INTRODUCTION

Overview

The production of durian is common to countries in Southeast Asia, more particularly to the tropical climates of Indonesia, Malaysia, Thailand and the Philippines. It is considered as a major fruit in these countries, except for the Philippines since its value and export potential has been recognized just recently. One of the reasons for having this export potential is derived from the difference in the environmental characteristics between the four countries which led to the different fruiting schedule of durian between countries. As an emerging export winner, durian can take advantage of the lower tariff in the world market and trade liberalization under the General Agreement on Tariffs and Trade (GATT). Global demand, particularly Asia, offers bright opportunity for the industry (PCARRD, 2003).

Considering the great economic contributions and potentials of durian, a lot of government and private initiatives had been undertaken to promote and develop the industry. One of the most significant of which is the formulation and availability of the National Road Map for fruit crops in the Philippines by the Department of Agriculture (DA). The objectives are to increase off-season production, reduce post-harvest losses, expand market, and produce globally competitive processed products. It envisions Southern Philippines durian industry to be globally competitive, expanding markets, and environmentally sustainable (Garcia and Pamplona 2009). Other developments include the laying down of good agricultural practices (GAP) for durian production, the formulation and approval of the Philippine National Standards as well as the ASEAN standards for the commodity.

The absence of supply, demand, price, and other relevant market information is a considerable constraint for expanding the market of durian, particularly tapping the export market. Expansion would necessitate the determination of current supply and demand situation, the specific markets and their requirements as well as whether existing supply chains are able to meet such requirements. Thus it is the utmost intention of the study to investigate on the following objectives;

Objectives

This study is designed to identify and assess existing supply chains for durian in Region 11 and to identify possible areas for its improvement. The specific objectives are as follows:

1. To provide an overview of the durian industry;
2. To map out the specific supply chain for durian;
3. To analyze the performance of the durian supply chain in terms of efficiency, flexibility and overall responsiveness;

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1 Research Proposal on SCI of Durian Industry in Regions 11 and 12
2 Philippine Recommends for Durian 2000
4. To identify areas for improvement in the supply chain such as behavioral, institutional and process;
5. To provide specific policy recommendations to improve the durian industry.

**REVIEW OF LITERATURE**

**Supply Chain Management Concepts and Objectives**

A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, but the complexity of these chains may largely differ among various industries and various firms (Ganeshan and Harrison, 1995).

In addition, Mentzer (2001) provided his own definition of supply chain as well as other related terms. A supply chain is defined as a set of three or more companies directly linked by one or more of the upstream and downstream flow of products, services, finances, and information from a source to a customer; while a basic supply chain consists of a company, an immediate supplier, and an immediate customer directly linked by one or more of the upstream and downstream flows of products, services, finances, and information.

On one hand, an extended supply chain includes suppliers of the immediate supplier and customers of the immediate customers, all linked by one or more of the upstream and downstream flows of products, services, finances, and information. On the other hand, an ultimate supply chain includes all the companies involved in all the upstream and downstream flows of products, services, finances, and information from the initial supplier to the ultimate customer. Meanwhile, a supply chain orientation is the recognition by a company of the systemic, strategic implications of the activities and processes involved in managing the various flows in a supply chain. Supply chain management, then, is the systemic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

As Lambert and Cooper (2000) would place it, supply chain management is the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customers and other stakeholders. Its objective is primarily to create the most value, not only for the company, but more importantly, for the entire supply chain network including the end customer.

According to Mentzer (2001), the term supply chain management has become prominent over the past decade. The rising popularity and importance of supply chain management as a concept to companies could be attributed to several factors which include (1) increasing global sourcing of corporations, (2) increasing time- and quality-based competition among companies and distribution channels, and (3) rising marketplace uncertainty due to all these global orientation and competition combined with rapidly changing technology and economic conditions.

Stevens (1989) stated that the objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost.

Harland (1996) stated that supply chain management can be used to refer to four main concepts:

- the internal supply chain that integrates business functions involved in the flow of materials and information from inbound to outbound ends of the business.
• the management of dyadic or two party relationships with immediate suppliers.
• the management of a chain of businesses including a supplier, a supplier’s suppliers, a customer and a customer’s customer, and so on.
• the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers.

Overview of the Durian Industry

Production of Durian is concentrated mainly in Thailand, Malaysia and Indonesia. Philippines and other Southeast Asian countries also produced durian for consumer’s consumption (Cunningham, 2000). The production area in Thailand increased 4.63% per year from 1922 to 1996. Its average production is 672,781 mt Malaysia has an average production of 310,957 mt from 2006 to 2011 (Department of Statistics, Malaysia). In Indonesia, durian is one of the major fruits consumed by Indonesian. Its average volume of production is 549,736 mt from 1998 to 2011 according to Regional Data Exchange System (RDES). Philippines has an average production of 45,255 mt. Durian here is widely grown in Mindanao particularly in Davao Region which is the durian top durian producing region with the most number of bearing trees and area dedicated to durian (BAS).

Key Customers and Key Players of Durian Industry

Thailand is the world exporter of fresh and frozen durian. Its major importers are Taiwan and Hong Kong for fresh durian while U.S.A., Australia and Hong Kong for frozen. Other countries that import durian from Thailand are Malaysia, Singapore, China, Europe, Canada3, and New Zealand4. Indonesia though one of the top producing countries has been importing durian from Thailand since 19975. Singapore buys majority of Malaysia’s and Indonesia’s durian exports as well as significant amount from Thailand6 but re-exports durian to Brunei and Hong Kong7. Durian is grown only in agrotechnology parks with three local cultivars, H. C. Tan No. 2, H. C. Lim and Lim Keng Meng. In the Philippines, durian is for local market however local farmers and durian association groups are exerting efforts to enter the global market (Miculob).

Product Flow of Durian

The direct buyers of durian in Thailand from the farmers are local collector, retail merchants, district collectors, collectors from other provinces and durian processors. From them, the product is sold to wholesalers and retailers. There are four major markets, the local markets (eastern part of Thailand), other province markets, Bangkok market and export market. The marketing structure for durian varied according to the markets. Central markets for fresh durian in the local production area are perfect for market competition. In this market, collectors and wholesalers can purchase durian in many ways such as contract farming partially or purchase the whole orchards. After harvesting durians are transported to Bangkok for retail market/retransport to other provinces as described in the fruit marketing system in Thailand in 1998.

In Indonesia, generally the middlemen buys the fruit from the farmers then pass it to collectors from village, district or province. The collectors then sell it to wholesalers which sell it to three different buyers such as traditional markets who supply street vendors, suppliers of retailers and super markets and directly to street vendors (Ahmad Dimyati). As shown this is for domestic market only for Indonesia for majority of their production is consumed by Indonesian.

3 Dr. Pattana Jealviriyanapan, et. al
4 Biosecurity Act 1993
5 Roedhy Poerwanto and M. Firdous
6 Tom Cunningham 2000
7 Durian Information- A BlogSpot Dedicated to the King of Fruits
In a study by Lustia et al., they cited a more detailed marketing channel for durian in Davao City as one of the top producing provinces in the country. From the production areas, the fruits are either picked up or are delivered by farmers to buyers in the trading centers or to traders in Davao City. The assembler delivers the fruits procured to the assembler/distributor and assembler/shipper in the trading center or assembler/distributor in the city. The assembler/distributor based either in the trading or market center both sell to transient traders, processors and consumers. Those based at the market center also sell to retailers. The assembler/shipper in the municipality ships directly to Manila and sells the rejects to consumers and processors. Aside from shipment to Manila, the assembler/distributor/shipper in the market center also sells to processors, consumers and transient traders (BAS, 1992).

Figure 1. Marketing Channels of Durian in Davao City, 1992, BAS
Durian Production in the Philippines

There is no clear information if durian is a native in the Philippines or was introduced (Brown M. 1997). Durian is grown widely in the island of Mindanao. A Durian tree grown from seed can reach a height of 30-40 m. Vegetative propagation can reduce this height to half. It has a usually straight, low-branching trunk and a dense canopy. The leaves are 10-20 cm long and 4-6 cm wide, dark green above and silvery or light golden yellow beneath. The large flowers are borne in pendulous, large inflorescences on usually bare branches, open at night and are bat pollinated. The large, long-peduncled, round to oblong fruit has a thick spiny rind, and five segments, each containing a yellowish white to yellow, sweet, aromatic aril surrounding 1-4 light brown seeds. The fruit matures about four months after flower opening (The Philippines Recommends For Durian).

In Palawan there is *Durio graveolens* which is smaller than the average durian weighing less than 1 kilo. The thorns are sharper and longer, a series of needles wrapped around a bright green or yellow exterior. Like the *zibethinus*, they fall to the ground when ripe, although endemic to Palawan opens on the tree and drops the flesh. The actual edible portion of a *graveolens* is very small, with even thinner flesh than a kampung or durian ban. This is why it has not reached the commercial market, although some farms in Sarawak and Kalimantan do specialize in *graveolens* and several *graveolens* clones have been selected by research facilities. In the Philippines, *graveolens* will be used as a disease resistant rootstock. Dr. Virgilio Loquias, the durian expert at the BPI said that there several varieties endemic to Palawan. He has two *graveolens* in his orchard, an orange and yellow fleshed one.

![Picture 1. *Durio graveolens*](image1)
![Picture 2. Thornless Durian](image2)
![Picture 3. *Durio zibethinus*](image3)
THEORETICAL FRAMEWORK

The efficiency and competitiveness of the durian industry in particular, both in the local and world markets, requires not only enhancing the performance of a single segment or member of the durian supply chain but more importantly that of the whole industry (Figure 1). Supply chain refers to the distribution channel of a product and the network of players, from sourcing of the product to its delivery to the end consumer. Supply chain management aims to utilize and capitalize on strengths, improve weaknesses, explore for opportunities, and mitigate threats in the supply chains.

The SCM, as a systems approach, draws contributions from various disciplines and scrutinize these areas to determine how the supply chain of durian can be developed to take advantage of the economic potentials of the industry.

Figure 2. Theoretical Framework of Agricultural Supply Chain

The specific key performance indicators under the three dimensional definitions (efficiency, flexibility, responsiveness, and food quality) are shown in Fig. 2. Gathered data will be summarized using descriptive statistics which will be used to analyze the supply chains in terms of the key performance indicators. More specific indicators such as production costs and profit along the chain are also considered very important.
Procedure and Instrument of the Study

Historical method was employed to secure data and present information about the overview of durian industry in region 11, survey using interview guide was done to gather cross-sectional current data on the 6 key questions of supply chain analysis and focus group discussion was done to triangulate and validate the data gathered particularly on the issues and concerns that were identified in the study.

The study used five different sets of questionnaire, each was patterned after the most common activities and processes involve for each type of player in the supply chain of durian. Primary data gathering was done thru a tracer methodology which started from downstream key customers to traders and to upstream durian growers.

Sampling

The study interviewed a total of 109 durian players in region 11, which served as the respondents of the study and supplied the necessary primary data needed in the study. Samples from key customers; institutional buyers, processors, retailers were purposively identified while traders and growers were traced based on the identified and interviewed key customers to compose their respective supply chains.

Table 1. Distribution of Durian Players in Region 11

<table>
<thead>
<tr>
<th>Type of Player</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durian Growers</td>
<td>22</td>
</tr>
<tr>
<td>Durian Growers / Processors</td>
<td>5</td>
</tr>
<tr>
<td>Contract Growers (Arriendo)</td>
<td>10</td>
</tr>
<tr>
<td>Contract Buyers</td>
<td>4</td>
</tr>
<tr>
<td>Assembler</td>
<td>2</td>
</tr>
<tr>
<td>Assembler / Retailer</td>
<td>14</td>
</tr>
<tr>
<td>Wholesaler / Retailer</td>
<td>11</td>
</tr>
<tr>
<td>Wholesaler / Assembler / Retailer</td>
<td>6</td>
</tr>
<tr>
<td>Retailers of Fresh Durian</td>
<td>18</td>
</tr>
<tr>
<td>Retailers of Processed Durian</td>
<td>5</td>
</tr>
<tr>
<td>Processors</td>
<td>6</td>
</tr>
<tr>
<td>Institutional Buyers</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>108</strong></td>
</tr>
</tbody>
</table>

Statistical Analysis

Cost and returns analysis was used to analyze the efficiency of every player along the chain. Profits and return to expenses (ROE) were computed to determine whether it pays more to continue operating, or returns substantially exceed production and marketing costs of each player. Net profit margin (NPM) was also computed to determine the proportion of profit to total returns of every player. Actual and potential costs were also compared to determine the efficiency of each player in the chain and that of the whole supply chain.
The formulas for determining efficiency are as follows (Bayacag, 2012).

1. Efficiency of Individual Player

\[ E_p = \frac{C_p}{C_a} \]

Where:
- \( E_p \) efficiency rating of individual player
- \( C_p \) potential cost in performing an activity
- \( C_a \) actual cost in performing an activity

Potential cost is computed by deducting cost of inefficiencies which includes losses and transaction costs from the actual cost of producing the product. As the cost of inefficiencies increases potential cost decreases bringing down the efficiency rating of the player or the chain, however at zero cost of inefficiencies players or the chain achieves full efficiency rating of 100 or 100%.

2. Efficiency of the Supply Chain

\[ E_c = \frac{\sum_{i=1}^{n} C_{pi}}{\sum_{i=1}^{n} C_{ai}} \]

Where:
- \( E_c \) efficiency rating of the whole chain
- \( C_{pi} \) potential cost of chain player \( i \)
- \( C_{ai} \) actual cost of chain player \( i \)
- \( i \) \( 1, 2, 3, \ldots, n \)
- \( n \) number of players in a chain

Scope and Limitations of the Study

The research was conducted from November of 2011 up to January of 2013 within the boundaries of Davao region. Moreover, in cases where the chain extends beyond the region the study only documented the volume of durian. All information generated in the study is lifted from the responses of the 109 respondents of the study.

DISCUSSION OF RESULTS AND FINDINGS

I. Overview of the Durian Industry
Worldwide, the top four durian producers are located in Southeast Asia. Among the four countries, Thailand occupies the first place in most durian produced, contributing almost 42.62%, seconded by Indonesia with a 34.82% share, followed by Malaysia with 19.7% and Philippines with 2.87%. These figures suggest that Philippines share in the world production of durian is not very significant, and if the country wishes to compete for a bigger share in the international market for durian, it has to pay attention to the supply aspect of the industry.

Figure 3 Percent Distribution of Durian Production in Southeast Asia
Sources: Countrystat.bas.gov.ph, Office of Agricultural Economics-Thailand, Regional Data Exchange System-Indonesia and Department of Statistics, Malaysia

General production trend of durian in the Philippines is on the rise for the past fourteen years. The past two decades was a significant milestone for the durian industry, it has been a response period to the economic potential of durian in the country. The increasing trend in the graph below includes sudden up and down movements for the past 5 years (Figure 5). Despite the constant increase in the area planted to durian, movements in total output during this period is somehow influenced by the rise and fall of the number of durian bearing trees in the country.

Figure 5. Production Trend of Durian in the Philippines from 1998 – 2001.
Source: countrystat.bas.gov.ph

The contribution of Region 11 or Davao region to the gross national value of durian in the Philippines averages to 54% for the past 14 year period of 1998 – 2011 (Figure 6). However, one striking scenario is the growing contribution of Davao region to the total production of durian in the country over time. Statistics shown that durian production is becoming more of a phenomenon in Davao region, the challenge to Dabawenios for now is to produce more than what the country needs and be able to create surplus for export.
Figure 6. Percent Contribution of Region 11 to Gross National Value of Durian from 1998 – 2011. 
*Source: countrystat.bas.gov.ph*

Shown in the figure below is the average per capita consumption of durian in selected countries of Southeast Asia. It can be seen that Thailand being the biggest producer of durian in the world also leads the per capita consumption of durian. Surprisingly, Singapore a country not known of its durian production placed second highest in terms of per capita consumption of durian, followed by Malaysians consuming an average of 10.25 kilos of durian annually. Indonesia considered as the second biggest producer of durian consumes only less than a kilo of durian per year which is 900 grams, and Philippines placed fifth in terms of annual per capita consumption wherein each Filipino is estimated to consume only 200 grams of durian a year.

Figure 7, Average Annual Per Capita Consumption of Durian in Southeast Asian Countries
*Sources:* 1) BAR, 2) T. Cunningham, 3) Department of Statistics-Malaysia, 4) R. Poerwanto, 5) BAS

II. Supply Chain of Durian in Region 11

Key Players in the Durian Industry of Region 11

The following are the 12 identified players operating in the durian industry of region 11 and these players are further categorically identified as key players (Table 5) and key customers (Table 6).
**Durian Growers**

There are more and more durian growers scattered in region 11. Digos, Davao, Panabo, Tagum and Mati are the major cities in the region and their appetite for durian is being served by farms sitting just outside the city proper. In this study, farms are categorized into small, medium and large (Table 2).

<table>
<thead>
<tr>
<th>Farm Size</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 1 hectare</td>
<td>3</td>
</tr>
<tr>
<td>1 – 3 hectares</td>
<td>13</td>
</tr>
<tr>
<td>Above 3 hectares</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>

**Key Players and Their Roles**

Table 3 shows the following 7 identified key players in the durian industry of region 11. Primarily, the durian growers, integrated durian grower/processor and arrienderos are the producers of the durian fruit. Majority of the integrated producers cater assemblers from other regions, as can be seen in Map 1 the inter-regional flow of durian from region 11 to ARMM, region 10 and region 12 is due to the workings of this type of producer. Worst case scenario for the producer was pointed out by A. Galang upon data gathering for this study, contract buyers take advantage of the time constraint facing durian growers, contract buyers would resort to delaying tactics to negotiate for a lower price of the value of the farm, earning them some degree of bargaining/market power.

Wholesaler/retailers are another type of players that has some degree of market power. Though their purchase price is negotiated with their suppliers they gain market power by doing wholesaling, since they have established market contacts they are the actual ones that decide on the wholesale price of durian.

Wholesaler/assembler/retailers have definitely have the entire marketing option, thus it is easy for them to squeeze some degree of price setting. They travel to source out their durian supply and bring them back to their place for marketing, in this manner; they have the option of scouting for a much cheaper source of durian and selling it a comfortable price.

Assemblers are established traders, buying several agricultural commodities and selling them to established supermarkets. As professional as they seem, their price in the market is the highest price. They are the durian traders with the highest average selling price of 47.5 pesos per kilo.
### Table 3. Key Players and Their Roles

<table>
<thead>
<tr>
<th>Players</th>
<th>Activities</th>
<th>Average Volume (kg)</th>
<th>Average Suppliers</th>
<th>Source Price Information</th>
<th>Market Power</th>
<th>Selling Price</th>
</tr>
</thead>
</table>
| 1. Durian Growers | - Responsible for taking care of farm operation and the production of durian fruits in different varieties.  
- Responsible for harvesting and sorting of mature durian fruits.  
- Deliver durian in wholesale to traders and retailers.  
- Engage into contract with traders and retailers for the disposal of durian. | 3063 | n/a | - Association  
- Assemblers  
- Calinan Public Market  
- Big producers | Overall no market power for this player except for the biggest producers. | 24.64 |
| 2. Durian Grower / Processors | - Responsible for taking care of farm operation and the production of durian fruits of different varieties.  
- Responsible for harvesting and sorting of mature durian fruits.  
- Perform on and off farm retailing of table ripe durian fruits.  
- Prepare ready to eat (RTE) durian for wholesale and retail.  
- Prepare durian meat for processing and for sale to processors.  
- Process durian for sale to consumers. | 8211 | n/a | - Big producers  
- Bankeroohan Public Market | There is a small magnitude of market power by having a fallback option on what to do with their fresh durian. | 25.19 |
| 3. Arriendo | - Enters into a long term contract “arriendo” with growers and assumes almost all the responsibilities of farm operation.  
- Responsible for securing the farm throughout contract duration.  
- Harvest, load, transport, and unload of mature durian fruits. | 2786 | n/a | - Own experience | No market power, they can only negotiate with the owner of the farm on the value of the farm. | 24.85 |
| 4. Contract Buyers | - Assume the role of the growers after fruit setting.  
- Provides technical guidance to durian growers.  
- Responsible for securing the farm throughout the contract duration.  
- Harvest, load, transport and unload mature durian fruits.  
- Wholesale mature durian fruits of different varieties to contacted traders | 3344 | 5 | - Association  
- Traders  
- Market | Yes, decides on contract price of durian farm. | 32.63 |
| 5. Wholesalers / Retailers | - Buys from contract buyers and contract growers.  
- Sort the mature durian in terms of size, shape, sound and variety.  
- Schedules delivery and wholesale of mature durian to retailers.  
- Schedules wholesale of mature durian to retailers.  
- Wholesale mature durian to known and contacted retailers.  
- Display and sells mature durian to consumers. | 2074 | 4 | - Market | Yes, negotiates the buying price with the suppliers and decides on the selling price of durian to retailers. | 36.53 |
| 6. Wholesaler / Assemblers / Retailers | - Buys and transport durian from other places.  
- Sorts mature durian in terms of size, shape, sound and variety.  
- Wholesales mature durian to known and contacted retailers.  
- Display and sells mature durian to consumers. | 4375 | 2 | - Own experience  
and existing market prices | Yes, by looking and scouting for cheaper supply farms and selling in different locations. | 43.54 |
| 7. Assemblers | - Coordinates the supply of mature durian in supermarkets from.  
- Delivers durian to supermarkets.  
- Display and sell mature durian in supermarkets.  
- Prepares ready to eat (RTE) durian for sale to consumers. | 5100 | 2 | - Farmers and Institutional Buyers | Has some degree of market power in selling by weighing buying price and supermarket markup. | 47.5 |
Key Customers of Durian and their Product Requirements

Table 4 shows the five different key customers identified in the study and their respective suppliers and product requirements.

Assembler retailers (AR) are located mostly outside of Davao City and each handles a weekly average of 1,160 kilos of classes A and B durian assembled at least twice a week with no specific packaging requirement. Fort them, there are three bases for durian classification, the first classification is based on variety, varieties that are highly demanded, to name a few these are puyat, duyaya and kob, are considered as class A which commands a higher buying price from the suppliers and to some cases higher selling price to consumers. In most cases especially during durian season all of these varieties will command the same selling price to consumers but varies in their cost of procurement. Class B durian includes the varieties arancillo, D101, GD69 and chanee and class C durian are monthong, native and alcon fancy. The second and third classifications of durian are in terms of size and shape respectively. Class A are within 1.5 to 4 kilos and follows the expected shape of the variety either oval or ovoid, class B follows the same size but slightly deformed while class C are rejects or inputs for processing and characterized as less than or more than the desired weight and extremely deformed (Picture 8).

Retailers of durian can be found almost all over the region and adopted almost the same requirement with the assembler retailer, differing slightly on the weekly average volume of 1057.3 kilos of the same characteristics mentioned above. However, retailers differ significantly from assembler retailers in terms of their suppliers, they have various suppliers compared to AR.

Processors are the key customer of arrienderos and wholesaler/retailers and are found primarily within the cities of Davao and Tagum. Their requirements ranges from fresh durian to durian meat to durian concentrate. During abundant supply of durian they would stack class A durian meat in their freezers, however if they fall short in inventory during off season they have no other choice than to use classes B and C. Some durian processors require durian meat instead of fresh durian that is properly pack using cellophanes or plastic disposable containers for convenience and waste management purposes. One processor notably uses durian concentrate as a substitute to make durian candies. In a week processors, used up to 200 kilos of fresh durian ranging between 50 to 70 kilos of durian meat as input for durian processing.

Institutional buyers are the key customer of assemblers and are scattered all over the region, but converge in the cities of Digos, Davao and Tagum. Supermarkets in this case, require class A durian during durian season and allow class B during off season where there are limited options available in the market. When it comes to processed durian products they strictly require processors to be registered under the Bureau of Food and Drugs (BFAD) and Halal certification. A supermarket in average can sell 250 kilos of fresh durian a week and 650 packs of assorted processed durian products. Souvenir shops “pasalubong centers” and fruitstands around the region sell not only fresh durian but also processed durian in most cases. Different processed durian products are packed based on their texture, some are better packed in cellophanes, boxes and plastic containers while others like durian jam needs to be bottled.

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8 Junrey Y, Bisate, Durian Trader
9 Marieto Pugado, Durian Trader
10 Rosario’s and Apo ni Lola
<table>
<thead>
<tr>
<th>Key Players</th>
<th>Key Customers</th>
<th>Location</th>
<th>Product Requirements</th>
<th>Packaging</th>
</tr>
</thead>
</table>
| - Durian Growers            | Assembler / Retailers                  | Digos City, Sta Cruz, Compostela, Mati City | - Class A and B of fresh durian in terms of variety size and shape.  
- Average Volume per Week: 1160 kilos of fresh durian  
- Delivery Schedule: Twice a week  
- Packaging: Bamboo basket and contained in a vehicle.                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                |
| - Durian Growers            | Retailers                              | Davao City, Panabo City, Tagum City, Mati City & Sta. Cruz | - Class A and B of fresh durian in terms of variety size and shape.  
- Average Volume per Week: 1057.63 kilos of fresh durian  
- Delivery Schedule: Twice a week  
- Packaging: Bamboo basket and contained in a vehicle.                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                |
| - Contract Growers          | Processors                             | Davao City & Tagum City                     | - Class A of fresh durian during season and B or C during off season.  
- Durian rejects that are not yet opened.  
- Properly packed durian meat.  
- Durian concentrate  
- Average Volume per Week: 200 kilos of fresh durian  
- Delivery Schedule: Once in four months for fresh durian and durian meat.  
- Packaging: New cellophane and plastic containers for frozen durian meat.  
- Bottle canister for durian concentrate.                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                |
| - Assemblers                | Institutional Buyers                   | Davao City, Digos City, Mati City & Tagum City | - Classes A and B of fresh durian in terms of size shape and variety.  
- Average Volume per Week: 250 kilos of fresh durian  
- Delivery Schedule: Every day to every week  
- Packaging: Plastic crates for fresh durian  
- Cellophane, bottle & plastic containers.                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                |
| - Processors                | Retailers of Processed (Supermarkets and Fruitstands) | Sta. Cruz Davao del Sur Davao City, Davao del Sur | - From 1 week to 4 week shelf life depending on the product.  
- BFAD and Halal Licensed and Certified processors.  
- Average Volume per Week: 102 packs of 12 durian bars  
- 162 packs of 12 durian candies  
- 61 bottles of 120-150 ml durian jam  
- 61 packs of 17 durian yema  
- 35 packs of 12 durian tarts  
- 25 boxes of 10 durian pie slices  
- 33 packs of 55 durian pastillas  
- 30 packs of 9 durian polvoron  
- 110 packs of 55 gram durian chips  
- 200 packs of 50 gram dried durian  
- Delivery Schedule: 2 times / week  
- 2-4 times / week  
- 1 / week  
- 1-3 times / week  
- 2-6 times / week  
- 1 / week  
- 1-3 times / week  
- 1-2 times / week  
- 2 times / week  
- 3 times / week  
- Packaging: Cellophanes, boxes, plastic and bottle canisters.                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                |
Spatial Flow of Durian in Region 11

Figure 8 shows the spatial flow of durian in region 11. Notably, Davao City is characterized as the major demand center and biggest supplier of durian in the region indicated by the outflow of durian supply from the city towards its neighboring cities and municipalities. Davao City along with Davao del Sur, Tagum City and Compostella Valley are the supply areas of durian in the region. It was found out in the study that Davao City is not only supplying Cotabato City in ARMM and Valencia City in Region 10 but also Cebu and Leyte in Visayas and Manila in Luzon. Another major supply area in the region is located in Malita, Davao del Sur home of the 810 hectare Cojuangco Durian Farm who is supplying Davao City during its durian off season since they have late fruiting schedule of durian in the area. It was also traced in the study that there is an outflow of durian from this part the of region to a certain part in region 12, specifically in Kabacan, North Cotabato.

Figure 8. Spatial Flow of Durian in Region 11

○ Supply Areas   ★ Demand Area

Product and Payment Flow of Durian in Region 11

○ Supply and Demand Areas
The Bureau of Agricultural Statistics in 1992 came up with categorization of the different marketing chains of durian in the area. Accordingly, the first category is the supply level which includes the durian growers, second is trading centers including almost all first-hand traders and the market centers including traders that transport the durian to their final point of consumption which is the demand level. Shown in table 5 is the movement of durian from the producer to its ultimate consumer, which has some resemblance to that of the marketing channel reported by BAS in 1992. Furthermore, it gives us an entire picture of the different supply chains of durian in the region, ranging from the shortest chain, involving direct disposal to the consumers, to a more complicated chain, involving 4 players before reaching the consumer. The table was able to provide and portray 12 unique market channels for durian as follows;

Table 5. Supply Chains of Durian in Region 11.

<table>
<thead>
<tr>
<th>Supply Chain</th>
<th>Players Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Durian Grower → Assembler/Retailer → Consumer</td>
</tr>
<tr>
<td>2</td>
<td>Durian Grower → Retailer → Consumer</td>
</tr>
<tr>
<td>3</td>
<td>Durian Grower → Wholesaler/Assembler/Retailer → Retailer → Consumer</td>
</tr>
<tr>
<td>4</td>
<td>Durian Grower → Contract Buyer → Wholesaler/Assembler/Retailer → Retailer → Consumer</td>
</tr>
<tr>
<td>5</td>
<td>Durian Grower → Contract Buyer → Wholesaler/Assembler/Retailer → Consumer</td>
</tr>
<tr>
<td>6</td>
<td>Durian Grower → Contract Buyer → Wholesaler/Retailer → Retailer → Consumer</td>
</tr>
<tr>
<td>7</td>
<td>Durian Grower → Contract Buyer → Wholesaler/Retailer → Consumer</td>
</tr>
<tr>
<td>8</td>
<td>Arriendero → Wholesaler/Retailer → Retailer → Consumer</td>
</tr>
<tr>
<td>9</td>
<td>Durian Grower → Assembler → Institutional Buyer → Consumer</td>
</tr>
<tr>
<td>10</td>
<td>Arriendero → Wholesaler/Retailer → Processor → Institutional Buyer → Consumer</td>
</tr>
<tr>
<td>11</td>
<td>Arriendero → Processor → Retailer of Processed → Consumer</td>
</tr>
<tr>
<td>12</td>
<td>Integrated Durian Grower/Processor/Retailer</td>
</tr>
</tbody>
</table>

The study was able to cover around 136.301 tons of durian produced in the region which served as the basis for the computation of the percentage values traded in each supply chain (Figure 9). Furthermore each chain shows the flow and distribution of the 136.301 tons of durian from all the suppliers. The flow also reflects the percentage loss from each market channel, as can be seen, there is discrepancy between the total inflow and total outflow of durian as it passes a particular player, except the case of the integrated durian grower/processors where they directly sell their durian to consumers and assemblers from other provinces.

More specifically, as each player in the chain is closely examined by tracing the flow of durian, the study reveals that the biggest loser of durian goes to the wholesaler/retailer accounting to 2.86% of the entire production in spite of having the most number of market outlets among traders. On the other hand, the most established growers, the integrated grower/processor were documented to have zero marketing loss. Their marketing involves negotiation with their buyers that would come to harvest and pick their durian from their farm. When it comes to retailing, durian that was not sold goes directly processing.
Figure 9. Product Flow of Durian in Region 11

F  fresh durian (percentage based on 136.301 tons/wk)
FZ frozen durian (percentage based on 269 kg/wk)
C durian candy (percentage based on 1793 packs/wk)
Cost and Return Analysis for Different Players in the Supply Chain of Durian in Region 11

The costs of activities of different players in the supply chain are presented in table 7. It is presented in a manner where it is easy to compare the different activities and costs of different players in the supply chain.

For the producer, its profit is around 20 pesos per kilo of durian after deducting all cash costs. It sells its durian at 25 pesos per kilo and incurs a cash cost of around 5 pesos per kilo of durian. Durian farming is labor intensive and at the same time capital intensive. It can be seen from the financial analysis of durian producers that their cost drivers are the labor input and fertilizer input in the farm, which accounts for almost 65% of their total cash cost. Among the players in the chain, it is the producer that achieves the highest return on expense of 1.97, where it almost doubles its income from its expenditures and the highest net profit margin of 0.66, where majority of its total returns goes to profit and the remaining 34% accounts for their expenditure. In terms of their non-cash cost most of it comes from production losses they incur in durian farming. Production losses accounts for the damages due to pests and diseases as well as pilferage and the portion of durian consumed by the growers is given to friends and relatives.

Selling frozen durian, yields the highest estimated profit of 50 pesos per kilo. Frozen durian still has seeds in it packed in disposable plastic containers and stored in freezers. It sells around 220 pesos per kilo and incurs cash cost of 170 pesos per kilo. Top three cost drivers for this form of durian are the cost of durian, materials and the electricity. Among the players in the supply chain of durian, this type of activity generates the highest non-cash cost of 23.43 pesos per kilo, most of it comes from imputed labor, since household members are the only ones preparing the frozen durian.

Processing durian into durian candy yields the lowest profit as shown in the table below. The estimated profit for processing durian is made in per pack analysis. The average selling price per pack of durian candy is about 25 pesos, and each pack incurs cash cost of 20.5 pesos leaving a 4.5 pesos cash profit for processors. Moreover, an estimated 100 packs of this durian candy is made from 1 kilo of durian meat, in which 4.5 pesos become 450 pesos cash profit that can be generated per cooking and assuming 6 cooking batches are made in one day\textsuperscript{11}, durian candy processing becomes very attractive averaging 2,700 pesos of cash profit every day.

Most durian processors do not specialize in making one product. They have various durian recipes (Table on Key Customers), which allows them to widen their market base and increase their sales. The next 3 analyses examine the costs and returns of processing and selling various processed durian products. Processors of this kind earn a respectable 15,321 pesos in a week of processing various durian products. When these products are sold in supermarkets its average buying price per pack is 31.13 pesos and sold at average price of 40.1 pesos, including the costs in handling, it generates a profit of 8.12 pesos per pack. When these processed durian products are sold in “pasalubong centers” or souvenir shops and fruit stands they command a higher procurement price of 39.4 pesos and sold at an average of 46.33 pesos per pack and with the other costs it gives retailers a cash profit of 6.63 pesos per pack.

\textsuperscript{11} Rosario’s Farm
### Table 7. Cost and Return Analysis for Different Players in the Supply Chain of Durian in Region 11.

<table>
<thead>
<tr>
<th></th>
<th>Producer</th>
<th>Assembler</th>
<th>Supermarkets</th>
<th>Contract</th>
<th>Assembling / Retailing</th>
<th>Wholesale / Retailing</th>
<th>Retailing</th>
<th>Wholesale / Assembly / Retailing</th>
<th>Arriendo</th>
<th>Frozen Durian*</th>
<th>Durian Candy Processing</th>
<th>Various Processed Durian**</th>
<th>Various Processed Durian in Supermarkets</th>
<th>Various Processed Durian in Pasalubong Centers*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Returns</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash Returns</td>
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<td>47.50</td>
<td>73.00</td>
<td>32.63</td>
<td>48.75</td>
<td>36.53</td>
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<td>43.54</td>
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<td>25.00</td>
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<td>6.12</td>
<td>2.70</td>
<td>7.73</td>
<td>4.62</td>
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<td>56.48</td>
<td>41.15</td>
<td>59.46</td>
<td>48.47</td>
<td>28.06</td>
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<td>Durian Cost</td>
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<td>27.53</td>
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<td>Rent / Taxes</td>
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<td>0.44</td>
<td>0.46</td>
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<td>0.14</td>
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<td>0.04</td>
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<td>0.92</td>
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<td>Losses</td>
<td>4.34</td>
<td>0.62</td>
<td>6.12</td>
<td>2.70</td>
<td>7.73</td>
<td>4.62</td>
<td>6.30</td>
<td>4.93</td>
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<td>4,720</td>
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<td>Depreciation</td>
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<td>Total Non-Cash Costs</td>
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<td>9.95</td>
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<td>7.86</td>
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<td><strong>Net Total Returns</strong></td>
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<td>8.83</td>
<td>15.99</td>
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<td>17.47</td>
<td>8.95</td>
<td>18.17</td>
<td>11.27</td>
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<td>11.042</td>
<td>6.12</td>
<td>6.48</td>
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<tr>
<td>Return on Expense</td>
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<td>0.45</td>
<td>0.28</td>
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<td>0.51</td>
<td>0.67</td>
<td>0.18</td>
<td>0.14</td>
<td>0.12</td>
<td>0.24</td>
<td>0.16</td>
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<tr>
<td><strong>Net Profit Margin</strong></td>
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<td>0.31</td>
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<td>0.34</td>
<td>0.40</td>
<td>0.15</td>
<td>0.11</td>
<td>0.19</td>
<td>0.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Accounts are not per kilo of fresh durian

** Average costs and returns of various processed durian
Efficiency Estimates of the Different Supply Chains in the Durian Industry of Region 11

The following efficiency scores of each player within the supply chain as well as the efficiency score of each supply chain (Table 8) is estimated based on the actual cost and potential cost of handling durian. The actual costs include the cash costs and non-cash costs while the potential costs are computed by deducting the cost of inefficiencies from the actual costs. The costs of inefficiencies include all the avoidable costs.

Supply chain 1 includes durian growers and assembler retailers. Bigger portion 68% of the returns this chain is being shared among assembler/retailers while durian growers share 32% of the returns. Assembler/retailers incur higher cost and still earn higher profit leading to higher efficiency compared to durian growers. In terms of the net income to actual expense ratio or the return on expense, retailers are able to generate 81 centavos for every peso spent, while assembler/retailers generate 40 centavos out of every peso spent. Overall, the chain achieves an efficiency score of 75.4%, which means that they can still increase their efficiency level by 24.6%, by minimizing or avoiding the unnecessary expenditures in handling the product.

Supply chain 2 includes durian growers and direct retailers and between the two it is the durian growers that generate the higher net income. Durian growers in this chain earn an average net income of 17.34 pesos per kilo sold while retailers are able to earn an average net income of 13.74 pesos for every kilo of durian sold. In terms of the cost of inefficiency, it can be seen that there are more losses among retailers than durian growers. Despite of this, the overall efficiency of durian growers achieves a lower efficiency score of 66.63% while the overall efficiency of retailers is 86.88% and the chain achieves and efficiency score 81.6%. This happened because the cost of inefficiency among durian growers, which is lower than the retailers, still plays a bigger portion to their actual cost when compared to retailers who achieve higher cost of inefficiency but keep it to be small or portion of their actual cost.

Supply chain 3 is composed of durian growers, wholesaler/assembler/retailers and retailers. This chain describes that wholesaler/assembler/retailers buy their durian direct from durian growers and wholesales them to retailers. For every kilo sold, durian growers earn a net income of 20.34 pesos while wholesaler/assembler/retailers earn a net income of 15.14 pesos and retailers are able to earn a decent 17.75 pesos. In terms of the cost of inefficiency durian growers achieves the lowest followed by wholesaler/assembler/retailers and then retailers. In this chain, overall efficiency for durian growers is 62.69%, for wholesaler/assembler/retailers it is 85.32% while for retailers it is 77.97% and the chain achieves an efficiency score of 79.77%.

Supply chains 4 and 5 involves the same sets of players except for supply chain 4 makes the wholesaler/assembler/retailers perform the role of wholesaler as it wholesales durian to the retailers. In supply chain 5 the wholesaler/assembler/retailers perform the role of a retailer. For both chains, the wholesaler/assembler/retailers get their durian from the contract buyers where they also source their durian from the durian growers. W/A/Rs when they operate as wholesalers their losses are estimated to be 3.39 pesos per kilo of durian handled and when they operate as retailers their losses are estimated to be 12.03 pesos per kilo of durian sold. This only means that they would be more efficient being wholesalers than being retailers.

Similar to the discussion above, supply chains 6 and 7 involves the same sets of players, the difference this time is the function of the wholesaler/retailers (W/R). Wholesaler/retailers perform both wholesaling and retailing, unlike the W/A/R, these players do not assemble their durian instead
they have an established network of suppliers. Wholesaler/retailers get their durian from contract buyers and contract buyers get their supply of durian from durian growers. Under these chains, W/Rs when they perform wholesaling they received the least incentive in the durian industry with 2.02 pesos net income for every kilo of durian sold, and when they do retailing they were able to increase their net income to 12.51 pesos per kilo of durian sold.

Under this chain 8 arrienderos do not generate net income similar to durian growers who owns the farm, since they are after all still traders and have to pay the owners of the farm. They earn an average net income of 8.55 pesos per kilo of durian sold and are able to achieve higher efficiency rating compared to regular durian growers. This means that arrienderos are more efficient durian producers when compared to durian growers, they are more cautious in committing losses in the farm and because of these they have become “maximizers” of farm inputs.

Supply chain 9 involves three sets of durian players. These are the durian growers who supply durian to assemblers who supply durian to supermarkets. Under this chain, durian growers earn in average a net income of 19.62 pesos per kilo while assemblers earn an average income of 9.22 pesos per kilo and institutional buyers or supermarkets earn a net income of 15.69 pesos per kilo of durian sold, which is the average markup price of supermarkets. In this chain much of the losses can be traced back from the farm, making the durian growers the least efficient and assemblers incurs minimal losses making them the most efficient player under this chain.

As a comparison, both processors in chains 10 and 11 are very efficient they are able to achieve 95% and 97% efficiency level, respectively. Processors in chain 10 received 11,292.33 pesos net income per week from all the products it produced, while processors in chain 11 earned 14,436.33 pesos of net income for its weekly operation. Unsold week-old processed durian products are given to relatives, neighbors, and to customers who buy in bulk as their marketing strategy to establish the traditional “suki” system.

Supply chain 12 describes one type of player, an integrated player that is both durian grower and at the same time processor. As durian growers, they sell their durian product in wholesale to assemblers from outside the region and retail a relatively small portion of their durian produce direct to consumers. As wholesalers, they earn an average net income of 17.95 pesos per kilo of durian sold and as processors they received different levels of income from different forms of processed durian. The average net income earned from selling frozen durian is 34.22 pesos per kilo, in selling a pack of durian candy the average net income is 3.17 pesos, selling puree generates a net income of 106.58 per liter, selling durian pie yields a net income of 180 pesos per whole pie and 56.84 pesos is earned in selling around 450 ml durian shake. It can be seen that processing durian is a lucrative business; return on expense almost reaches 100%.
### Table 8. Efficiency Estimates of the Different Supply Chains in the Durian Industry of Region 11

<table>
<thead>
<tr>
<th>Key Player per Chain</th>
<th>Supply Chain 1</th>
<th>Supply Chain 2</th>
<th>Supply Chain 3</th>
<th>Supply Chain 4</th>
<th>Supply Chain 5</th>
<th>Supply Chain 6</th>
<th>Supply Chain 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenues</td>
<td>Actual Cost</td>
<td>Net Income</td>
<td>Cost of Inefficiency</td>
<td>Potential Cost</td>
<td>Return on Efficiency</td>
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Cont. Table 8. Efficiency Estimates of the Different Supply Chains in the Durian Industry of Region 11
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Logistic Issues and Concerns in the Durian Industry of Region 11

Inbound Logistics

Adoption of Newly Developed Durian Cultivars

In addressing existing threats in durian farming, agricultural scientists have been constantly developing durian varieties. To address one major issue, it was identified that Puyat variety shows promising characteristics against phytophthora. Farmers in Davao have observed that of all the other varieties Puyat comes out to be the most resistant against this disease. Upon realizing this many small and big durian growers would like to replace their durian trees with this variety, however doing so entails additional set of investment in terms of time and money.

Durian Nurseries and Supply of Seedlings

Issues arising from the inbound logistics of durian industry can be traced back at the nursery level. In order to be assured about the variety and quality of durian planting materials durian growers rely on certified nurseries. However one of the loopholes of the system was the planting materials themselves, although nurseries are certified not all durian planting materials sold come from them. There are instances, especially when buyers buy in bulk, these nurseries have to source out other planting materials from other uncertified nurseries in order to satisfy the volume requirement, in this case the assurance that the planting material is said to be what it is disappears. This can be the reason why some of the durian growers are surprised why the durian that they planted 5 years ago are not what they expect them to be.

Operations

Harvesting

Harvesting durian is not easy to perform due to its characteristic of being thorny. This could be one given scenario that can contribute to the safety of farm workers/harvesters and at the same time has something to do with the quality of products. Picture 4, shows how durian is being harvested in one of the durian farms in region 11, it involves two farm workers the other one climbs up the tree to pick the durian fruit and the other one stays on the ground and catches the fruit using a pair of flip flops or slippers to protect his hands from a definite shred off.

Harvesting practices specially the timing should be perfect or else the quality of durian will be compromised, early harvesting of fruits may hinder the maturity of fruits and results to underdevelopment of durian meat within the locules which they call as “lato” or technically known as uneven fruit ripening (UFR). This problem is very common among the retailers of durian in region 11, some of them have the means of returning them back to the suppliers but some don’t have and in this case contributes to their losses. The practice of harvesting in region 11 is very common among
traders who are supplying the market, they have to harvest the durian fruit ahead of time, 3 to 5 days before table ripe, and table ripe durian will last for another 2 to 3 days so all in all the durian fruit is said to last for 5 to 6 days before it becomes over ripe which is no longer good for consumption as well as processing.

Pests and Diseases in Durian

Growers lost majority of their production from pests and diseases. Majority of them blame the production losses from *Phytophthora palmivora* a soil-borne fungus which continues to wreak havoc in many durian producing areas. It causes the most devastating diseases among durian fruits, affecting all stages of the cropping cycle. Rats and fruit and tree borers combined with the dreaded disease would affect an annual yield of as much as 30%.  

Shortage of Processed Durian Products

Processed durian products are good things when leaving region 11 since region 11 is known to be the durian capital of the country, processed durian products are good souvenirs to relatives and friends back home. During fiestas and even big events in Davao City, processors are stressed up to supply and meet the demand for processed durian since fresh durian is not allowed to be transported back home thru passenger airlines. Processors dilemma during this period is they could not cope up with the demand of the market thus resulting to shortage of supply for processed durian. However, during regular days, there is just enough supply of processed durian in the market, one can buy them in supermarkets, pasalubong centers and fruit stands.

Outbound Logistics

Classification and Grading.

Durian players have different classification and grading. Some classify according to size or shape, yet some according to variety. Generally their comment is there is no standard classification for durian known and applicable to them.

Street Taxes

Street tax in the durian industry of region 11 comes in two forms. First and almost always is in money terms, and second would be the durian fruit. Although most of the time these taxes are negligible there are instances that it would reach as much as 2500 pesos in one shipment and this could be detrimental to the durian industry as a whole. This transaction cost may not be avoidable but it could be minimized when traders would only abide with the traffic regulations of not overloading or travelling with defective motor vehicle parts in order for the other party not to take advantage of the situation.

Marketing and Sales

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12 GEM Program 2005
Very Low Price of Durian

Durian can sell for as low as P8 per kilo by growers who could hardly get back their investment. This is a threat to them. Selling at very low prices is not fair to the farmers who have toiled for years to grow their durian. Growers revealed that most of the time traders dictate the price during their transactions and some traders would buy Class A would sell for 20 pesos per kilo, class B would sell for P15 per kilo and class C would sell for 10 pesos per kilo (Pictures 7 & 8). Adding insult to injury, the traders assign the durian on the class where it belongs. This is one issue that the Mindanao Fruit Industry Council (MinFIC) would like to address where their goal is to have a common farm gate price of durian and pegged it at P25 per kilo (Miculob, 2013), where it is already a fair price for the producer to be able to earn a decent profit and be able to continue with durian farming.

Quality of Durian

For retailers, most of their losses do not come from pilferage or personal consumption but instead from the quality of durian that they are selling. The quality of durian in retail stores greatly depends on how the product is being handled by the traders during transfer and transport. As much as possible these activities (Picture 10) should be minimized in the chain, even if durian is a sturdy solid fruit but the way it is handled it can still be damaged. One of the many reasons that contribute to the poor quality of durian can be attributed to product mishandling.

External Factors Influencing Durian Industry of Region 11

Government support

13 Lovely A. Carillo, Edge Davao
14 Alma Uy, Tagum Tourism Council President
Venue and Permit

During peak season, durian floods the entire region. Durian retailers mushroom all over the region. One evident problem in the region is the regularity of the venue where these durian traders can operate. These retailers only operate during this time of the year, and thus the city and municipal governments do not provide a regular venue for them to sell durian. As a result, they are always given a marginal venue for retailing (Picture 10) where there is no water supply and in some cases no electricity. This venue also poses grave threat to durian’s shelf life since durian is exposed to the elements and most especially compromises product’s safety. Wholesaler/retailers provide durian meat to processors, and the quality of durian meat depends on the store setup and their product handling.

Farm Conversion

Durian farms are slowly converted to banana plantations. Unlike durian, banana has long term contract with the buyer so there is an assured market for their produce (Miculob). Marketing problem of durian is what MFIDC addresses to help growers find or match buyers. If this conversion continues, this will hinder the expansion of the durian industry.

SUMMARY AND CONCLUSION
Philippines ranked fourth from the biggest producer of durian in the world which is Thailand. Indonesia and Malaysia are the countries in between, ranked second and third respectively. There is a tremendous gap between the top three durian producing countries and Philippines in fourth which suggests that top three shares almost all durian produced in Southeast Asia accounting to 97.13% and Philippines only contributed 2.87% to the total production of durian in the area. In terms of annual per capita consumption of durian, Thailand the biggest producer sits on top where each Thai consumes an average of 14 kilos of durian every year followed by Singapore 13 and Malaysia in third consuming 10.25 kilos while Indonesia the second largest producer is alongside the Philippines where each citizen’s consumes less than a kilo of durian every year.

Production trend of durian in the country is gradually increasing for the past 14 years and in the last decade the role of Davao region in this trend becomes more and more vital which means that durian production in the country is being taken care of by the region.

The study was able to identify 12 unique players of the durian industry in Region 11. There are two types of durian growers, the durian growers and the integrated durian grower/processors. Third and fourth types of players are the arrienderos and contract buyers. Fifth to ninth are the five types of retailers who are the assembler/retailers, wholesaler/retailers, wholesaler/assembler/retailers and the final retailers of fresh and processed durian. Tenth are the assemblers, eleventh are the processors and twelfth are the institutional buyers or supermarkets.

The study found out that majority of the key customers of durian, the retailers and institutional buyers require only class A and B durian, while processors entertain class C durian. In the study, classification of durian is determined based on the variety, size and shape of the fruit. Class A are highly in demand varieties while class B are less demanded varieties and class C are varieties that are least preferred by consumers like the Monthong. The size of class A durian is within the range of 2 to 4 kilos its shape is ovoid, a characteristic of fully filled locules and classes B and C deviate from these standards.

In region 11, durian flows from Davao City to its neighboring towns during the months of September to November and April to May. During peak season for durian, Region 11’s durians are shipped to regions 10, 11 Cebu and NCR. Other than those months, Davao City depends on the production of durian from Malita, Davao del Sur and sometimes Tagum and Compostella.

Overall there are 12 supply chains formed in region 11 ranging from producer direct to consumers to producer passing thru 4 middlemen then to the final consumer. Of the 13.301 tons of durian covered in the study majority came from durian growers while 20.54% came from the integrated durian grower/processors, this means that only few of our durian growers have the fall back option of processing their durian produced and be able to exert a decent price for their durian. Out of the 79.46%, 19.1% went to processing and 50.13% sold to final consumers. Notice the unaccounted 10.23% forms part of the total losses in the industry which contributes to the total inefficiency in the industry.

In terms of the sources of information, durian growers and processors rely on the government agencies, and non-government organizations like associations of durian growers and association of food processors as well as other durian growers and processors and especially from their own experience in the farm, for technical guidance. For small traders they rely on big
traders when it comes to pricing, but when it comes to product handling, experience is their best teacher. Institutional buyers also rely on other institutional buyers when it comes to suggested retail price of durian in their supermarkets.

Final retailers sell their fresh durian within 3 to 5 days and processed durian for 6 to 7 days. Durian supply chain players sell their durian in cash and in consignment. Most chains exhibit the two forms of payment, in average the consignment in region 11 is 4.5 days and in the case of supermarkets it takes a lot longer doubling the payment time to 9 to 10 days. This is one of the reasons why processors are hesitant in selling their durian to supermarkets; they would prefer to sell them thru souvenir shops or pasalubong centers where the lead time for payment is much shorter.

Out of the players in the supply chain of durian in region 11, the durian growers has the smallest production cost per kilo of durian which yielded to having the highest net cash returns and net profit margin. The highest profit made was 50.48 pesos by the integrated durian grower/processors selling their frozen durian at 220 pesos per kilo. Processing durian gives the players control over the shelf life as well as price of durian, thus in region 11, durian processing achieved the highest efficiency ratings ranging from the lowest which is 95% to zero wastage. Much of the losses in the industry can be attributed in the farm level, where a lot of external factors are always present and threatening, thus the study investigated on the possible factors affecting durian production. It was found out that the dreaded disease in durian farming was the Phytophthora palmivora and together with the perennial pests like rats and extreme weather condition, much of the losses happen in the farm. Government intervention is highly needed to address these issues faced by durian growers. In terms of outbound logistics and marketing and sales, small but many retailers of durian especially those in the neighboring towns of Davao City do not have good facilities and so government can always be of assistance. These are just few of the many and pressing problems facing the durian industry of region 11, and further advancement of knowledge in the field is necessary in order for the industry to grow and become globally competitive.

RECOMMENDATION

Based on the results and findings of the study the following recommendations are conceptualized to further improve and address the current issues and threats in the durian industry of region 11.
To address the issue on high cost of farm inputs the study found out that durian growers association has bargaining power when it comes to the procurement of farm inputs. It is done in some areas of the region more specifically in Tagum City and can be replicated in other durian producing areas of the region most especially in Davao City. Davao City has the Durian Industry Council of Davao just recently revived, and its members are not so many, however, this time around this will be one good avenue for organizing durian growers in the area. Although consumers do not want them to be organized or collude in that matter, the benefits of organizing them will bring forth benefits for the industry as a whole and may eventually give more benefits to the final consumers. Thus, it is recommended in this study that a multidisciplinary team of community organizers, social scientists and natural scientists be formed to help establish a more solid group of durian growers in the region and establish a database for easier decision making in terms of production and marketing. Organizing durian growers into a more solid group shall allow them to gain more command on resources as well as it will be easier for the suppliers to meet the full range of their needs, may it be on certified planting materials, production, processing or marketing. This recommendation though not lifted from has the same thought with that of Indonesia’s Ahmad Dimayati, Dir. General of Horticulture Ministry of Agriculture recommendation in the form of Empowering Growers and Marginalized Traders.

The problem of retailers on the poor quality of durian ranging from lower class durian, uneven fruit ripening to product mishandling stemmed from production, harvesting and handling practices of durian traders as documented in the study. Thus, the study recommends a more focused investigation about the possible causes and effective solutions to address these issues regarding the poor quality of durian. This recommendation is based on the losses that are documented in the supply chain, much of the losses are traced back in the farm and significant volume is documented in the final stage of disposal which is in the hands of the retailers. The various supply chains exhibit minimal loses at the hands of the traders, but upon reviewing the issues raised by the retailers as well as assemblers, it was found out that these losses are incurred during mishandling of the product by the traders. Therefore, further investigation on the effective solutions in inbound and outbound loses in durian is highly recommended. In line with the poor quality of durian, durian farmers are faced with the problem of the classification of their product. Undeniably, lower class durian commands lower price, and in order to promote the development of the industry, it is imperative for the durian growers to keep up with the standards of the trader for a good quality durian. This issue can be addressed thru the assistance of a technical working group mentioned above.

The problem on durian farms being converted to a more economically attractive banana farms has threatened the durian industry in region 11. Region 11 is also known to be the biggest producer of Cavendish banana in the country, thus competition on resources between the two commodities exists. Conversion of durian farms needs to be controlled or regulated in one way or another, and there is no better authority to do this than the national government thru the local government units in the region.