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Tablea Processing Systems in Davao, Philippines

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***Abstract*—** *The study aimed to establish baseline information on the postproduction systems of cacao processing so as to serve as basis for improving the quality of Philippine tablea. Currently, most of the tablea processors especially in village operation use poor postharvest practices and processing facilities. The chain actors involved in producing tablea products were the farmers, trader/consolidator, processor, distributor and consumer. Among these actors, processor earned the highest at P222.50 per kg while the farmer received the least income at P24.48 per kg. Utilizing processing equipment available, postharvest losses recorded at 16.13 percent. Farmers' problems were on the lack of drying facilities. Experienced difficulties of processors were on sorting, roasting, cracking, winnowing, grinding and packaging.*

***Keywords*—** *Cracking, grinding, postharvest equipment, roasting, sorting, tablea.*

I. INTRODUCTION

Dominant product currently produced and traded in the domestic market in Mindanao region is the *tablea* or the cocoa liquor in tablet form. *Tablea* is a roasted ground and molded nibs of fermented pure (100%) cacao beans without added ingredients and additives. *Tablea* processing normally covers the activity of converting the beans into nibs and liquor. Production of semi-processed products represents a viable value adding option for the Mindanao cocoa industry.

Cacao farmers' cooperatives produce the beans from members and then collectively process and sell the *tablea*. However, some cooperatives only produced wet and dried cacao beans to supply the *tablea* processors. In order to gain higher profitability, producers must value-add their products instead of settling into wet and dried beans alone.

With the increasing world consumption of chocolates, the global demand had been exceeding the global supply. Netherlands is the top importer valuing to 2.076 billion USD in 2009 (FAOSTAT, 2012). Also, demand is growing more rapidly in Asia where strong economic growth, particularly in India and China is resulting in more people being able to afford luxury foodstuffs such as chocolate (Sunstar Davao, 2012).

The cacao production in the Philippines shows a potential for expansion since the country is ideal for cacao production particularly in Mindanao. For instance, about 2 million hectares planted with coconut is "highly suited" to be intercropped with cacao. As of 2015, the Philippines produced around 6,023 metric tons of cacao, the bulk coming from the Davao Region with 3,127 metric tons of production (BAS, 2016). However, by 2022 and beyond, the cacao major industry stakeholders in the country are aiming to supply 100,000 metric tons of fermented dried beans to exporters of cacao products (Cacao Road Map, 2016)

Philippine total exports and imports of cacao and cacao preparation recorded at US$21M and US$178.8M respectively (PSA, 2016). Chocolate imports accounts for US$87M while US$49M worth of cacao powder was imported to support local confectionary industries. Commercial or large-scale chocolate makers are using imported cacao powder to sustain their operation. Philippines exported chocolate products valued at US$12.5M and US$5.8M worth of cacao beans.

Currently, most of the *tablea* processors especially in village operation use poor postharvest practices and postharvest facilities. The corn mill is use for hulling, winnower *bilao* for winnowing resulted to low recovery of nibs accounted to 70%-75% (CocoaPhil, 2016). A peanut grinder is used for grinding and conching of cacao nibs which did not meet the required particle size of 50 microns (PNS/BAFPS).

The general objective of the project is to establish baseline information on the postharvest systems of cacao as basis for improving the quality of Philippine *tablea.*

II. MATERIALS AND METHODS

1. Value Chain Analysis

Study area was Davao as the top cacao producing region in the country. Secondary and primary data were gathered. Focus group discussions were conducted in the study area involving the farmers and key informants to identify the existing practices and marketing products of cacao as well as the marketing chains.

A survey on the major postharvest and processing practices and problems were conducted using a semi-structured survey instrument. Around 84 farmers and 22 processors from Davao participated in the survey conducted. In addition, ocular observation and field visits were done on the production as well as postproduction practices of cacao. Data were analyzed using descriptive analysis and cost and return analysis were done.

2. Loss Measurement

To determine the magnitude of the postharvest losses in processing *tablea* product, loss measurement was computed per handling point using the following formula (BPRE, 2009).

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Percent loss at each handling point (point loss) is computed as the loss at the point divided by the volume entering the point multiplied by one hundred:

$$\%\ loss_{(sorting)} = Loss_{(sorting)} / volume_{(sorting)} \times 100 \qquad Eq.\ (1)$$

Percent total loss (system loss from the start to end point) is computed as the total volume of all losses divided by the starting volume, thus:

$$\%\ loss_{(system)} = \sum Losses_{(start\ to\ end)} / Volume_{(start)} \times 100 \qquad Eq.\ (2)$$

III. Results and Discussion

1. Existing marketing chains and actors involved

Results revealed that farmers were marketing wet and dried beans. In Davao, farmers' usual practice was to market wet beans to the trader/consolidator (59.10%) and trader/processor (40.90%). Consolidated wet beans from the farmers by the trader/consolidator were subjected to fermentation process, then dried and market them to the processors. Dried beans handled by the processors were turned into *tablea* products wherein around 44.10% and 15% went to the distributor and consumers, respectively. On the other hand, accepted wet beans from the farmers by the trader/processor (40.90%) were subjected to fermentation, dried and further processed them to *tablea* and supplied it to the distributor. Distributor's collected supply of tablea products from the processors (44.10%) and trader/processors (40.9%) were marketed to the end consumers (Figure 1). It was evident that actors (trader/consolidator, trader/processor and processor) were doing similar activities.

2. Postharvest activities

Though the *tablea* processing started from sorting the dried beans as raw materials, the following discussion started from the farmer's handling practices up to the cacao beans reached the processor level because the quality of the end product *tablea* depends upon the raw materials.

Farmers were involved in the harvesting, pod-breaking and selling the wet beans to the traders/consolidators. These traders/consolidators on the other hand, were doing fermentation of wet beans and drying it. Fermented dried cacao beans were then sold to processors performing the activities of sorting, roasting, cracking, winnowing, grinding, molding, and packaging of *tablea* products.

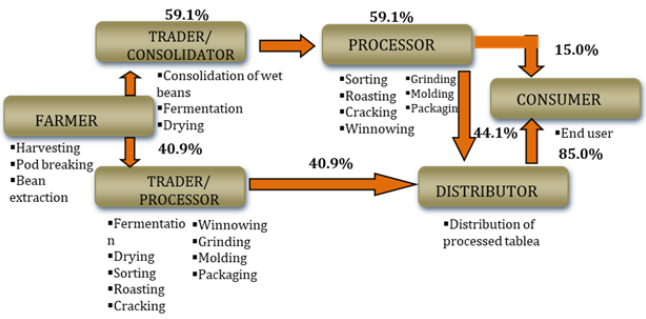

Fig. 1. Market chain of tablea in Davao Region, 2019

Farmer

Harvesting and Pod-breaking

Results showed that most of the farmers were selling wet beans at Php 32.00 per kg. With three (3) laborers to do the pod breaking activities in two days, they spent around Php 250 per day for the labor expenses. Majority of the farmers preferred to market wet beans because of immediate need of cash (Figure 2).

Trader/Consolidator

Transporting, Fermenting, and Drying

Trader/consolidator usually picked-up the wet beans from the farmers' area. From the farm, the wet beans would be directly placed in a wooden fermentary box with the capacity of 500 kilograms. Fermentation process lasted for 6 to 7 days. After fermentation of beans, drying them would be carried out for 2 to 3 days depending on the weather condition. The expenses incurred for these activities include the costs of raw materials, fuel and labor expenses for the transport, fermentation, and drying of beans (Figure 3).

Maximizing the full capacity of the fermentary box of 500 kilograms at Php32 per kg, a trader/processor needed more or less Php16,000 capital. Transport activity from the farm to the fermentation area, a trader needed a liter or two for the fuel expenses, depending on the distance will be sufficient. Moreover, labor costs would be for 10 days at Php250 per day to cover the fermentation to drying activities.

The fermented dried beans product would be marketed to the processors at Php150 per kilogram.

Processor

Sorting, Roasting, Cracking, Winnowing, Grinding, Molding, and Packaging

Sorting

Manual sorting was practiced in Davao region where flats, brokens, and twin beans were sorted out as rejects using an improvised sorting table for the activity. This sorting table is with a bamboo table frame with plastic mesh mounted as table top where the dried beans were spread out to easily identify the reject beans such as the flats, brokens and twins. Flats and twins were manually picked out by the sorter while broken beans usually slipped out of the mesh. A sorter could classify more or less 200 kilograms of dried beans within an 8-hour working period and paid at Php2 per kilogram sorted.

Roasting

The beans were roasted in preparation for cracking and grinding. There were two ways to do this activity, manual or electric roasting. For manual roasting, the capacity of the roaster used was 18 kilograms per hour with a total capacity of 144 kilograms per day; while the electric roaster can roast 10 kilograms per batch (@20 min/batch) amounting to a total of 200 kilograms per day. Manual roasting requires one to two laborers while one labor for electric roasting

Cracking and Winnowing

Cracking was the process done to separate the roasted beans from its shells and obtain the nibs. A cracking machine with blower was used to separate the shells from the roasted beans. After cracking, the nibs were winnowed to remove the remaining shells. The capacity of the electric cracker was 160 kilograms per day and a laborer can winnow the same volume for an 8-hour working period.

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Fig. 2. Farmers' postharvest activities in producing cacao beans as raw materials for *tablea* processing, Davao, 2019

Fig. 3. Trader/consolidator's activities in preparing cacao beans as raw materials for *tablea* processing, 2019

Grinding

After winnowing, nibs were subjected to grinding where two to three passes were done to produce the *tablea* liquor. Grinding requires one to two laborers depending on the volume of nibs to be ground.

Molding and Packaging

Molding comes after tempering the *tablea* liquor. There were different practices for molding and different molders were used. The time consumed f

or molding *tablea* liqour depends on the size of molder. On the average, a laborer can mold a total of 5 kilograms of liquor for two hours using a tablet-sized molder.

The sequence of the processes discussed was the whole process of *tablea* making. Sorting was done a day prior to the scheduled date of processing to give ample time for the sorter and not to delay the entire process. The molding was done a day after the grinding and refining of tablea liquor. Packaging was deferred to let the molded *tablea* harden so it will not melt easily. The *tablea* making process required one to two days excluding the time for sorting (Figure 4).

The price of the end-product depends on the size and type of *tablea* produced (in tablets and/or blocks).

Distribution and Retailing

Distribution of processed tablea

After the *tablea* were packed, distributors pick up their orders from the processors. They shoulder the transportation and marketing expenses at their own cost. Displayed *tablea* in the stores usually lasts for several months. During our visits to the different stalls, cacao products did not have best before dates or expiry dates indicated on the packaging. Moreover, white spots on the products were observed but the owner claimed that they were still safe for consumption. These products were recooked, repacked and displayed as newly processed *tablea* products for sale.

3. Cost and return analysis and value addition

To be able to compute the values addition by each actor involved in the chain, we based them on the 500 kilograms wet beans capacity of the available fermentary box of the processor. The processor consolidated the supply of the wet beans from several farmers. On the average, a farmer shared 133 kg of wet beans to fill the fermentary box.

Fig. 4. Processor's activities in tablea processing, 2019

From the 500 kilograms of wet beans, 157.8 kilograms of fermented dried beans were recovered (31.56% recovery). After sorting, around 7.5 kilograms were rejected leaving only 150 kilograms for roasting (95.24% recovery). Next is the *tablea* processing with a recovery rate of 89 percent, giving an output of 133.5 kilograms of *tablea* liquor.

Results show that a farmer incurred labor costs of P1,000 from harvesting to bean extraction activities to share the 133 kg. Meanwhile, the transport and fermentation to drying of beans activities were the trader/consolidator's responsibility and spent around P2,375 for labor and its delivery. Moreover,

the processor expended for labor, electricity cost and packaging materials amounting to P1,275. From these activities and expenses, the farmer, trader/consolidator and processor earned a net income of P3,256, P6,375 and P2,225, respectively (Table 1).

In terms of kilogram, Table 2 shows that among the chain actors, the processor received the highest income per kg at P222.50 as well as incurred the highest costs at P127.50 because he performed the most activities in processing *tablea*. Though the farmer shared the second highest volume of cacao in the *tablea* production, unfortunately he received the lowest income among the actors which was primarily due to the low price of wet beans.

Based on the *tablea* market price of P650 per kg, the gross margin percent shared by the farmer was 3.49 percent which was the lowest among the chain actors involved while the processor got the highest gross margin share at 53.85 percent (Table 3).

TABLE 1. Cost and return analysis on cacao postharvest and processing, 2019 in kg

	Rate, Php	Volume, kg/ No. of days	No. of laborer	Total PhP
FARMER				
Harvesting to Bean Extraction				
Labor, Php/manday	250.00	2 days	2	1,000.0
Selling price, Php/kg	32.00	133	-	4,256.00
Net income, Php				**3,256.00**
TRADER/ CONSOLIDATOR				
Transport to drying				
Buying price, Php/kg	32.00	500	-	16,000.00
Transportation cost	2.00	500	-	1,000.00
Labor, Php/manday	250.00	5.5	1	1,375.00
Selling price, Php/kg	150.00	165	-	24,750.00
Net income, Php				**6,375.00**
PROCESSOR				
Sorting to packaging				
Buying price, Php/kg	150.00	10 kg	-	1,500.00
Labor, Php/manday	250.00	2 days	2	1,000.00
Electricity cost, Php/batch	250.00	-	1	250.00
Packaging material, Php/pc	1.00	25 pcs	-	25.00
Selling price, Php/kg	100.00	25 packs @200g/pack	-	5,000.00
Net income, Php				**2,225.00**

TABLE 2. Actors' role, volume handled and value added per kg handled by each actor in the chain, 2019

Item	Farmer	Trader/ Consolidator	Processor	Distributor
Role	Harvesting, pod breaking, bean extraction	Consolidation of wet beans, fermentation, drying	Sorting, roasting, cracking, winnowing, grinding, molding, packaging	Distribution of *tablea* products
Volume handled, kg	***133***	***500***	***10***	***5***
Buying price, PhP/kg	0.00	32.00	150.00	500.00
Expenses, PhP/kg	7.52	4.75	127.50	1.25
Selling price, PhP/kg	32.00	150.00	500.00	650.00
Net income, PhP/kg	**24.48**	**113.25**	**222.50**	**148.75**

TABLE 3. Gross margin share of the different actors involved in the *tablea* chain, 2019

Chain Actors	Selling Price/ kg	Buying Price/ kg	Gross Margin/ kg	Percent Share
Farmer	32.00	-	32.00	4.92
Trader/ Consolidator	150.00	32.00	118.00	18.15
Processor	500.00	150.00	350.00	53.85
Distributor	650.00	500.00	150.00	23.08
Total			**650.00**	**100.00**

4. Philippine National Standards for Cacao

In order to reflect the recent technology development in the industry, the Cacao Industry Development Sub-Committee of the National Agriculture and Fishery Council (NAFC) under the Department of Agriculture requested the Bureau of Agricultural Food Product Standards (BAFPS) to develop cacao product standards harmonized with Codex requirements in heavy metals, pesticide residues and hygiene. This resulted to the Philippine National Standards (PNS) 58:2008 on the specifications of cacao or cacao beans. This aims to provide common understanding on the scope, definition, quality requirements, grading, sampling, methods of tests, marking and labeling, storage, fumigation and contaminants.

In 2012, a code of practice for Philippine *tablea* was prepared to ascertain the distinct identity and quality of *Tablea* produced in the Philippines. The PNS/BAFPS 88:2012 or the code of practice for Philippine *Tablea* addresses the essential principles of food safety and quality from selection of cacao beans to its transport. It focuses on general quality parameters, Good Hygienic Practices (GHP) and Good Manufacturing Practices (GMP) that will help control microbial, chemical and physical hazards associated with cacao. Further, it provides

general recommendations to allow flexible and uniform adoption even as processing practices are diverse. Therefore, this Code is also applicable to micro and small-scale producers.

In the same year of 2012, PNS/BAFPS 111:2012 or Philippine National Standard for Philippine *Tablea* was crafted. It provides the essential food safety and quality characteristics of roasted, ground, molded nibs of fermented pure (100%) cacao beans without added ingredients and additives. Philippine *Tablea* is produced mostly by micro to small-scale processors and/or farmers in various regions in the Philippines. This standard ensures that the Philippine *Tablea* is safe to eat, of good quality and has export potential.

PNS/BAFPS 131:2013 is the practice for the prevention and reduction of *Ochratoxin A* contamination in Philippine *Tablea* which is intended to provide guidance for all interested parties producing and handling cacao beans for human consumption to prevent and reduce OTA contamination in cacao beans. All cacao beans should be prepared and handled in accordance with the Codex General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4, 2003), which are relevant for all foods being prepared for human consumption. This Code of Practice indicates the measures that should be implemented by all persons that have the responsibility for assuring that food is safe and suitable for human consumption

5. Processing losses

With the increasing volume of production of cacao in the country and the demand in the international market of Philippine chocolate, farmers were encouraged not only to produce cacao beans but instead to processed them into *tablea* for value adding. With the initiative of the Department of Agriculture (DA) and the cacao industry, *tablea* processing machines were distributed to qualified cooperatives.

The following losses covered the *tablea* processing only; starting from the activities sorting, roasting, cracking, winnowing, grinding, molding and packing.

The loss data for mechanized tablea processing was from the operations of cooperatives using the set of *tablea* processing equipment from the DA. Processing loss measurement results showed a 16.13 percent loss. Since per activity handled different volume, data of percent losses were gathered per activity and computed total system's losses was based on the total losses divided by the volume used in the first activity multiplied it by 100 (Eq.1 and 2). Records revealed that manual winnowing registered the highest loss at 21.63 percent and followed by sorting at 11.83 percent. Basically, the source of losses was the weight of cacao shell/husk and the reject beans. Molding and packing losses were from left-over cacao liquor from the molders (Table 4).

Processing equipment used for *tablea* processing were locally made and imported ones. The roaster and cracker equipment were locally made while the grinder and refiner were imported ones. Molders available were locally made or imported ones.

TABLE 4. Postharvest losses and its sources in mechanized *tablea* processing, 2019

POSTHARVEST ACTIVITY	Processing losses (%)	Sources of Losses
Sorting	11.83	Reject beans
Roasting	7.66	Moisture loss
Cracking	0.39	Cacao shell/husk
Winnowing	21.63	Cacao shell/husk
Grinding	1.52	Left-over cacao liquor
Molding	9.15	Left-over cacao liquor
Packing	6.75	Left-over cacao liquor
Total system's loss, %	**16.13**	

Note: Percent losses can not simply added since the volume of the commodity is not constant as the commodity passes from one handling point to the next.

TABLE 5. Postharvest activities, practices and problems encountered in *tablea* processing, 2019

Activity	Existing practices	Problems encountered
Drying	• Traders/Consolidators in Davao region use solar dryer to dry the cacao beans	• Lack of drying facilities
Sorting	• Improvised sorting tables for cacao beans • Hand picking	• The sorting table is only capable of sorting out flat beans. Twin and broken beans were still handpicked.
Roasting	• Manual roasting • Electric roaster	• Manual rotary roaster has a capacity of 18 kg per batch with an average of 1 hour roasting period with two alternating laborers • The capacity of manual roasting using frying pan is 7-10 kg with an average of 30 minutes roasting period • Electric roaster's capacity is 10 kg per batch • Low capacity of roaster
Cracking	• Electric cracker or dehuller	• Inefficient blower; still requires manual winnowing • Some are still coming out uncracked
Winnowing	• Processors use *bilao* for winnowing	• Manual winnowing was one of the bottlenecks in *tablea* processing
Grinding	• Electric grinder	• Inefficient grinder; requires two to three passes to be in liquor state • After the first pass, manual feeding of the liquor has to be done
Molding	• Manual molding • Plastic bottles • Stainless molders • PVC molders	• For manual molding, 2-3 laborers are needed 1 – wiping the molders in preparation for molding 1 – filling the plastic bottles with liquor 1 – filling the molder with liquor from the plastic bottle • Use of non-food grade materials
Packing/packaging	• Manual packaging	• Time consuming

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As to the *tablea* quality loss, it was observed that processors long time displayed had visible white spots on the products that resulted to low price. This perhaps was attributed to the storage conditions of the processors or stall owners in the market. Big processors did not allow the project team to visit their processing areas and stock rooms.

One of the cooperators shared their experience on exporting cacao beans and had been rejected due to the quality that did not meet the requirements of the importing country.

Technology gaps

The following were the problems encountered by the actors involved in the *tablea* processing. Primarily for drying, since this affects the flavor and quality of the *tablea*, the problem was the lack of drying facilities. At present, sorting is manually done and using an improvised sorting tables that is only capable of sorting the flat beans. There were roaster facilities available but with smaller capacity while the cracker/huller was inefficient because some came out uncracked and still required manual winnowing that turned out the bottleneck in the processing. Moreover, grinders required two to three passes and manual feeding of cacao liquor after each pass was required. Lastly, manual molding was time consuming (Table 5).

IV. CONCLUSION

It is evident that *tablea* processing in Davao, needs improvement not only on the quality of cacao beans as raw materials but also in the set of equipment used in its processing and storage. More so, efficient set of equipment in processing would lessen the processing losses presently incurred by the processors. Improving the quality of Philippine *tablea* products which conforms with the Philippine and international standards would surely penetrate the export markets and no rejections in the years to come.

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REFERENCES

[1]. Afoakwa, EO, Peterson A, Fowler M, Ryan A. Flavor formation and character in cocoa and chocolate: a critical review. *Crit Rev Food Sci Nutr* 48:840-57., 2008
[2]. BPRE and PHTRC. Qualitative and quantitative loss assessment on selected fruits and vegetables in the Philippines. BPRE, Science City of Munoz, Nueva Ecija, Philippines 3120, 2009
[3]. Department of Agriculture. 2016. Cacao Roadmap, 2016
[4]. FAOSTAT. 2012. Global demand and supply of chocolates
[5]. Hamrick, D., Fernandez-Stark, K., Gereffi, G. 2017. The Philippines in the Cocoa-Chocolate Global Value Chain. Duke University Center on Globalization, Governance, and Competitiveness. https://gvcc.duke.edu/cggclisting/the-philippines-in-the-cocoa-chocolate-gvc/
[6]. Department of Agriculture. 2014. Value Chain analysis and Competitiveness Strategy: Cacao Bean Mindanao. https://docplayer.net/42442155-Value-chain-analysis-and-competitiveness-strategy-cocoa-bean-mindanao.html
[7]. Department of Agriculture. 2014. Value Chain analysis and Competitiveness Strategy: Davao del Norte Cacao Bean.
[8]. Florendo, N. (n.d.). Locally Developed Food Processing Equipment for MSMEs. https://pcieerd.dost.gov.ph/images/downloads/presentation_materials/pcieerd4thanniversary/session_c/3_MS_FLORENDO_food_process_eqpt.pdf
[9]. https://www.icco.org/wp-content/uploads/Production_QBCS-XLVII-No.-2.pdf
[10]. https://www.statista.com/statistics/675801/average-prices-cocoa-worldwide/
[11]. https://trendeconomy.com/data/h2/Philippines/1806
[12]. Jinap S and Zeslinda A. Influence of organic acids on flavor perception of Malaysian and Ghanian cocoa beans. *J. Food Sci Technol* 32: 153-155, 1995
[13]. Laiskonis, M. 2016. Ruling the roast: Chocolate craftsmanship. *2021 Institute of Culinary Education*.
[14]. Peace and Equity Foundation. 2014. A Primer on PEF's Priority Commodities: Industry Study on Cacao. https://pef.ph/wp-content/uploads/2016/03/Industry-Study_Cacao.pdf
[15]. PNS/BAFPS 58:2008. Cacao or cacao beans - Specifications, Bureau of Product Standards, 2008
[16]. PNS/BAFPS 88:2012. The code of practice for Philippine *Tablea*, Bureau of Product Standards, 2012
[17]. PNS/BAFPS 111:2012. Philippine *Tablea*, Bureau of Product Standards, 2012
[18]. PNS/BAFPS 131:2013. Code of practice for the prevention and reduction of *Ochratoxin A* contamination in Philippine *Tablea*, Bureau of Product Standards, 2013
[19]. Philippine Statistics Authority. 2015. Import-export data on cacao
[20]. Philippine Statistics Authority. 2015. Import-export data on cacao
[21]. Philippine Statistics Authority. 2019. Agricultural indicators system (AIS), Agricultural exports and imports, Report No. 2019-4, 2019
[22]. UNIDO. Agro-value chain analysis and development. The UNIDO Approach. A working paper. *United Industrial Development Organization (UNIDO).* Vienna, Austria, 2009
[23]. UNIDO. Industrial Value Chain Diagnostics: An Integrated Tool. *United Industrial Development Organization (UNIDO).* Vienna, Austria, 2011