

## **ANALYSIS OF POSTHARVEST HANDLING OF TABLE EGGS PRODUCED IN SAN JOSE, BATANGAS, PHILIPPINES**

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(Received: September 17, 2017; Accepted: November 12, 2016)

### **ABSTRACT**

The study analyzed the postharvest handling practices done on table eggs by the market participants in San Jose, Batangas, Philippines through a survey conducted from February to May 2016. Data obtained from 60 farmer-respondents and 31 market intermediary-respondents were subjected to cost and returns analysis, partial budgeting, and combination of price margin and ladder pricing analysis along with descriptive analysis. Forward tracing was performed to identify the channels where table eggs passed before reaching final consumers. Farmers, assembler-wholesalers, wholesalers and retailers were involved in the marketing of table eggs produced in San Jose, Batangas. Practices performed can be a combination of the following: assembly, cleaning, sorting and grading, storing, packaging and transporting. Assembly and transporting are usually done by the assembler-wholesalers. Farmers store the eggs at their houses while market intermediaries have their own storage houses. Farmers used polystyrene trays whereas market intermediaries used the cheaper egg carton trays. Results revealed that small- to medium-scale farmers and traders manually sorted and graded the eggs while only a few large-scale farmers used mechanized grading facilities. Both did not conform to the Philippine National Standards. Re-grading was practiced along the marketing chain resulting to re-grading profit. It was concluded that farmers and market-intermediaries who adopt postharvest handling practices generated more profit. Promoting awareness on the proper performance of cleaning as a postharvest handling practice to minimize losses was recommended. The use of uniform standards by the BAFPS-PNS was likewise suggested to be properly implemented in cooperation with the local government units (LGU) serving as the front-liner.

**Key words:** ladder pricing, re-grading, egg quality standards, profitability

### **INTRODUCTION**

The poultry and chicken industry is the most progressive enterprise and the world's fastest producer of meat (PCAARRD 2010). The country's total chicken population is shared by broilers, native chicken and layers. In 2014, the United States Department of Agriculture (USDA) International Egg and Poultry section reported that the total chicken population of the Philippines was 172.41 million heads broken down into 64.70 million heads of broilers, 78.48 million heads of native chicken and 29.23 million heads of layers. According to the Philippine Statistics Authority (PSA 2017) the inventory of broilers, native chicken, and layers dropped compared with the previous year by 3.16%, 0.04% and 7.40%, respectively. As of January 2017, total chicken inventory of the Philippines was estimated at 175.33 million birds, 1.93% lower than that of 2016. However, layer chicken inventory increased by 6.97%. In 2017, this inventory accounted for 20% of the total chicken inventory in the country, 36.59% of which is reported to be in Region IV-A. Production-wise, in 2016, chicken egg was estimated to be 461,719 metric tons with 23.01% contributed by Batangas (PSA 2017).

### *Analysis of postharvest handling of table eggs.....*

The average farm gate price of eggs in San Jose, Batangas increased by 2.42% from PhP4.04 to PhP4.29 per piece in 2014 (PSA 2017). Likewise, wholesale and retail prices increased by 2.28% and 2.4%, respectively. By 2016, average annual farm gate price was 5.12% higher than its 2015 level (PSA 2017). The question of what could have caused such price increases is a relevant and important one considering that table eggs are one of the cheapest sources of protein.

Table eggs are prone to breakage leading to postharvest losses suggesting the need to employ postharvest handling practices. The flow of activities from harvest to the point of consumption is referred to as postharvest handling (Nagpala as cited by Lantican 2015) which aids in strategically selling the eggs to maximize the market participants' profit. It is usually done to minimize the losses incurred along a marketing chain and to facilitate distribution. In the Philippines, postharvest handling practices for table eggs involve the assembly, cleaning, sorting and grading, storing, packaging and transporting. While it is expected to lead to efficiency in the egg marketing system, such needs to be verified as it also entails cost that could undermine the possible net gain from any practice.

Chicken eggs produced also vary in size and quality and prices fluctuate accordingly. Grading is done "to eliminate inedible and defective eggs; separate eggs into high and lower acceptable categories; and establish uniform weight classifications" (FAO 2003). It makes possible the orderly marketing of eggs by avoiding confusion and uncertainty with respect to quality values. Uniform standards in grading also promote efficiency in the distribution system (USDA 2000). Quality of eggs is based on interior factors such as condition of the white and yolk and size of the air cell as well as cleanliness and soundness of the shell. In the Philippines, more frequently, eggs are classified according to weight (or size) expressed in grams per egg. Although eggs are not sold according to exact weight, they are grouped within relatively narrow weight ranges or weight classes.

Standardization is the implementation of rules or any specifications for a repeated use to attain consistency that should help the farmers to obtain optimum profit (Lakhotia 2015). It is advantageous to standardize the grades as it results to high quality eggs that consumers are willing to pay establishing trust between the buyers and sellers (FAO 2003). Despite being the "Egg Basket of the Philippines," grading and standardization in eggs is not regularly and properly practiced in San Jose, Batangas (Calora 2015). Initially, the local government unit posted a billboard listing the standard weights that should be followed in sorting and grading of eggs. However, such posting is no longer existent in San Jose. As a consequence, during grading, it is common practice to modify the grade set for eggs as these are moved along the marketing chain in order to take advantage of the price premium for "large" eggs. Sometimes, there is re-grading being done violating the PNS for eggs and literally exploiting not only the farmers but consumers as well.

This study determined the profitability of performing egg postharvest practices, verified and documented instances of re-grading or non-standardization, and quantified the undue advantage in terms of additional profit being charged to consumers or have been lost to the farmers. Given the importance of eggs in poor man's diet, it is imperative that egg prices are at its most efficient. An important egg industry player such as San Jose Batangas, should be at the helm when it comes to promoting fair trade practice. The findings of the study could therefore help local chief executives to craft measures that will further improve not only the efficiency of pricing but the whole gamut of processes involved in bringing the eggs to the consumer's table. Along with the improvement of the industry should be the protection of the consumers in terms of reasonable prices for table eggs.

The general objective of the study was to analyze the postharvest handling practices done for table eggs produced in San Jose, Batangas. The study also: identified the market participants involved in the marketing chain of table eggs; described the postharvest practices performed by the market participants along the chain; assessed the profitability of performing postharvest practices; and determined the price differences in table eggs along the marketing chain. The study was anchored on

the hypotheses that performing postharvest practices adds profit and market participants are able to enjoy undue economic advantage when standardization in egg grades is not implemented.

## **RESEARCH METHODOLOGY**

The study was conducted in the municipality of San Jose, Batangas because of its large number of small- to medium-scale egg producers. As discussed earlier, San Jose, Batangas is well-known as the “Egg Basket of the Philippines” because it provides a large portion of the country’s supply of table eggs. Farmers were randomly chosen from the list of the registered table egg farmers per barangay. Other participants in the chain were traced through the interviewed farmers and traders. Primary data were collected through personal interviews using pre-tested interview schedule. Data collected included cost of performing postharvest practices, volume bought and sold, sorting and grading procedure, grades, and prices of eggs produced and marketed which were subjected to descriptive analysis using means, frequencies, and percentages. Those performing similar postharvest practices were identified and grouped for the conduct of cost and returns analysis. Results of this analysis were used in partial budgeting which compared the groups with similar practices except for the one whose profitability is being tested. In addition, a combination of profit margin and ladder pricing analysis was performed to assess the differences in table egg prices along the identified marketing chain. Price ladder allowed a clearer understanding of how market participants within a particular market level (price ladder) set their price in order to increase their profit. This is very important in the case of table eggs because of the greater tendency of the egg grade to be changed as it moved from one level to another within the same marketing chain. Analyzing the marketing margin within the ladder allows one to distinguish the amount of price change due to regular margin and the price change due to re-grading. Re-grading is a violation of the standards set by the PNS.

## **RESULTS AND DISCUSSION**

### **Market participants and postharvest practices performed**

A total of 91 respondents comprised of farmers (60); assembler-wholesalers (5); wholesalers (15); and retailers (11) were personally interviewed. Assembler-wholesalers also known as *vijeros* are the type of middlemen who only deal in large quantities. They usually go from one farm to another to pick up the eggs and assemble for bulk distribution to either wholesalers or retailers. Wholesalers also pick up and buy eggs in bulk for selling to retailers or fellow wholesalers. On the other hand, retailers buy the eggs from wholesaler or directly from the farmers. Retailers are the final link in the marketing system and usually offer the highest price in small quantities. Two marketing channels were identified in the study: farmer→assembler-wholesaler→wholesaler→retailer and farmer→wholesaler→retailer. It is expected that the longer the channel the higher the price consumers had to pay because of additional marketing margin per added intermediary or level. In other commodities, a longer channel and/or wider marketing margin does not automatically imply marketing inefficiency because other necessary services that entail cost might have been performed in order to satisfy the need of consumers. However, in the case of eggs, additional channel participant might only result to price padding without necessarily resulting to added value because nothing is usually done to the product except, in some cases, transport them.

The postharvest practices for table eggs include a combination of the following: assembly; cleaning/washing; sorting and grading; storage; packaging; and transporting (Table 1).

### **Assembly**

Assembly is the practice of collecting eggs from different farms and storing them at a warehouse or storage house. This is the main function of the assembler-wholesalers who go from one farm to another to buy eggs in bulk and lump them for distribution to wholesalers. Some retailers who

are neighbors of the farmers also bought from several farms but they no longer distribute them to big buyers unlike the assembler-wholesalers.

**Table 1.** Distribution by postharvest handling practice done on table eggs, 60 farmer-respondents and 31 market intermediary-respondents, San Jose, Batangas, Philippines, 2016

Postharvest Practice	Farmers (n=60)	%	Intermediaries (n=31)					
			A-W (n=5)		W (n=15)		R (n=11)	
			Number	%	Number	%	Number	%
Assembling	0	0	5	100	0	0	0	0
Cleaning	34	57	5	100	11	73	3	27
Sorting and Grading	29	48	5	100	15	100	11	100
Storing	60	100	5	100	15	100	11	100
Packaging	60	100	5	100	7	46	7	64
Transporting	29	48	4	80	15	100	0	0

A-W = assembler-wholesaler; W=wholesaler; R = retailer

### **Cleaning/washing**

Even during egg collection, primary sorting is being performed to separate the “luno” or those with soft shells and are “dirty” (contaminated with blood or fecal matter). Cleaning of dirty eggs is usually done to ensure their good quality because food safety is important. Farmer-respondents however, are of differing opinions regarding washing of eggs with some believing that washing them will cause spoilage. As such, only 57% of them clean dirty eggs by wiping them out with a piece of cloth in the case of small-scale farmers and using tap water for large-scale farmers. In the case of intermediary-respondents, those who picked-up from the farms were the ones who cleaned dirty eggs. In countries where poultry farms are at their cleanest possible state, washing of eggs is prohibited as it is believed to cause the incidence of salmonella infection. However, in the Philippines where clean production areas cannot be assured, especially for backyard raisers, cleaning of dirty eggs is regarded as good practice to promote food safety. Technically, spoilage of washed eggs can be prevented if the cleaning water is set at 10 to 20 degrees warmer than the eggs. This also facilitates easy removal of the dirt (VSU 2009).

### **Sorting and grading**

Sorting and grading is vital as it can improve price setting. The practice of grading and sorting is simultaneously done and it can either be manual or mechanized. Manual sorting and grading is the easiest and an inexpensive way of classifying eggs. However, such practice leads to inconsistencies in grading because it is performed based only on size and exterior quality. Egg size is determined using “eyeball” estimation or by “feeling” egg weight on the sorter’s hand and assigning it to particular grade therefore, time consuming. On the other hand, mechanical egg sorter is costly but it does not only give accurate grades – it is also able to check the interior quality of the eggs in a shorter period of time (USDA 2000). Aside from the expected improvement in labor efficiency, exact selection of the eggs will save good eggs from being wasted due to erroneous grading. Despite this advantage, only 48% of the farmers interviewed performed sorting and grading and among them were only a few large-scale ones who had the financial capability to acquire mechanical egg sorter. It would have been better for the study to compare the profitability of using the two methods of egg sorting and grading but the lack of respondents performing mechanized egg sorting prevented the inclusion of this analysis.

On top of the required weights for each class of eggs, the PNS has the following minimum requirements: must be fresh; must be clean and free from visible cracks; must be practically normal in shape; and must be free from foreign odors. Nothing has been mentioned that would require eggs to

be graded according to interior quality. This has some implications in terms of harmonizing standards with trading partners if ever eggs produced in the Philippines will be traded internationally. For instance, Thailand has the following egg interior quality requirements: air cell shall be small with height of not more than 0.8 cm and it does not move when the egg is twirled; for the broken-out egg, the yolk shall not attach to the inner shell; it shall be firm and surrounded by the thick egg white; the egg shall not be spoiled and must be free from abnormal odor; the yolk shall have normal and consistent color; the egg white shall not be cloudy; and free of visible mold (TAS 2010). Almost the same are being required by the USDA for traded eggs in the USA (USDA 2000). The grades used by the market participants and those set by the BAFPS-PNS are shown in Table 2. There are wide discrepancies in the assigned weights per grade by the different market participants and all of them are lower than the PNS. The large-scale farmers had the highest weights assigned per grade but still such were much lower than the PNS set weights suggestive of non-standardization in the egg industry.

**Table 2.** Grades set by 29 farmer-respondents and 31 trader-respondents versus Philippine National Standards, San Jose, Batangas, Philippines, 2016.

<b>Grades</b>	<b>Small-Scale to Medium-Scale Farmers</b>	<b>Large-Scale Farmers</b>	<b>Traders</b>	<b>Philippine National Standards</b>
	Weight in Grams			
Small	<40	38-44	<35	50-55
Medium	41-50	45-54	36-40	56-60
Large	51-55	55-60	41-50	60-65
Extra Large	56-60	>61	46-50	65-70
Jumbo	61	>63	>51	70

Generally, the traders had the least weight assignment per grade among all the respondents. This is because they practice re-grading specifically when there is high demand and yet low supply of eggs. On the average, 61% of them practiced re-grading. Retailers have the highest proportion (64%) of those who re-graded (Table 3). Re-grading essentially implies non-standardization.

**Table 3.** Distribution of 31 market participants by practice of re-grading, San Jose, Batangas, Philippines 2016.

<b>Market Participant</b>	<b>Re-Grading</b>		<b>Not Re-Grading</b>	
	<b>Number</b>	<b>%</b>	<b>Number</b>	<b>%</b>
Assembler-Wholesaler	3	60	2	40
Wholesaler	9	60	6	40
Retailer	7	64	4	36
Total/Average	19	61	12	39

**Storage**

Another postharvest handling practice done on eggs is storing. The main objective of storage is to prolong the shelf life of the eggs and its performance is heavily dependent on the speed eggs are disposed. Eggs not disposed within the day are immediately transferred to the storage area. In the tropics, eggs can deteriorate very quickly unless they are stored at low temperatures. The ideal temperature for storage in such climate is 13°C or lower, usually between 10° and 13°C. The relative humidity should be between 80 and 85% to minimize the loss of egg moisture (FAO 2003). In the Philippines, small- to medium-scale farmers usually store eggs in their house or in a simple cemented building. This is in contrast to well-ventilated storage houses used by large-scale farmers. All the farmers who store eggs do so mostly during summer time at the maximum of only three days.

**Packaging**

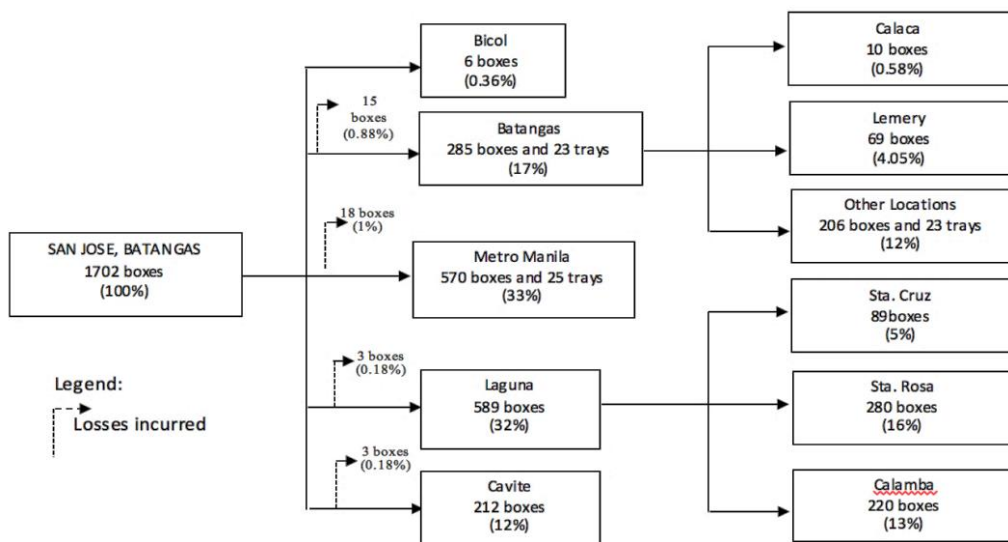
Proper packaging is very important during transportation because eggs are fragile, thus all farmers are performing this activity. There are two common types of primary packaging for eggs and the most popular and the cheapest are carton trays made from wood pulp. The more durable ones are plastic or polystyrene trays. During delivery, trayed eggs are placed in carton boxes. Each carton box contains 30 trays for a total of 900 eggs per box. All the farmers interviewed used polystyrene instead of carton trays. Traders provide their own egg carton trays during pick-up from the farms. The usual practice is while being transferred to their own trays eggs are already being sorted and graded at the same time. This maximizes the use of man-hours among the hired laborers. All of the traders used carton egg trays for the primary packaging of the eggs. They are mostly selling the carton trays along with the eggs.

**Transporting**

Transporting is vital to the marketing of eggs as it makes them available where they are demanded by the consumers. Only 29 (48%) of the farmers transported their eggs since the majority opted for them to be picked up (Table 1). These are usually the small- to medium-scale farmers who do not have the vehicle necessary to deliver the eggs directly to their buyers. This implies that most of the delivery of the eggs was done by the large-scale farmers. Assembler-wholesalers and wholesalers do the transporting of eggs for those farmers who do not deliver.

**Geographic and product flows**

The geographic flow of eggs from 60 farmer-respondents is shown in Figure 1. It can be seen that the major market for eggs produced in San Jose, Batangas is Metro Manila since it captured the largest proportion (35%) amounting to 570 boxes and 25 trays. The least proportion with 6 boxes (0.36%), were sold to Bicol traders due to long distance traveled. Laguna is another major market capturing 32% and this is mainly due to accessibility and good markets. Within Laguna, Sta. Rosa and Calamba were the noted main destinations since the two municipalities are densely populated with workers employed by their in-house industrial and science parks. Around 17% were also distributed within Batangas while the nearby Cavite had 12% share.



**Fig. 1.** Geographic flow of table eggs produced per week, 60 farmer-respondents, San Jose, Batangas, 2016.

Considering product flows, the marketing channel for eggs was found to be relatively short with only four participants or levels as the longest. The most number of table eggs sold by the farmers were to the wholesalers (932 boxes/week) while the least were sold to individual consumers (228 boxes/week), equivalent to almost 55 and 13%, respectively (Fig. 2). Individual consumers who bought from the farmers are those who live near the farms. In San Jose, Batangas, layers are literally raised in the backyard of many farmers that is why it is easier for the consumers to buy from the farms.

During transport from the farm to the destination markets, losses were incurred and as expected, Metro Manila deliveries which were the second farthest (against Bicol) sustained the highest with around 1% equivalent to 18 boxes per week. Overall, a total of 39 boxes of eggs were lost to farmer due to breakage, “*luno*,” and those that were given away. Eggs that were given away are usually to relatives and friends and those that are small and have thin and dark colored shells.

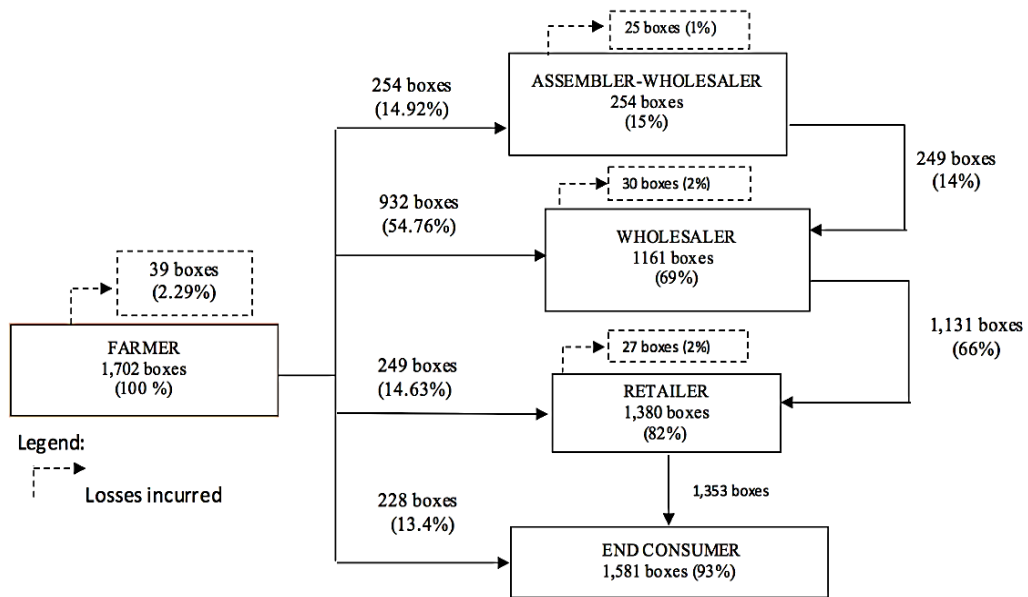


Fig. 2. Weekly product flow of table eggs, 60 farmer-respondents, San Jose, Batangas, Philippines

**Table egg prices**

Results of the study further revealed that prices paid for eggs are dependent on the type of intermediaries handling the eggs, mode of sale, and size. All the farmers sold on pick-up basis. Assembler-wholesalers who picked up eggs from farmers paid PhP3,454 per box of large eggs and only PhP2,890 per box of small eggs. For those assorted, they paid an average of PhP3,364 per box (Table 4). The market intermediary-respondents preferred buying the eggs assorted and do the sorting and grading themselves because of the advantage of being able to classify them based on their own set standard. While they claimed that they usually follow the grades set at the farmer’s level, they also admitted that they are re-grading the eggs when there is low supply but high demand in the market.

Among those who picked-up the eggs, wholesalers paid an average of PhP3,674 per box to assembler-wholesalers, which is much lower than the average price paid by the retailers (PhP4,298/box). On the other hand, the retailers paid a higher price (PhP4,416/box) when they bought from the wholesalers. The consumers who bought from the wholesalers enjoyed a lower price of PhP4,433 per box as opposed to PhP4,975 per box that they paid to the retailers (Table 4). These

suggest that indeed buying in bulk is advantageous and that buying direct cuts the prices down. Delivered eggs are priced higher than those that were picked up due to transfer cost.

**Table 4.** Average prices paid for eggs (PhP/Box) by market outlet to different sources and by grade, 31 market intermediary-respondents, San Jose, Batangas, 2016.

Market Outlet/Egg Grade	Farmer	Assembler-Wholesaler		Wholesaler		Retailer
	Picked-Up	Picked-Up	Delivered	Picked-Up	Delivered	Picked-Up
<b>Assembler-Wholesaler</b>						
Small	2,890	-	-	-	-	-
Medium	3,267	-	-	-	-	-
Large	3,454	-	-	-	-	-
Assorted	3,364	-	-	-	-	-
<b>Wholesaler</b>						
Small		3,467	-	-	-	-
Medium		3,613	3,645	-	-	-
Large		3,845	-	-	-	-
Assorted		3,770	-	-	-	-
<b>Average</b>		3,674	-	-	-	-
<b>Retailer</b>						
Small		4,374	-	4,367	4,745	-
Medium		4,428	4,543	4,390	4,974	-
Large		4,773	-	4,680	-	-
Extra Large		-	4,689	4,875	-	-
Jumbo		-	-	4,880	-	-
Assorted		4,095	-	3,976	-	-
<b>Average</b>		4,416	4,616	4,298	4,860	-
<b>Consumer</b>						
Small		-	-	4,320	-	4,350
Medium		-	-	4,456	-	4,650
Large		-	-	4,650	-	5,100
Extra Large		-	-	4,680	-	5,400
Jumbo		-	-	4,727	-	5,450
Assorted		-	-	4,743	-	4,900
<b>Average</b>		-	-	4,433	-	4,975

#### **Profitability of performing postharvest handling practices**

Performance of postharvest practices proved profitable as shown by the highest net income (PhP4,456.26) generated by those (Group 4) who did five practices and the least (PhP4,246.48) by those (Group 1) who had two practices only (Table 5). Similarly, for intermediary-respondents, Group 5 with the most number of practices gained the highest net income (PhP5,795.31/box) while Group 1 had the lowest at PhP5,673.81 per box (Table 6).

Using partial budget analysis, net income from each postharvest practice was determined by comparing the groups with similar practices except for one the profitability of which was measured. Under this approach only cleaning and sorting and grading were isolated for the farmer-respondents and transporting and cleaning for intermediary-respondents. Table 7 revealed that sorting and grading generated a net income of PhP347.30 for the farmers while for cleaning they were able to gain an additional net income of PhP186.96 per box. For the intermediary-respondents, additional net incomes of PhP23.60 and PhP19.33 per box for transporting and cleaning, respectively, were acquired. Farmers and intermediaries were able to charge a premium price for cleaned and sorted eggs hence the additional income.



**Table 5.** Net income (PhP/box) by grouping on postharvest handling practices adopted, 60 farmer-respondents, San Jose, Batangas, Philippines, 2016

Item	Group 1 <sup>a</sup> n=17	Group 2 <sup>b</sup> n=14	Group 3 <sup>c</sup> n=9	Group 4 <sup>d</sup> n=20
<b>REVENUE</b>				
Quantity sold (per box)	1.00	1.00	1.00	1.00
Selling price (PhP/box)	4,858.02	4,917.90	5,036.10	5,332.20
<b>TOTAL REVENUE (PhP)</b>	<b>4,858.02</b>	<b>4,917.90</b>	<b>5,036.10</b>	<b>5,332.20</b>
<b>COSTS</b>				
Cost of production	356.95	340.64	358.05	360.70
Depreciation	0.27	0.34	6.14	9.43
Labor	40.00	31.00	53.00	130.00
Electricity	167.00	98.00	155.00	205.00
Water/cleaning	31.25	27.00	40.00	72.14
Transportation	-	-	38.00	44.00
Packaging materials	16.07	12.78	21.34	54.67
<b>TOTAL COSTS</b>	<b>611.54</b>	<b>509.76</b>	<b>671.53</b>	<b>875.94</b>
<b>NET INCOME</b>	<b>4,246.48</b>	<b>4,408.14</b>	<b>4,364.57</b>	<b>4,456.26</b>

<sup>a</sup>Group 1 (storing-packaging); <sup>b</sup>Group 2 (cleaning-storing-packaging); <sup>c</sup>Group 3 (sorting and grading-storing-packaging-transporting); <sup>d</sup>Group 4 (cleaning-sorting and grading-storing-packaging-transporting)

**Table 6.** Net income (PhP/box) by grouping on postharvest handling practices adopted, 31 market intermediary-respondents, San Jose, Batangas, Philippines, 2016

Item	Group 1 <sup>a</sup> n=3	Group 2 <sup>b</sup> n=4	Group 3 <sup>c</sup> n=7	Group 4 <sup>d</sup> n=5	Group 5 <sup>e</sup> n=12
<b>REVENUE</b>					
Quantity sold (per box)	1.00	1.00	1.00	1.00	1.00
Selling price (PhP/box)	5,690.90	5,725.08	5,760.32	5,860.50	5,895.67
<b>TOTAL REVENUE (PhP)</b>	<b>5,690.90</b>	<b>5,725.08</b>	<b>5,760.32</b>	<b>5,860.50</b>	<b>5,895.67</b>
<b>COSTS</b>					
Depreciation	0.13	0.03	0.06	5.88	9.77
Labor	13.08	23.75	27.50	32.92	27.25
Electricity	-	-	-	24.83	19.50
Transportation	-	24.02	38.75	30.25	32.42
Packaging materials	3.88	-	-	5.33	5.75
Cleaning materials	-	-	7.22	-	5.68
<b>TOTAL COSTS</b>	<b>17.09</b>	<b>47.80</b>	<b>73.53</b>	<b>99.22</b>	<b>100.36</b>
<b>NET INCOME</b>	<b>5,673.81</b>	<b>5,677.28</b>	<b>5,686.79</b>	<b>5,761.28</b>	<b>5,795.31</b>

<sup>a</sup>Group 1 (sorting and grading-storing-packaging); <sup>b</sup>Group 2 (sorting and grading-storing); <sup>c</sup>Group 3 (assembly-cleaning-sorting and grading-storing); <sup>d</sup>Group 4 (sorting and grading-storing-packaging-transporting); <sup>e</sup>Group 5 (cleaning-sorting and grading-storing-packaging-transporting)

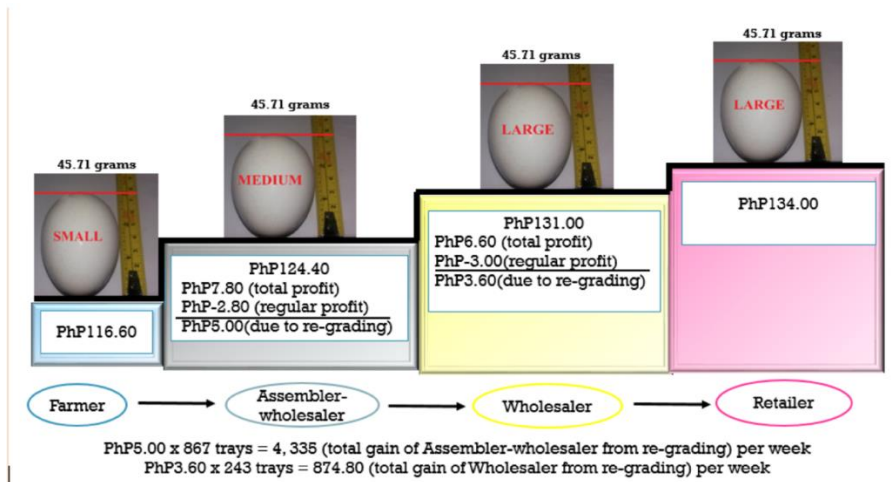
**Price differences at different market outlets**

In order to assess the effect of re-grading or non-standardization on the prices of table eggs, a combined ladder pricing and margin analysis was performed for the following three scenarios based on the identified marketing chains and the extent of re-grading done: farmer→assembler-wholesaler→wholesaler→retailer and farmer→wholesaler→retailer. The latter had two distinct re-grading standards - one for medium-sized eggs bought from the farm but sold at the retail level as jumbo and the other one was large-sized eggs at the farm level that reached the consumers as jumbo-sized.

**Table 7.** Summary of partial budget per box of table eggs, 60 farmer-respondents and 31 market intermediary-respondents, San Jose, Batangas, Philippines, 2016.

Impacts	Postharvest Handling Practice			
	Farmers		Market Intermediaries	
	Cleaning	Sorting and Grading	Transporting	Cleaning
Positive				
Added return	296.10	414.30	69.42	35.17
Reduced cost	0	0	0	0
Total positive impact	296.10	414.30	69.42	35.17
Negative				
Added cost	109.14	67.00	50.09	0
Reduced return	0	0	0	0
Total negative impact	109.14	67.00	50.09	0
Net impact (income)	186.96	347.30	19.33	23.60

Results show that differences in prices were triggered by undue margin enjoyed from re-grading. Without re-grading, that is, small egg bought at the farm will be sold as small also, the assembler-wholesaler would have gained only PhP2.80/tray or PhP84.00 per box as profit. However, as practiced, small-sized eggs bought by the assembler-wholesaler at PhP116.60 per tray were re-graded as medium-sized and sold at PhP124.40 per tray. This resulted to an additional profit of PhP5.00 or a total gain of PhP4,335 for 867 trays of eggs re-graded per week by the assembler-wholesalers when they sold to the wholesalers. In addition, the same eggs were re-graded as large by the wholesalers and were sold at PhP131.00 per tray enjoying a gain in profit of PhP3.60 per tray for a total of PhP874.80 additional re-grading profit from 243 re-graded trays (Fig.3).



**Fig. 3.** Gain from re-grading small eggs at the farmer level to large at the retail level along F-AW-W-R channel.

On the average, 269 trays of medium sized eggs were re-graded as large sized by the wholesalers with a total profit of PhP13.50 per tray whereas if not for re-grading they would have gained only PhP5.50/tray. As these eggs were transferred to retailers, eggs were again re-graded as “jumbo” giving a total profit gain of Php18.00/tray (regular profit was only PhP14.50/tray). This

resulted to a re-grading profit of PhP2,152 by wholesalers from re-grading and PhP1,263.50 per week by the retailers (Fig. 4).

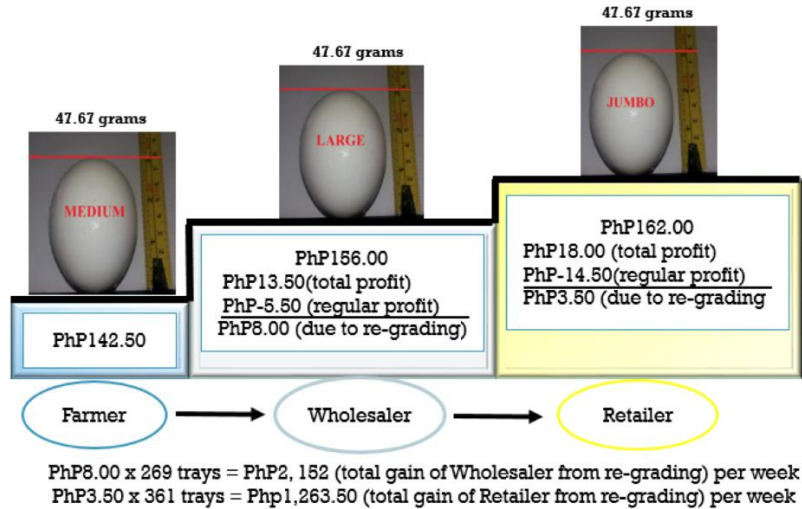


Fig. 4. Gain from re-grading medium eggs at the farmer level to jumbo at the retail level along F-W-R channel.

On the other hand, a total of 386 trays of eggs, on the average, were graded as “large” by the farmers and sold to the wholesale-retailers for PhP144 per tray. These were however re-graded by wholesalers as “extra-large” with an added gain of PhP10.50 per tray. The same was re-graded by retailers and sold to consumers as “jumbo” for PhP184 per tray reflecting re-grading gain of PhP9.50 per tray. Overall, wholesalers were able to enjoy undue profit of PhP1,407 while the retailers had PhP2,394 per week (Fig. 5).

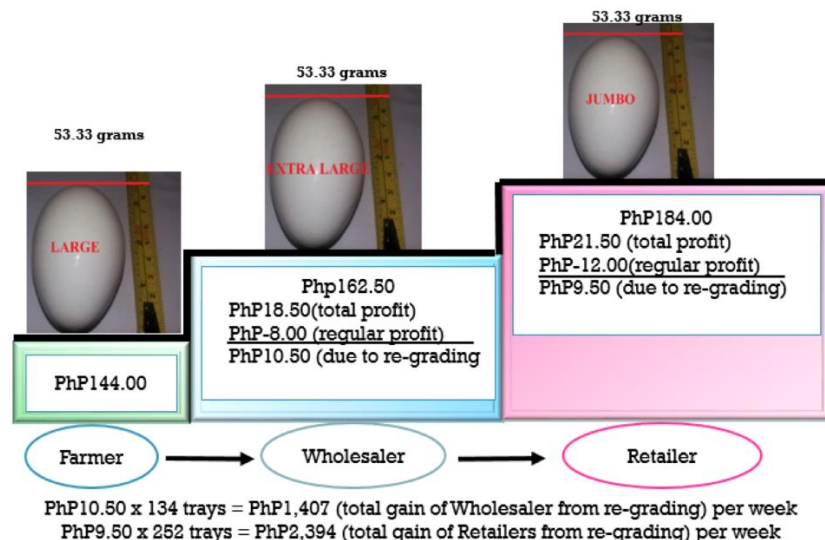


Fig. 5. Gain from re-grading large eggs at the farmer level to jumbo at the retail level along F-W-R channel.

## **CONCLUSIONS AND RECOMMENDATIONS**

Farmers and market intermediary-respondents who adopted postharvest handling practices generated more profit than those who did not adopt such practices. In particular, sorting and grading will give farmers additional net income. Likewise, market intermediary-respondents can increase their net income if they will adopt the additional practice of cleaning. It is therefore recommended that farmers and market intermediaries be encouraged to adopt these practices. Information dissemination on how this should be done properly must be made a priority by the local government unit (LGU) in cooperation with experts from nearby universities and related government agencies. This is particularly true for cleaning or washing where proper cleaning procedure is a requirement for ensured food safety.

The non-compliance to PNS for eggs in San Jose, Batangas had a negative effect on the egg prices at the farmer level and positive effect to the egg prices paid by consumers. There is thus, a need for BAFPS-PNS to ensure that all the participants involved in the marketing of table eggs are adopting uniform standards. It is also recommended that the LGU, from the municipal down to the barangay level, should serve as the implementing arm since they are in the best position to do so being always in close contact with the farmers and the traders. On the spot or random checking on the farms and weighing stations/checkpoints along the road can facilitate monitoring. The *Sangguniang Bayan* should give police powers to the assigned barangay officials to apprehend and penalize violators. In relation to this, proper labeling as indicators of assigned sizes should also be promoted together with corresponding standard sizes of trays for different grades to expedite random checking of lots bought from the area and to be sold elsewhere. And since, eggs from San Jose, Batangas find their way in many areas around the region and in other areas it might be of national interest to implement the same nationwide.

There is also a need for BAFPS-PNS to take a closer look at the issue of interior quality as a grading/standard requirement. Being tagged as “The egg basket of the Philippines” is a pride in itself and such should be given importance by the LGU. The need to maintain uniform standard is crucial in marketing with buying and selling online increasingly becoming the norm. Under this scheme of marketing, all participants are always on the assumption that the products being referring to are of standard quality.

## **ACKNOWLEDGEMENT**

The authors would like to acknowledge the cooperation of the egg farmers and traders who agreed to act as respondents for this study. Due recognition is also given to Dr. Aldo-Amado A. Delos Reyes, poultry consultant-veterinarian for the technical expertise and Prof. Bates M. Bathan and Ms. Jennifer C. Padrid for initial comments.

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