied with work. How to do pruning and cleaning of trees should be taught in

January and February, application of fertilizers should be taught in June-July and August-September and post-harvest training should be organized before the harvesting period; (d). give farmers necessary support in order to enable them to adopt appropriate cultivation practices; (e). provide loan with 1 per cent interest rate to farmers – currently loan from the Cooperative Department charges 2 per cent and the MADB charges 0.6 per cent interest rate; (f). support farmers to establish producer groups, and NGOs should help these groups to acquire institutional capacity building; (g). undertake research to study Durian varieties and cultivation methods; and (h). carry out surveys to document details regarding size, tree and yield of farms through collaboration between TDOA and Township Department of Agricultural Land Management and Statistics (DALMS).

## 6.13 Trading

### A. Trading at Taungoo Market and Kawkareik Market

There are approximately 5 trading centres in Taungoo which trade Durian from Thandaunggyi. One trading company has traded Durian from Bawgali Sub-Township of Thandaunggyi. By contrast, there are 3 trading centres in Kawkareik town, which trade Durian from villages of the township. Approximately 20 smaller village level traders visit farmers to buy fruits and resell them to trading centres of Kawkareik town. The trading season is from April to October, and the trading volume drops by 40 per cent in July and 80 per cent in August.

**Table 6.3 Trading Volume per Month of Largest Trading Centre of Kawkareik in 2019-2020 Season**

Months	April	May	June	July	August
Pieces of Fruits	15,000	15,000	15,000	9,000	3,000

Farmers sell fruits that are naturally falling down from trees, which have a shelf life of only 3 days. KNU imposes fine to farmers who pluck fruits. Traders buy Durian from orchards and transport them to trading centres in Kawkareik town and then to Yangon wholesale market within 24 hours. Traders use a cash down payment system to buy fruits from farmers.

One trader offers varying prices to Durian farmers for four categories, 4,000 MMK for a large-size, 3,500 MMK for a medium-size, 2,000 MMK for a small-size and 1,000 MMK for a smallest-size. The quality of fruits sold by farmers is mixed. Selling price is set at 5,000 to 6,000 MMK per piece for the fruit with the farm gate price of 4,000 MMK per piece. When this trader sells fruits to consumers, he gives a warranty, and replaces a low quality one with a high quality one. This is the reason why the price difference of 1,000 to 2,000 MMK per piece is set up.

Selling price for indigenous Durian variety is set in accord with the price of Durian variety imported from Thailand. Consumers do not buy indigenous variety if the price is higher than 4,000 MMK per piece. This trader also sets up a retail shop on the roadside of Myawaddy-HpaAn Thai-Myanmar highway to sell fruits to travellers directly.

The largest trading centre of Kawkareik sells fruits to two wholesalers from Thirimingalar market. Wholesalers from Yangon transfer cash one day after receiving goods from this trader who has to shoulder transportation cost from Kawkareik to Yangon while Yangon wholesalers pay labour cost for unloading goods.

### B. Trading at Thirimingalar Whole Sale Market in Yangon

There are 10 wholesalers of Durian in this largest wholesale market of fruits and vegetable in Myanmar. 7 to 8 wholesalers trade both indigenous varieties and imported Thai Durian varieties whereas one wholesaler participating in this assessment sells indigenous varieties solely.

The wholesaler participating in the assessment forms a partnership with some trading centres from Myeik, Palaw, Ye, Taungoo and Kawkareik Townships. Advanced money of 15 million MMK per one partner is issued before the harvesting season without charging any interest, and each partner returns advanced payment at the end of season. These partner trading centres dispatch fruits through light trucks. The wholesaler pays transportation cost and labour cost first and deducts these costs from sale income later. 10 per cent commission fees are charged to partner trading centres by this wholesaler. Set Ka Wet village tract of Kawkareik Township supply Durian to this wholesaler through one trading centre from Kawkareik town that trades Durian and EFY in the previous years. However, traders from Set Ka Wet village do not supply any fruit in the 2019-2020 season to this wholesaler, and as a result, he cannot sell Durian from this area.

This wholesaler also establishes a partnership with retailers from various regions of Myanmar. Two payment systems are used, cash down payment and making a payment only after selling fruits by the partner retailers. Some retailers break their promises to make payment to the wholesaler, thereby causing loss from the business. Although wholesalers of Thirimingalar market do not set the standard sale price, the price variation among various wholesalers is believed to be miniscule at 100 MMK per piece. It is reported that trading centres of major Durian producing townships derive 100 to 150 MMK per piece.

**Table 6.4 Trading Volume of Various Durian Varieties by Wholesaler of Thirimingalar Market**

<b>Thandaunggyi Variety</b>	<b>August</b>	<b>September</b>			
2018-2019 season	6,000 pieces per day				
2019-2020 season	300 pieces per day until the date of interview on 15 August				
<b>Ye Variety</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>
2019-2020 season	1,000 pieces per day	2,500 to 3,000 pieces per day	7,000 to 8,000 pieces per day	1,500 to 2,000 pieces per day	200 to 300 pieces per day
<b>Set Ka Wet Variety from Kawkareik</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>
2018-2019 season	800 pieces per day	800 pieces per day	5,000 pieces per day	5,000 pieces per day	800 pieces per day
2019-2020 season	This trader does not sell Set Ka Wet variety because traders from Set Ka Wet do not send durian to Yangon.				

### **C. Trading of Thandaunggyi Durian Variety at High End Retail Market in Yangon**

One trading company has traded Durian from Bawgali Sub-Township of Thandaunggyi Township along with other fruits such as Lychee, Mangosteen, chilli, black cardamom and tomato since 2019, of which Durian comprise 60 per cent of the total trade volume. Farmers

usually send fruits to the one check point manned by KNU located in Thandaunggyi Township, and the company fetches goods from this check point and transports them to Yangon's warehouse through using rented 6 or 12 wheel trucks.

This company does not have an organic or GAP certificate yet. Township DOA does not issue a GAP certificate to farmers in Bawgali Sub-Township because this area is under the control of KNU. The company introduces partner farmers to buyers and arranges visits of buyers to Durian farms. Three meetings between Durian farmers and buyers are held per year in either Taungoo or Thandaunggyi to help them understand each other and explore avenues to work as a business partners.

This company sold an average of 10,000 pieces of Durian per month from May to October in 2018-2019 crop season to City Mart and Capital, some of the largest retailed chains in Myanmar. City Mart and Capital apply a consignment system to buy Durian from the company. They make a payment after selling fruits to customers, which usually take 7 days from the time of supplying fruits to these retailers. The company also makes a payment to farmers 7 days from the time of supplying fruits to the company.

Farmers from Bawgali Sub-Township who supply Durian to this company pluck all fruits, including immature fruits, in May 2020 because farmers have serious concern that the COVID-19 pandemic would be prolong to impede sale of Durian and farmers are in need of income. When the company supplies fruits to two supermarkets, these supermarkets reject some of the fruits because fruits are unripe. Two supermarkets also reduce the order of fruits in April and May 2020 to 10 per cent of the order in the 2018-2019 crop season due to low level of purchase of consumers. As a result, the sale volume of this company falls down dramatically in May 2020 to 1,000 pieces.

#### **D. Retailers and Consumers of Durian from Thirimingalar Whole Sale Market**

Retailers from Yangon Region, Pyay and Thayet Townships of Bago Region and Patheingyi Township of Ayeyarwaddy Region purchase Durian from wholesalers of Thirimingalar wholesale market. Other buyers are retailers who sell Durian through using on-line shopping method and value-adding processors who produce Durian pillow, which is a desert made by wrapping Durian flesh and cream with a thin layer of baked wheat. Each customer buys at least 20 to 30 pieces per time.

#### **E. Retailers of Durian from Koe Taing Village of Kawkaik Township**

One Chinese trader bought Durian fruits worth 20 million MMK from 3 retailers from Ko Taing village in the 2018-2019 season. This Chinese trade bought fruits that are plucked from trees and paid 5,000 MMK per a large-size one and 3,000 MMK per a medium-sized one. This trader does not come back to buy fruits in the 2019-2020 season.

The trading season is from April to September. Two varieties of Durian from Kawkaik, with golden and white milk colour, respectively, have heavier sweet taste than that of Durian varieties imported from Thailand although they have thinner pulp than that of Thai varieties. Durian value adding processors from Mawlamyine and Yangon buy fruits from retailers of Koe Taing village previously but not in 2020. Buyers from Kyaikkaw, Hpa-an, Naung Long, Thaton, Nyaunglebin, Pyin Tha Kar and Taungoo also buy fruits from these retailers.

These retailers carry fruits from Durian producing villages with motorcycles or car at the gasoline cost of 3,000 to 5,000 MMK per time. They have to spend 200,000 to 500,000 MMK per time of purchase and reinvest sale income for the second round of purchase.

#### F. Input Traders from Kawkareik

This section discusses findings from the input traders who trade propagation material such as Durian seedlings, chemical compounds and fertilizers.

There are 2 traders who sell chemical pesticides and fertilizers in Kawkareik Township. These traders have to seek a license to sell seeds, fertilizers and insecticides from Township DOA before selling these products. Township DOA provides training on basic knowledge on use of insecticides and fertilizer to traders.

One fertilizer trader from Kawkareik Township receives fund support from the IFDA's project to invest in the trade. In exchange, this trader supplies fertilizers to farmers who grow rice, peanut and green gram when they participate in training sessions and set up demonstration plots. Farmers receive 4 training sessions regarding cultivation methods while input traders receive training sessions on ways of managing investment and income, how to apply for a loan, marketing and proposal writing, which collectively enhance the business performance. Input traders give advice to farmers who ask their advice regarding the utilization of chemical compound for Durian.

One input trader gives the following advices to Durian farmers: (a). to address Stem Borer, systematic insecticide such as Cypermethrin, Phantho-8, Better and Alarm should be mixed with water, and the mixture should be poured into the hole that has larva by using syringe. Farmers like to buy a pack of 10 gram or 10 cc insecticide because it is suitable for one-time use; and (b) Funguran and carbin should be used for *Phytophthora disease*.

Table 6.5 shows the price of various types of fertilizer and chemical compounds. The price of fertilizer and insecticide from Thailand declines in 2020 because the value of Baht depreciates. The price of Better and Alarm brands that are produced by Awba company of Myanmar also falls down.

**Table 6.5 Comparison of Price of Various Types of Fertilizer and Chemical Compound**

	Amount	Price in 2019-2020 (Kyats)	Price in 2018-2019 (Kyats)
Insecticides			
Cypermethrin	100 cc	2,000	2,000
Cypermethrin	500 cc	9,000	9,000
Phantho-8	100 cc	3,000	3,000
Phantho-8	500 cc	11,000	11,000
Better (Awba)	100 g	13,000	18,000
Better (Awba)	10g	1,500	1,500
Alarm (Awba)	100 g	13,000	18,000
Alarm (Awba)	10g	1,500	1,500
Carbin	100 cc	3,500	3,500
Carbin	500 cc	15,000	15,000
Funguton	100 g	3,500	3,500

Funguton	1000 g	18,000	18,000
Funguton	500 g	10,000	10,000
Cypermethrin from Thailand (Green – Head Bone)	100 cc	2,500	3,000
Cypermethrin from Thailand (Red – Tiger Head)	100 cc	3,000	3,500
Fertilizer			
NPK 15:15:15 from Thailand (Myin Pyan Brand)	50 kg	45,000	48,000
NPK 16:16:8 from Thailand (Myin Pyan Brand)	50 kg	35,000	38,000
Nat Aw Zar organic fertilizer	50 kg	16,000	16,000

The assessment team interview two input traders who are selling Durian seedlings in Kawkareik Township. One input trader imports Durian scions from Thailand and sells them in Kawkareik and another trader propagates Durian seedlings by grafting with Thai variety and sells these grafted seedlings to other farmers. These traders sell these Durian seedlings and scions during June to August. Annual volume and price of these propagation materials are presented in Table 6.6 and 6.7.

**Table 6.6 Volume of Durian Seedlings and Scions Traded by Traders**

Trader	2017-2018	2018-2019	2019-2020	2020-2021
Trader one	200	200	400	700
Trader two	-	500	Not sell	500

**Table 6.7 Price of Durian Seedlings and Scions Reported by Traders in 2020-2021**

Trader	Price of Each Type of Seedlings and Scions (Kyats per seedling or scion)			
	1 ft length seedling	2 ft length seedling	3 ft length seedling	4 ft length seedling
Trader one	2,500	4,000	6,000	8,000
Trader two	Variety one	Variety two	Variety Three	
	2,500 – 3,000	25,000	300,000 – 400,000	

A first trader grows seeds of indigenous variety to use as root stock and this root stock is grafted with scion of Thai variety. She discloses that there is 80 per cent survival rate of seedlings if the root stock is good and the weather is favourable. This kind of seedlings starts to bear 5 fruits 5 years after growing. She explains to her customers how to grow the seedlings and if necessary, she demonstrates how to do it. She also gives advices on how to control pests and diseases when planting grafted seedlings. The total investment of the first trader is about 2 million MMK and the total income of the 2020-2021 season is 4 million MMK. This business, operated by family members, does not have to pay electricity and rental fees.

A second trader imports the most expensive variety of scions when a customer orders them. Traders from Bangkok send scions to Mae Sot border town from where the second trader carries by his car. He transfers money after selling these scions. The total investment is approximately 2 to 3 million MMK. Types of operations cost of this trader are: (a). electricity cost of 15,000 MMK per month; and (b). rental of shop is 25,000 MMK per month. This business is operated by his family members. An average monthly income of this business is 300,000 Kyats.

#### 6.14 Value-Adding Processors from Yangon and Kawkareik

Durian value adding processors produce a range of products such as Durian pillow, Durian cream and Durian cake during April and August and sometimes until October depending on the availability of fruits. They use Durian varieties from Ye, Kawkareik and Thandaunggyi Townships of Myanmar rather than Durian varieties imported from Thailand to produce snacks because consumers prefer the aroma and taste of domestic Durian varieties to those of Thai varieties. The highest sale volume is recorded during May and July.

Of three Durian pillow producers participating in the assessment, one producer from Yangon sells products through both wholesale and retail, another producer from Yangon sells snacks to consumers via an on-line channel and the other one from Kawkareik sets up a retail shop. The first producer distributes products to Yangon, Kyonepyaw, Phyu, Zeyawaddy and Myitkyinar towns. Goods are transported in cold boxes to prevent them from being spoiled. Retailers who buy the snacks make a payment to the wholesaler when they finish selling goods. Retailers use a cash down payment system for sale to consumers. The shelf life of Durian pillow is 2 days if they are kept inside a refrigerator.

The first producer sets up a registered company, the second producer has a production license from the Yangon City Development Committee and the third producer from Kawkareik does not have any license. None of the producers has obtained a certificate from FDA yet.

These Durian pillow producers encounter the following challenges: (1). some fruits that they get are unripe ones that cannot be used for making snacks; (2). some fruits have fewer pulp; and (2). some fruits have pests inside that cannot be used for making snacks. These circumstances raise the cost of production, which in turn reduce profit or leads to loss of the business. Gross Margin of these value added products varies widely from one product to another and from one producer to another as shown in Table 6.8

**Table 6.8 Comparison of Price and Cost of Production of Various Value Added Products**

Producer	Type of Durian Product	Price per Piece in 2019-2020 (MMK)	Cost of Production Per Piece in 2019-2020 (MMK)
Producer 1 from Yangon	Durian Pillow	600	500
Producer 2 from Yangon	Durian Cream (100 g)	5,000	Not disclose
	Durian Cream (500 g)	8,000	Not disclose
	Durian Cream with cashew-nut (500 g)	10,000	Not disclose
Producer 3 from Kawkareik	Durian Pillow	1,000	700

Durian cake	15,000	10,000
Durian layer cake	20,000	12,000

## 6.15 Price Trend of Various Durian Varieties

### A. Factors Influencing Price

This assessment discovers that four factors influence the price trend and variation: (a). seasonal availability; (b). changes in production volume which distorts the supply and demand balance; (c). impact of COVID-19 pandemic; (d). price offered by individual traders; (e). different trading mechanism; and (f). lack of setting up standard price, standard quality and quality assurance system across locations and value chain actors. Each of these factors is discussed in details in the following sections.

### B. Seasonal Variation of Price and Price Difference Due to Supply and Demand

Price trend of various indigenous varieties during the previous 3 years appear to be hinged on supply and demand curve on each year as well as each month of 8 months of Durian season each year. Price of each variety is high when production volume drops and vice versa. Similarly, price is relatively higher at the beginning and the end of the season of each variety than in the middle of the season.

Each variety has its unique characteristics that capture consumers. For instance, Durian varieties from Ye Township of Mon State are renowned for having more flesh, attractive appearance and correct ripeness because farmers only sell naturally falling down fruits as opposed to picking up fruits from trees. In comparison, some varieties from Thandaunggyi Township are known for its unique, exquisite taste despite the presence of the apparent weaknesses such as unripe fruits due to early harvesting and highly unpredictable quality of flesh.

**Table 6.9 Variation of Price of Durian Variety from Ye Township of Mon State at Wholesale Market of Yangon**

	April	May	June	July	August
2017-2018 season	2,000	1,800	1,300 to 1,500	2,000	2,000
2018-2019 season	2,500	2,000	1,700 – 1,800	2,500	3,000
2019-2020 season	As above	As above	As above	As above	As above

An average price of one piece of Durian with an average weight is reported.

**Table 6.10 Variation of Price of Durian Variety from Thandaunggyi Township at Wholesale Market of Yangon**

	August	September	October
2018-2019 season	2,000	1,300 to 1,500	2,000
2019-2020 season	5,000	Not known yet *	Not known yet*

\* The assessment is carried out in August 2020 and price for September and October 2020 is not known yet. An average price of one piece of Durian with an average weight is reported.

On contrary to tumbling farm gate price, the price of Durian from Thandaunggyi in the 2019-2020 crop season at Yangon market is nearly twice higher than that of the 2018-2019 season. Supply of Durian from Thandaunggyi Township in Yangon market is relatively lesser in the 2019-2020 crop season than that of the 2018-2019 crop season, which explains the price increase.

Data of Durian farmers from Thandaunggyi Township substantiate this finding. One 70 years old Durian tree gives rise to 500 to 800 pieces of fruits in the 2018-2019 crop season and 200 to 300 pieces of fruits in the 2019-2020 crop season. It means production of the 2019-2020 season is 2.5 to 2.7 times less than that of the 2018-2019 crop season. The reason for falling down of production volume is lack of rain at the time of blossoming and high temperature in summer when fruitlets are growing. The second plausible explanation is malfunctioning of supply chain system that disrupts fruits inflow from Thandaunggyi to Yangon, which is contributed by restrictions on movement of cargoes.

### C. Price Difference between 2018-2019 Season and 2019-2020 Season

As illustrated in Table 6.9, the price of Durian Variety from Ye Township does not appear to be different between the 2018-2019 crop season and the 2019-2020 crop season. In a stark contrast, the price of Durian variety from Kawkareik Township of Kayin State in April and May of the 2019-2020 season is 50 to 60 per cent of the corresponding price in the same period of 2018-2019 crop season (See Table 6.11). This tumbling price is contributed by two factors. First, Durian producing villages from Kawkareik put a ban on entry of outsiders as part of the COVID-19 control measures, which prevents Durian traders from buying fruits. Second, retail shops that are set up along the Thai-Myanmar Asian highway cannot be opened during the season because the road is being reconstructed. The price resurges when a ban on entry of outsiders is lifted in June 2020, and the price is even higher than the corresponding period of the 2018-2019 season.

Some farmers from Kawkareik Township sells fruits to consumers directly through setting up a small retail shops alongside the highway because they can derive additional 2,000 MMK per piece. They give a warranty to consumers by replacing a low quality fruit with a good quality one.

**Table 6.11 Comparison of Price of Durian Reported by Farmers from Ka Mot Ka Thu village of Kawkareik**

Weight of Fruit	2019-2020 Season		2018-2019 Season	
	Month	Price (MMK)	Month	Price (MMK)
2 to 3 viss or 3.2 to 4.8 kilograms	April and May	3,000	April and May	5,000
1 viss or 1.6 kilograms	April and May	1,500	April and May	3,000
50 ticals or 0.8 kilograms	April and May	500	April and May	-
3 viss or 4.8 kilograms	June, July and August	7,000	June, July and August	5,000
1.5 viss or 2.5 kilograms	June, July and August	3,300	June, July and August	3,000

### D. Price Variation of Individual Traders

Comparison of the farm gate price of Durian between the 2018-2019 season and the 2019-2020 season shows that the price difference varies from one trader to another (See Table 6.12). One retailer pays the lower price in the 2019-2020 than that of the 2018-2019 season whereas two other traders pay the higher price in the 2019-2020 than that of the 2018-2019 season.

**Table 6.12 Comparison of Price of Durian Reported by Retailers from Koe Taing village of Kawkareik**

Weight of Fruit	2019-2020 Season			2018-2019 Season		
	Farm Price (MMK)	Wholesale Price (MMK)	Retail Price (MMK)	Farm Price (MMK)	Wholesale Price (MMK)	Retail Price (MMK)

<b>Retailer 1</b>						
1.8 viss or 3 kilograms	3,500	3,700	5,000 – 7,000	5,000 – 7,000	5,200 – 7,200	6,000 – 8,000
1 viss or 1.5 kilograms	1,500	1,700	3,333	3,500 – 4,500	3,700 – 4,700	5,000
30 ticals or 0.5 kilograms	750	950	1,000 – 1,500	2,000 – 3,000	2,200 – 3,200	2,500 – 3,500
<b>Retailer 2</b>						
1.8 viss or 3 kilograms	5,000	5,200	5,500	3,500	3,700	4,000
1.2 viss or 2 kilograms	4,000	4,200	4,500	2,500	2,700	3,000
60 ticals or 1 kilograms	3,000	3,200	3,500	1,000	1,200	1,500
<b>Wholesaler 1</b>						
1.8 viss or 3 kilograms	Nil	Nil	Nil	Nil	Nil	Nil
1.2 viss or 2 kilograms	3000	3,200	5000	2,000	2,200	5,000 – 7,000
60 ticals or 1 kilograms	1500	1,700	3333	1,000	1,200	2,000 – 3,500
30 ticals or 0.5 kilograms	750	950	1,000 -1,500	500	700	1,500 – 2,000

As illustrated in Table 6.14, purchasing price of one piece of fruit with 2 kilograms in the 2019-2020 season from Durian farmers by one trader is slightly higher than that of the 2018-2019 season in April and August but slightly lower than that of the 2018-2019 season in May. The price of the 2019-2020 season and the 2018-2019 season is the same in June and July. The price of one piece of fruit with 1 kilogram in 2019-2020 is higher than that of the 2018-2019 season in April and August but lower in May, June and July.

With respect to the seasonal variation of price, the price is higher in April and August than May, June and July because supply of fruits is low. The price goes down in May, June and July because Durian varieties from places other than Kawkareik Township enter into the market, which raises supply.

**Table 6.13 Comparison of Price Reported by Trader from Kawkareik Township between 2018-2019 Season and 2019-2020 Season**

<b>Weight of Fruits</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>
<b>2 kilograms</b>					
2018-2019	3,500	3,500	2,500	2,500	3,500
2019-2020	4,000	3,000	2,500	2,500	4,000
<b>1.5 kilograms</b>					
2018-2019					
2019-2020	2,000	1,500	1,250	1,250	2,000
<b>1 kilogram</b>					
2018-2019	1,250	1,250	600	600	1,250
2019-2020	1,400	1,000	800	800	1,400
<b>0.5 kilogram</b>					
2018-2019					

2019-2020	1,000	800	600	600	1,000
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### E. Price Variation by Trading Mechanism

The assessment looks at price difference of fresh Durian from farm gates to consumers in Yangon city, which is the largest domestic market. Two distinct trading mechanisms are observed: (a). a conventional trading mechanism consisting of farmers, local traders, the largest wholesale market in Yangon, retailers at conventional wet markets and consumers; and (b). a new, modernized trading mechanism encompassing farmers, a trading company, high end super markets and consumers.

A conventional trading mechanism seems to have more layers of value chain actors than a non-conventional one. Some layers of this mechanism are assessed to take higher share of profit than others.

The price difference between various layers of the trading mechanism operated by a new modernized trading mechanism seems to be lower than that of the conventional trading mechanism operated through Thirimingalar wholesaler market. This company offers 2,000 to 2,500 MMK per piece of Durian weighted 1.6 to 2.5 kilograms and 3,000 MMK per piece with the weight higher than 2.6 kilograms. It sells one piece of Durian weighted 1.6 to 2.5 kilograms to City Mart and capital at the price of 2,500 to 3,000 MMK and one piece with the weight higher than 2.6 kilograms at 3,500 MMK. It implies that this company takes the margin of 500 MMK per piece that does not take into account the operations cost. The Gross Margin would be lower than 500 MMK per piece or 20 to 25 per cent of the sale price.

Besides, consumers have to buy the fruit at higher price with lower quality of fruits from the conventional trading mechanism than a non-conventional mechanism. There is no differential benefit for farmers from both mechanisms as the farm gate price is more or less the same.

### F. Price Variation Across Various Layers of Value Chain Actors

Table 6.14, 6.15 and 6.16 shows huge price difference across trading centres of Taungoo town, the wholesale market of Yangon city and retailers of Yangon. This assessment uncovers that farmers do not seem to enjoy additional value from soaring retail price. By contrast, wholesalers and retailers derive significant profit as shown in Table 6.17. Wholesaler gets 28.8 per cent of the price difference and retailers get 57.1 per cent of price difference. The price that consumers have to pay per piece of Durian is 7,000 MMK or 2.3 times higher than the price that farmers get.

**Table 6.14 Wholesale Price of Various Quality Grades of Durian Variety from Thandaunggyi in 2019-2020 Season at Taungoo Trading Centres**

Grade	Weight	Price
Grade one	0.4 kilogram	500
Grade two	1.3 kilogram	1,800 – 2,000
Grade three	1.6 kilogram	2,500 – 3,000
Grade four	2.5 kilogram	5,000
Grade five	3.3 kilogram	6,000

**Table 6.15 Wholesale Price of Various Quality Grades of Durian Variety from Thandaunggyi in 2019-2020 Season at Wholesale Market of Yangon**

Grade	Weight	Price
Grade one	1 kilogram	3,000
Grade two	1.5 kilogram	4,000
Grade three	1.5 kilogram	5,000
Grade four	3 kilogram	6,000
Grade five	3 kilogram	7,000

**Table 6.16 Retail Price in Yangon of Durian Variety from Thandaunggyi in 2019-2020 Season**

Grade	Weight	Price
Thandaunggyi grade two	1.3 kilograms	8,000
Thandaunggyi grade two	1.8 kilograms	10,000
Thai Durian	1.8 kilograms	20,000

**Table 6.17 Value Captured by Actors of Fresh Durian Variety from Thandaunggyi in 2019-2020 Season**

Value Chain Actors	Price	Price Difference	Value Capture*
Farmer	3,000		
Trader in Taungoo	4,000	1,000	14.3 per cent
Largest wholesale market in Yangon	6,000 **	2,000	28.8 per cent
Retailer in Yangon	10,000	4,000	57.1 per cent
Total price difference between producer and consumer		7,000	

Price comparison is made for Good Quality Durian with Weight of 1.8 kilograms.

\* Price difference of each layer is divided by the total price difference and multiplied with 100.

\*\* Wholesaler gets 10 per cent of sale income, which is equivalent to 600 MMK per piece. The remaining price difference consists of transportation cost, labour cost and profit of partner trading centres.

**Table 6.18 Value Captured by Actors of Fresh Durian Variety from Kawkareik in 2019-2020 Season**

Value Chain Actors	Price	Price Difference	Value Capture*
Farmer	4,000		
Largest wholesale market in Kawkareik	4,200	200	9 per cent
Retailer in Kawkareik	6,000*	2000	91 per cent
Total price difference between producer and consumer		2200	

\* Retailers selling with guarantee and if consumer does not like, they have to change with good one.

The study discerns reasons for the price discrepancy from study participants and discovers the following plausible explanations. First, different layers of traders raise the price to derive profit for them. The price variation between a producing end and a consuming end depends on the amount of profit each layer obtains and the number of layers present. Second, some traders increase the price when demand exceeds supply. Third, it is possible that some retailers ask higher price from consumers whom they perceive as not likely to bargain the price. Besides, some traders use trucks to carry fruits from producing villages from Thandaunggyi Township to Taungoo town to prevent fruits from exposing to rain, which consequently raise the cost of marketing and the selling price. In addition, fees for using roads collected along the transportation route contribute to higher sale price. Finally, loss and damage occurs at each layer of trader forces each layer of trader to raise the sale price.

The assessment team buys Thandaunggyi Township Durian from some retailers from Yangon and uncovers that some fruits are not ripe yet although the price of 10,000 MMK per piece with 1.8 kilogram is charged. This situation is examined with some traders who have considerable experience. The first possible reason is that when traders do not come to producing villages during April and May due to the restriction of movement, some farmers have serious concern

that they could not sell fruits this year, and farmers are also in need of income. Subsequently, some farmers pluck unripe fruits and sell them. Secondly, some traders do not have adequate skills in distinguishing mature from immature fruits, and consequently, they buy and sell unripe fruits. Third, some traders ask farmers to pluck unripe fruits. Finally, farm workers pluck unripe fruits intentionally in order to derive more labour wage.

An irrational price hike and low quality of the goods are two most important impediments for value chain development of Myanmar Durian for the domestic market and future outlook to compete with Durians from other countries. A lack of a quality assurance system across value chain actors and the absence of setting up the standard price and quality for different actors are the most important shortcomings of the value chains, which needs the prioritized attention in the future intervention.

### 6.16 Gross Margin of Each Value Chain Player

Gross Margin analysis demonstrates that Gross Margin of farmers ranges from 77 to 82 per cent, Gross Margin of town level traders ranges from 7 to 59, Gross Margin of wholesaler from Yangon is 31 per cent and retailers from Kawkaareik and Yangon ranges from 36 to 38 per cent.

How the total profit is shared among various value chain actors is computed by dividing the profit of each value chain actor by the entire profit multiplied with 100. The per cent of value captured by farmers is 54 for Kawkaareik and 14 for Thandaunggyi, by town level traders is 6 for Kawkaareik and 26 for Taungoo, wholesaler in Yangon is 20 and retailers is 41 for Kawkaareik and Yangon is 40.

**Table 6.19 Gross Margin Analysis of One Piece of Durian of Kawkaareik**

	Investment for Purchase of Durian	Other Types of Cost	Income/ Revenue	Profit	Gross Margin (Profit Divided by Income Multiplied by 100)	Value Captured (Profit of Each Value Chain Step Divided by Total Profit Multiplied by 100)
Farmer*	-	583	2,556	1,973	77	54
Wholesalers in Kawkaareik	2,556	100	2,856	200	7	6
Retailers in Kawkaareik	2,556	100	4,156	1,500	36	41

\*An average cost of participating farmers is computed and an average price offered by traders to farmers is used.

**Table 6.20 Gross Margin Analysis of One Piece of Durian of Thandaunggyi**

	Investment for Purchase of Durian	Other Types of Cost	Income/ Revenue	Profit	Gross Margin (Profit Divided by Income Multiplied by 100)	Value Captured (Profit of Each Value Chain Step Divided by Total Profit Multiplied by 100)
Farmer*	-	274	1,550	1,276	82	14
Trader Taungoo	1,550	80	4,000	2,370	59	26
Wholesaler in Yangon	4,000	117	6,000	1,883	31	20

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Retailer in Yangon	6,000	250	10,000	3,750	38	40
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\*An average cost of participating farmers is computed and an average price offered by traders to farmers is used.

Types of operations cost of the wholesaler from Thirimingalar are: (a). electricity cost of 3,000 MMK per month; (b). salary of one permanent worker is 300,000 MMK per month; and (c). rental of shop is 450,000 MMK per month.

The total running cost of the trading company is estimated at 5.7 million MMK per month, which consists of the following types of operations cost: (a). total cost for running an office is 600,000 to 700,000 MMK that includes electricity cost of 300,000 MMK per month and other costs such as water, etc.; and (b). salary of 19 permanent employees is 5 million MMK per month. As 60 per cent of the goods are Durian, operations cost of trading Durian is 3.4 million MMK.

Types of operations cost of traders from Taungoo town are: (a). electricity cost of 3,000 MMK per month; (b). salary of 4 workers is 792,000 MMK per month; and (3). rental of shop is 250,000 MMK per month.

The total operations cost of the largest trader from Kawkareik town in the 2019–2020 season is 1 million MMK that includes transportation cost and labour cost. Profit of this trader in 2019-2020 is 3 million MMK. The total operations cost and profit of this trader in 2018-2019 is 4 million MMK and 15 million MMK, respectively. The profit declines from 2018-2019 to 2019-2020 because the production of Durian decreases, which prevent this trader from selling fruits to the Yangon wholesale market.

### **6.17 Future Outlook for Export**

With regard to the prospect of exporting Durian to international markets, one of the leading companies that has initiated an export of Durian to China perceives that Myanmar Durian varieties cannot compete with Durian varieties from Thailand and Malaysia in terms of quality. The second factor that may prevent exporting Durian is a short shelf life, which may lead to spoilage of fruits by the time fruits reach to consumers of the international markets. Besides, it is likely that the supply cannot meet the demand of good quality varieties because orchards are too small to produce fruits at the commercial scale. It is forecast that it will take 2 to 3 years for the company to export Durian because the existing quality has to be improved and a cold storage system is needed to keep fruits to extend shelf life.

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## **Annex 2. Global Durian Market**

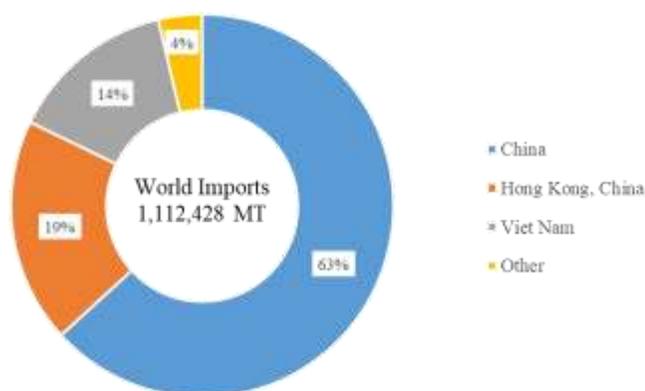
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Durian, known as the king of fruits and is the highest prized fruit in Southeast Asia, is cultivated in Indonesia, the Philippines, Malaysia, and southern Thailand primarily. These countries export to other countries. The fruit has a mild sweet flavour but have a pungent door. The pulp which resembles in texture as a custard-like pulp, is eaten at various stages of ripening and used in a variety of sweet and savoury dishes. The seeds of the fruit which are roasted as snacks are also eaten. Although it is highly favoured in Asian countries due to its exquisite taste and flavour, it is less popular in Western countries due to its distinctive door. Durian flesh is popular for further processing in the food industry to make ice-creams, jams, desserts, and cakes. Durian can be canned and dried and can be stored with longer shelf life to retain its taste and flavour.

Durian is popular among both the local markets where it is grown and the international market. Similar to other various tropical fruits, Durian is rich in energy, vitamins, and minerals. It also provides phytonutrients, water, proteins as some of the beneficial nutrients. Being a good source of fibres and vitamin C, which make it an overall enriching nutrient fruit for consumption? Furthermore, it is believed to address indigestion, aging, insomnia, blood pressure, cardiovascular problems, bone problems and anaemia. Owing to its positive impact on health of human beings, it is likely to be consumed globally over the forecasted period.

Thailand and Malaysia are the two largest producers of Durian fruit globally with the combined total production of up to 90 per cent of the global production. In 2016, Thailand produced 600,000 tons of Durian while Malaysia produced nearly 400,000 tons. The Philippines is the third largest producer globally with 71,500 tons. Thailand's production is mainly to export and the production in Malaysia and Philippines is consumed domestically. Approximately 80 to 90 per cent of Thailand's Durian production has been exported annually from 2012 to 2017, especially to China, and Thailand is one of China's largest suppliers.

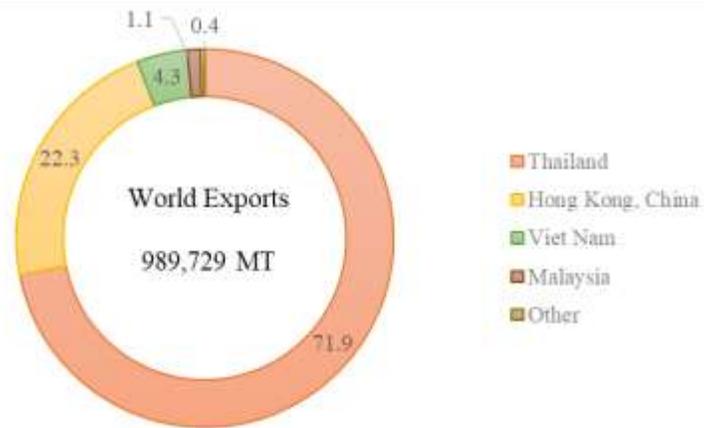
People Republic of China is ranked first with 63 per cent of the global import followed by Hong Kong with 19 per cent global market share, Vietnam with 14 per cent global market share and other countries with 4 per cent global market share.



\*Source: Data from International Trade Centre (ITC) Trade Map

**Figure 6.1 World Import Market Share of Fresh Durian in 2019 (in metric tonnes)**

Thailand is ranked first with 71.9 per cent of the global export followed by Hong Kong with 22.3 per cent of the global market share, Vietnam with 4.3 per cent and Malaysia with 1.1 per cent.



\*Source: Data from ITC Trade Map

**Figure 6.2 World Export Market Share of Fresh Durian in 2019 (in metric tonnes)**

Analysis of secondary data of the ITC Trade Map illustrates that Myanmar exported 5 tons of fresh durian to China at the price of 1,400 USD per ton in 2018.

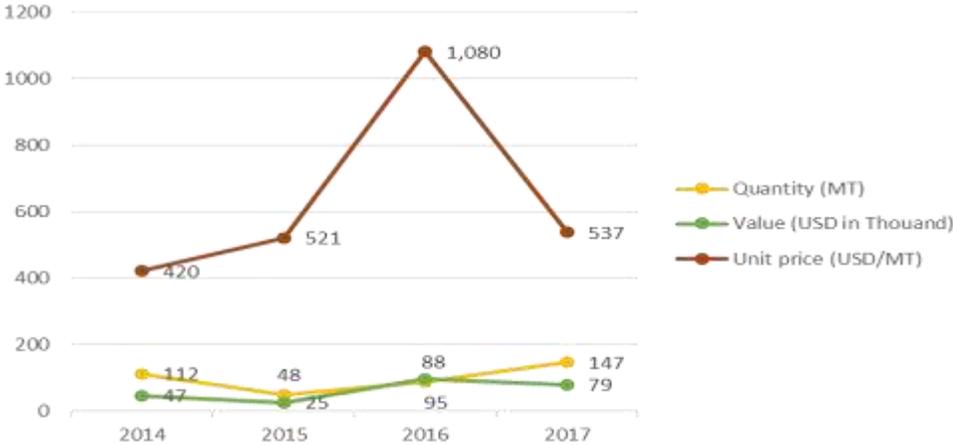


\*Source: Data from ITC Trade Map

**Figure 6.3 World Fresh Durian Trade Analysis from 2015 to 2019 (in metric tonnes)**

According to the secondary data from ITC Trade Map, the trend of export volume of fresh Durian has increased gradually from 2015 to 2019. Meanwhile, the import volume of fresh Durian has slightly declined from 2015 to 2017 and increased from 2018 to 2019.

Myanmar imported the fresh Durian from Thailand from 2014 to 2017. The highest quantity of Durian was imported with the unit price of 537 USD per ton in 2017. Data regarding Durian import of Myanmar is not available for 2018 and 2019 from the ITC trade map.



\*Source: Data from ITC Trade Map

**Figure 6.4 Thailand Market for Fresh Durian imported by Myanmar**