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The Philippine Mallard Duck *(Anas platyrhynchos)* Business in Eastern, Laguna, Philippines

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Abstract
The study examined the status, challenges, and potentials of the Philippine Mallard Duck (*Anas platyrhynchos*) Business in Eastern, Laguna, focusing on understanding the current status of the business and identifying constraints and opportunities for sustainable growth. It aimed to assess the factors affecting the Philippine Mallard Duck industry in Eastern, Laguna and provide insights for enhancing its productivity, profitability, and environmental sustainability. Face to face interview using survey questionnaire was used to gather information. The data collected was analyzed through descriptive method using purposive sampling technique since it was concerned with present status, current production, marketing practices and financial information of the business. Study revealed that even the Philippine Mallard Duck industry faced challenges such as disease outbreaks, Philippine Mallard Duck business is a profitable venture for many raisers. Data showed that the Philippine Mallard Duck business in Eastern, Laguna has significant potentials for further development and sustainable growth and economic benefits to rural communities. Furthermore, it is recommended to Philippine Mallard Duck raisers to share their knowledge and experiences through online platforms and stay updated with the market trends and buyers' preferences.

Keywords: Philippine Mallard Duck, Status, Challenges, Prospects, Duck Farming

Introduction

Duck raising in the Philippines is primarily for production of egg that is processed into balut or cooked embryonated egg and salted egg. Local duck industry is a five billion industry and is being controlled by small and medium scale producers (Chang *et al*., 2003) [11]. The Philippine Mallard Duck (*Anas platyrhynchos)*, or locally known as Pateros duck, is the most predominant species raised. In 2010, the estimated population of ducks for both the commercial and backyard farms in the country is 10.1 million heads (BAS, 2011) [6].

According to DOST-PCAARRD (2012) [13], Itik Pinas or Mallard Duck is a breeding true-to-type Philippine Mallard ducks selected for high egg production, predictable performance, and consistent product quality. The selection criteria include the replacement stock coming from the top 50% egg producing family at 40 weeks of age, with egg weight between 65-70 grams. At 18 weeks of age, body weight is approximately 1.0 - 1.3 kg and plumage color and pattern should either be black or khaki.

Mallard Duck or Itik Pinas was developed in a project conducted by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD) and the National Swine and Poultry Research and Development Center of the Bureau of Animal Industry (BAI-NSPRDC). Itik Pinas was a product of continuous selection and breeding of the traditional Pateros duck stated by (Parungao, 2017) [27].

The Philippines, being an archipelago, is home to diverse plant and animal genetic resources. Recent reports showed that the Philippines is the center of biodiversity for chicken and marine life (Thomson *et al*., 2014) [32]. Philippine Mallard Ducks, or locally known as "Pateros," are very popular for balut and salted egg processing. The majority of the inventory is concentrated in the Central and Southern Luzon, Cagayan Valley, Western Visayas, and Davao regions. The mallard duck populations are being kept under varied production environments, from free-ranging to complete confinement, and exhibit diversity in physical traits (Lambio *et al*.,2013) [19]. This phenotypic diversity needs to be further validated using the molecular technique as it provides more reliable 725 information for assessing the degree, structure, divergence, and distribution of diversity within and among populations found in different locations.

The Philippine duck industry is accounted for more than 75 percent of the total duck production. Currently, domestic production covers practically all of the need for duck eggs while only two percent of duck meat is imported. Imports do not seem to pose a substantial danger to the domestic supply. The duck business in Philippines is anticipated to experience more competition from foreign and other overseas products as trade liberalization progresses. According to Philippine Statistics Authority (PSA), the total amount of duck eggs produced from January to March 2022 was 12.88 thousand metric tons up to 11.8 percent from the output of 11.52 thousand metric tons during the same period in 2021. The Philippines raises two different breeds of ducks: Egg-type and meat-type.

Almost all varieties of the domestic ducks (*Anas platyrhynchos domesticus*) are descended from the Mallard or wild ducks (*Anas platyrhynchos*) except the Muscovy duck (*Cairina moschata*). The domesticated ducks are mostly raised for eggs and meat purposes; however they are also kept for down, show and as pets. The male and female ducks are known as drake and duck (hen). The drake and duck can be differentiated from external appearance, sound, behavior, and internal anatomy. The drakes have generally more colorful feathers & bills, prominent curled feather near the tail, softer & harsher quack sound extended or elongated genital organ and are larger in size. However, the ducks have generally dull feathers and bill color, absence of curled feather near the tail, distinctive loud quack sound, cone-like genital organ, and are smaller in size (Makram, 2016) [22].

In the tropics, there are examples of Mallard ducks which are regarded as native or indigenous. The Philippine al mallard duck is oftentimes called the Pateros duck. It is believed to have evolved from stocks introduced from mainland China many centuries ago. Their original plumage color was black with a white bib or necklace. The present-day Pateros ducks show various plumage color and pattern. The predominant plumage colors and patterns are the khaki-type (brown), the Pateros-type (black), and the intermediate-type pattern. This variation in color pattern is believed to be a consequence of their mating with exotic stocks. Drakes weigh between 1.5 to 1.75 kg while adult female ducks weigh between 1.25 to 1.5 kg. The average egg size is between 65 g and 70 g. The average annual egg production is between 200 to 270 eggs. Pateros ducks are primarily raised for the production of balut-a special Filipino delicacy, Balut is an incubated fertile egg with a sixteen to eighteen day-old embryo which is cooked and eaten with a dash of salt. Incubated eggs which are either infertile or with dead embryos are called penoy and are consumed just like balut. Pateros duck eggs are also popularly utilized in the form of salted eggs and century eggs (Lambio, 2012) [20].

Balut is a popularly known Filipino delicacy made from incubated duck eggs. It is the main product of the duck industry in the Philippines, followed by salted duck eggs or locally known as “itlog na maalat”. Its name was derived from the traditional way it was prepared—“balut” which plainly means “wrapped” or covered inside bags during its incubation process. The perfect balut is incubated for 17 to 18 days while its embryo is still wrapped with a whitish covering and has not yet fully developed. This is locally known as “balut sa puti” which literally means “wrapped in white.” Despite the popular association of the consumption of fertilized duck eggs or incubated eggs to the Filipino cuisine, it has been documented to have existed and continuously patronized in many Asian countries. It has been identified that fertilized duck egg consumption was originally developed in China to extend the shelf life of the eggs before the discovery of refrigerators. It was called “maodan” or literally translated as “feathered” or “hairy egg,” as feathers are still visible when it is cooked. The Vietnamese prefer the egg to be incubated for 19 to 21 days so that the embryo will be firm when cooked. Similarly, it is incubated for 18 to 20 days in Cambodia. At present, it is still popularly known and commonly consumed in most East and Southeast Asian countries, including Laos and Thailand (Alejandria *et al*., 2019) [4].

Duck ranks second to chicken in terms of economic importance. Some farmers raise ducks around the Laguna Lake area, since they can easily get feed from the lake, such as snails, small fish and shrimps. However, Laguna Lake has now become a huge sink for solid and liquid wastes coming from households, croplands, agro-livestock industries and fishery activities. The industry's ineffective marketing system is one of the issues. Too many middlemen use the duck's marketing and distribution, which causes a considerable price difference between initial and retail prices. In addition, the business has seen a decline in demand due to consumers' lifestyles. The false belief that ducks meat contains harmful ingredients which contribute to the drop in demand. Both public and private sectors have taken steps to promote the consumption of duck meat and clear out the myth that associates duck product consumption in order to adapt to changing consumer preferences. The Laguna commercial duck meat sector still has the potential to return to its past high output levels; in fact, individual farm incomes have been gradually rising in recent years. This can serve as a strong hint to potential investors interested in this industry. Smallholder production dominates the Philippine duck industry. The Philippine duck business is expected to confront more competition from abroad as well as from other products as trade liberalization progresses. The industry's ability to compete in a globalized market, which in turn depends on how effective the production and marketing systems are in comparison to rivals, is essential to the industry's continued existence and expansion. The Philippine Mallard Duck is a widespread species that can be found throughout the country. Ducks are a popular choice for many backyard raisers. They are relatively easy to care for, provide supply of eggs and meat, and their waste is a valuable fertilizer. Ducks are also good for the environment because they help to keep ponds and wetlands clean. They eat a lot of insects, which helps to control the population of harmful pests. Ducks also add oxygen to the water, which is good for plant and animal life. To efficiently manage and protect wetland ecosystems, Harmonized National Research and Development Agenda (HNRDA) may give Philippine Mallard Ducks priority in order to better understand their ecological relationships, habitat needs, and population dynamics.

The rice-duck farming system established in Siniloan, Laguna by the Duck Ranger Program was evaluated in terms of productive performance of the ranged Mallard ducks housed in traditional and floating duck sheds or “balsa”. The floating duck shed was a raft-like structure which held up the housing as the water level increased and at the same time enabled the farmers to move the housing together with the ducks to a place where snails and other feed materials were abundant. On the other hand, the traditional duck shed was a

stationary housing placed adjacent to rice paddies which confined the ducks when environmental factors were unfavorable for ranging. Ducks housed in traditional duck sheds were fed with more duck layer pellets (DLP) which in turn yielded more eggs with thicker eggshells as compared to the eggs of the ducks raised in a floating duck shed. However, eggs produced from the ducks housed in a floating duck shed turned out to be cheaper due to a lower feed cost with the provision of less expensive snails as a substitute to DLP. Farmers using floating duck sheds largely depended on the feed materials found in the lake and in the paddy range while those who used the traditional duck shed were more capable and willing to buy DLP (Bulatao *et al*., 2008) [10].

Materials and Methods

The study utilized descriptive method quantitative research design. This is the appropriate method since the study was concerned with the present status, challenges and potential of Philippine Mallard Duck Business in Eastern, Laguna. In this study, thirty six (36) respondents Philippine Mallard Duck (*Anas Platyryhnchos*) raisers. Respondents that are subjected to the study are the resident from Eastern, Laguna Philippines. Specifically, fifteen (15) respondents are from Siniloan, nine (9) respondents from Sta. Maria, eight (8) respondents from Mabitac, and four (4) respondents from Famy. On the other hand, municipalities of Pangil, Pakil, Paete and Kalayaan showed no recordes on Philippine Mallard Duck raisers. Purposive sampling techniques were used in this study due to the fact that answers and responses from the questions should only be answered by the respondents.

In this study, the researcher used survey questionnaire as research instrument to gather information from different respondents that the researcher had to accomplish. Interview schedule or face to face interview was used in gathering the data regarding the demographic profile of the respondents. The second part of the questionnaire was composed of current status, current production, current problems, marketing practices and financial information of the business. For better communication between the researcher and the respondent, a questionnaire employed was asked in Filipino.

All the data gathered were organized, analyzed, and tabulated statistically using the frequency, percentage, weighted mean, and verbal interpretation to determine the significant differences among the answers of the respondents. To facilitate easy computation, data collected were analyzed using the Microsoft Excel Software and further analysis using the Likert Scale method.

Objectives

This study was conducted to determine the Status, Challenges and Potentials of Philippine Mallard Duck (Anas Platyryhnchos) Business in Eastern, Laguna. It specifically answered the followings questions:

1. What is the financial status of duck business in the study area?
2. What is the current production and methods of selling applied on the business in the study area?
3. What are the investment opportunities and development entry points of Philippine Mallard Duck business?
4. What are the problems encountered by the Philippine Mallard Duck raisers?

Results and Discussion

Table 1 shows that the majority of Philippine Mallard Duck (*Anas platyrhynchos*) raisers in Eastern, Laguna save enough money from their business. It shows that out of thirty six respondents, 33 respondents conduct financial reviews with a mean of 4.89. The lowest number is statement, "they experienced financial challenges in operating the business" with a mean of 1.33. The financial accounting system is the backbone derived from the International Accounting Standards, which is based on a set of concepts and principles used as a framework for reference, where the output of the financial accounting system in any institution consists of financial statements and reports. It also contributes to clarifying the financial and monetary flows and changes and changes in equity. A lot of other information is added to these lists to complement the information included in these lists, through the disclosure of the various accounting methods and principles used by the institution or organization in preparing its own lists (Dabash and Khamili, 2017) [12].

Table 1: Financial status of Philippine Mallard Duck raisers

Statement	Weighted Mean	Verbal Interpretation
1. Conducted financial review of business finances. (ex. used for expenses and money earned in business.)	4.89	Always
2. Have diversified income stream from business. (ex. meats and eggs)	4.83	Always
3. Experienced financial challenges in operating the business.	1.33	Never
4. Negotiate favorable prices for Philippine Mallard Duck needs.	5.00	Always
5. Save enough money from business.	4.78	Always
Total	4.17	Always

Table 2 displays that in terms of current production; most of the respondents stated that they commonly maintain the records of production, manage the breeding activities, control pests and predators, collect eggs for incubation and evaluate the productivity and performance of Mallard Duck. This statement got a mean of 5.00 with a verbal interpretation of always.

According to Chang *et al*., (2007), ducks have traditionally raised in the backyard in the Philippines by rural households to provide low-cost animal protein. Unlike other duck producing countries, the Philippine duck industry specializes in egg production for making Balut (an embryonated egg of 16-18 days old). In recent years, the share of commercial duck farms (with more than 100 heads) has increased from about 10% in 1991 to about 24% in 2005. The significant growth in the commercial duck sector in recent years has been attributed to the introduction of commercial duck feeds and more advanced production technology. This trend is

expected to continue. This means that about 75% of ducks are still raised as backyard (less than 100 heads). Research has shown that in general there are economies of scale in livestock production that is the larger the farm, the lower cost of production and the higher the returns.

Financial analysis also helps to provide financial information that is useful in predicting financial failure, and the consequent critical decisions on how an organization operates. The financial decision-making process is one of the most important organizational procedures and roles played by the members of the institution, and the decision-maker cannot do its work unless available to him information. This necessitates an in-depth study and numerical analysis of the financial statements before any financial decision is taken, so that the manager can discover the strengths and best exploit, and identify weaknesses to take the necessary corrective actions (Ahlam, 2016) [1].

Table 2: Current production practices of mallard duck raisers

Statement	Mean	Verbal Interpretation
1. Maintain record of production (ex. number of egg yields per day)	5.00	Always
2. Monitor and manage the breeding activities.	5.00	Always
3. Monitor and control pest and predators.	5.00	Always
4. Collect eggs appropriately for incubation.	4.61	Always
5. Evaluate the productivity and performance of the business.	4.61	Always
Total	4.84	Always

Table 3 shows that all of the raisers surveyed employed pricing strategies based on their fellow poultry farmers, take into customers' preferences, collect feedback, use social media platforms and collaborate with wholesalers to market their products. These statements have a mean of 5.00, signifying a strongly agree and frequent usage based on to the verbal interpretation. It is important that businesses invest in having a connection with their customers in order to achieve customer satisfaction and income growth. It altered traditional methods of customer and business interaction. That is the problem in which resorts need to reassess and develop new relationship strategies because customers nowadays have much higher expectations of businesses proactive services, personalized interactions, and connected experiences across digital channels (Ranjan, 2021) [30].

Table 3: Methods of selling

Statement	Mean	Verbal Interpretation
1. Maintain pricing strategy depending on other poultry farmers.	5.00	Always
2. Consider customer's preferences when selling.	5.00	Always
3. Collect feedbacks from customer to improve selling activities.	5.00	Always
4. Collaborate with wholesalers to sell meat products.	5.00	Always
5. Use social media platform in selling.	5.00	Always
Total	5.00	Always

Table 4 reveals the potentials and opportunities of Philippine Mallard Duck Business. Engaging in the Philippine Mallard Duck Business opens a potential growth, sustainability and profitability. The inherent adaptability and versatility of the Mallard Duck business create a favorable environment for entrepreneurial endeavors, showcasing a multitude of opportunities waiting to be explored. These statements have a mean of 5.00, signifying a strongly agree and frequent usage based on the verbal interpretation. Duck production is one of the most profitable livestock industries in the Philippines mainly because of its egg which can be marketed through different channels. Duck eggs, both in fresh and preserved forms, are sold and consumed daily throughout the country. The demand for duck products in the Philippines continually rises indicating that the duck industry can be a profitable enterprise (Alejandria *et al*., 2009) [4].

Laying performance is governed by many traits that are influenced by genetics, environment and interaction effects. These major factors can be regulated and modified under the state of current technological advances. However, improving the performance of laying traits entails an understanding of the mechanisms and interactions underlying the expression of these traits. There are various methods utilized to improve laying efficiency from the use of fundamental knowledge in breeding such as selection and mating systems to the application of molecular technology like marker-assisted selection. All of these methods require large population size, large facilities for research, organized systems for handling and evaluation of large data sets and are, therefore, time-consuming. Hence, it is vital that a research procedure that could offer similar results at least cost and at a short period of time be developed. The novel procedure is the association of vitellogenin with the expression of reproductive phenotype (Gorman *et al*., 2009) [17].

No one is engaged in the day-old-ducklings breeder production. Replacement stocks usually were only the surplus of balut production. The main stock used is the Pateros duck, which exhibits varied physical and production performance due to lack of organized selection and mating systems. It also shows high genetic diversity based on simple-sequence repeats markers (Magpantay *et al*. 2019) [23].

Meat-producing duck strains grow quick because of genetic selection. economical housing systems, and excellent nutrition. Many strains of duck are usually utilized in industrial meat production due to their high growth rates, good feed conversion rates, fascinating body conformation, and high dressing percentages (Biesiada-Drzazga, 2021) [7].

Table 4: Potentials and opportunities of Philippine Mallard Duck business

Statement	Weighted Mean	Verbal Interpretation
1. Demand for the products us growing.	5.00	Strongly Agree
2. Eggs and meats has a higher price to other poultry products.	5.00	Strongly Agree
3. It has a potential for product development.	5.00	Strongly Agree
4. Has a potential for exporting to international markets.	5.00	Strongly Agree
5. It can provide additional opportunities to communities.	5.00	Strongly Agree
Total	5.00	Strongly Agree

Problems encountered by the Philippine Mallard Duck raisers are presented in Table 5. The general mean is 5.00 with a verbal interpretation of strongly agreeing. The data shows that the problem encountered due to a lack of financial resources refers to the situation where individuals face difficulties in obtaining or managing sufficient funds to meet their needs. It is followed by the statements, lack of attended trainings and seminars, insufficient government support and availability of needs supply directly impact the profitability and sustainability Philippine Mallard Duck Business activities. The Philippine duck industry faces the challenges of high cost of inputs and unstable prices of duck and egg products, limited performance testing of Itik Pinas in strategic provinces/regions, limited product innovations, limited balut product safety standards and protocols, and absence of legitimate local duck meat industry (PCAARRD, 2015) [29]. Martin *et al* (2020) [25], in his research, the allotted flooring space of 1.5 ft2/duck performed satisfactorily, irrespective of feeding system, and that adverse effect on the gain in weight and FCR were evident with higher floor space allotment. These observations were associated with higher energy expenditures of the IPK ducks when provided with wider space to move around. Moreover, the optimal performance of itik pinas can be achieved by providing proper nutrition, feeding management, housing, and health management.

Table 5: Problems encountered of mallard duck raisers in Eastern, Laguna

Statement	Weighted Mean	Verbal Interpretation
1. Lack of financial.	5.00	Strongly Agree
2. Limited access to affordable feeds supply.	5.00	Strongly Agree
3. Lack of trainings and seminars.	5.00	Strongly Agree
4. Insufficient government support.	5.00	Strongly Agree
5. Predation by pests and animals.	5.00	Strongly Agree
Total	5.00	Strongly Agree

When access to affordable needs is constrained, it can lead to increased production costs but lower productivity for raisers. Lastly, predation negatively impacts Philippine Mallard Ducks by a threat to their survival through the predation of eggs and ducklings by natural predators such canker worms. Numerous studies have explored the impact of financial constraints and limited access to training and seminars on businesses. The period of closure and movement prevention policies adopted by governments in many countries have greatly affected SMEs, paralyzing their operations, weakening their financial positions, and exposing them to financial risk (Omar *et al*., 2020) [26].

Conclusion

With the above findings, data showed that the current production of Philippine Mallard Duck raisers in Eastern, Laguna, Philippines was influenced by various factors, including the cost of agricultural inputs. On the other hand, Philippine Mallard Duck (*Anas platyrhynchos*) raisers can generate their income through the sale of valuable by-products like eggs and meat. Most of the respondents face predation issues from pests and animals. Predations are serious challenges for Philippine Mallard Duck raisers as it can result in the loss of their financial and interruption in the breeding and production process.

Recommendation

Based from the findings and conclusions, the study recommends to conduct duck raising extension projects and activities to encourage farmers to venture in the industry. This may be done in all forms such as online, on-site and through e-extension. It also recommended that existing farmers (mallard duck raisers) be assisted in the review and analysis of marketing strategies for more improved product and by-products of mallard ducks. Also, it is recommended that mallard duck raisers may engage in breeding activities to improve the genetic lines of ducks to increase the production and improve farmers income.

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