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# **The Philippine Duck Industry: Issues And Research Needs \***

Hui-Shung (Christie) Chang and Clarita T. Dagaas \*\*

## **Abstract**

The Philippine duck industry is dominated by balut (partially hatched embryos) production and by smallholder production that accounted for more than 75 percent of the total duck production. However, the commercial sector is gaining momentum in moving towards a higher degree of vertical integration and contract farming and there appears to be some increase in the demand for duck meat. At present, almost all of the demand for duck eggs is met by domestic production while about two percent of duck meat consumption is imported. As such, imports appear not to be a serious threat to the domestic supply at present. However, it is envisaged that as trade liberalisation continues, the Philippine duck industry will face increasing competition from overseas and other food products. Continuing survival and future growth of the industry depend on its ability to compete in a free trade environment, which, in turn, depends on efficiency of the production and marketing systems relative its competitors. The objectives of this paper are to provide an overview of the industry, identify industry issues and suggest areas for further research. The key issues identified in this paper include (1) a possible declining demand for duck products; (2) the absence of product standards and market information; and (3) the collection and consistency of BAS data. One suggestion is that expert opinions are needed to reconcile discrepancies in the published data. In addition, more research is needed on several areas, including identifying issues facing the smallholders, including the emergence of large scale commercial duck farms; better understanding of consumer demand; defining and establishing product standards, and generating more reliable market intelligence.

**Key Words:** : duck, poultry marketing, trade liberalisation, balut.

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## **Introduction**

In 2002, the Philippine poultry industry generated 40.3 billion Philippine pesos (about \$US 806 million, based on an exchange rate of 50 Philippine pesos in a dollar), which accounted for 11 percent of total value of agricultural production (BAS, 2003a). The Philippine poultry industry had been protected from imports through tariffs and other non-tariff measures in the past. However, since the accession to the World Trade Organisation (WTO) and signing of regional trade agreements (Asia Pacific Economic Cooperation and ASEAN Free Trade Area) in the mid-1990s, imports of poultry meats (mainly frozen chickens and ducks) and other meat products (particularly frozen beef) have increased substantially. It is envisaged that as trade liberalisation continues, the Philippine poultry industry will face increasing competition both from overseas and other food products. Continuing survival and growth of the industry and its sub-sectors (including broiler chickens, layer chickens, native chickens and ducks) depend on their ability to compete in the global market, which, in turn, depends on efficiency of their production and marketing systems.

Because the poultry sub-sectors differ significantly in their production and marketing systems, the trade impacts on them are likely to differ, imposing threats on some while creating opportunities for others. For example, the commercial broiler and layer chicken farms are generally vertically integrated with large scale, technologically advanced, geographically concentrated production units while ducks and native chickens are produced mostly by geographically and technologically more diverse smallholders.<sup>1</sup> Typically, the marketing chains for commercial chicken products are relatively short and efficient, with integrated operators employing contract farming and their own processing and marketing facilities while ducks and native chickens rely mainly on traditional and much less efficient marketing channels (SEARCA, 1999).

Some studies that analysed competitiveness of, and trade impacts on, the Philippine livestock and commercial poultry sectors have found them to be not competitive with both imports and exports in a more liberalised trade environment (Jarvis, 1993; Gonzales, 1995; Mangabat, 1998; SEARCA, 1999; University of Asia and the Pacific, 1999; PCARRD, 2000; Mateo, 2001; Arboleda, 2001). This is because the Philippine poultry industry was a high cost producer, relative to major exporting countries such as Brazil, China, Thailand and USA, due

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<sup>1</sup> Backyard production of ducks and native chickens accounted for more than 60 percent and 75 percent of the 2001 total duck and chicken inventories, respectively (BAS, 2002a,b).

to its heavy reliance on imported inputs (including feedstuffs, vaccines and breeding stock) (Mateo, 2001; Department of Agriculture, 2001; Arboleda, 2001).

Given that the smallholder duck and native chicken sector is largely undeveloped, it is reasonable to assume that it too, like its commercial counterpart, will not be able to compete with imports. But this assumption is not necessarily true. This is because although the smallholders may not compete well with the commercial sector on productivity, such as egg production, weight gain, body weight, etc, they are lower cost producers based on local breeds that are resistant to diseases and harsh living conditions, local resources that are lower cost, and less intensive production systems (Arboleda, 2001). In addition, there are strong consumer preferences for the freshness and unique taste of duck and native chicken products (SEARCA, 1999; Lambio, 2001). Therefore, smallholder duck and native chicken production may have a market advantage over the commercial sector and may become technically more productive if sufficient support in research and development were given to help identify issues and improve productivity.<sup>2</sup> Given the massive involvement of farm households in duck and native chickens production, even a small productivity gain as a result of research and development can have a tremendous impact on the livelihood of resource-poor farmers.

This study is a part of a research project, entitled “Future prospects for smallholder Philippine poultry producers: ducks and native chickens”, funded by the Australian Centre for International Agricultural Research (ACIAR). The overall objective of the research project is to determine whether and how the Philippine smallholder duck and native chicken producers can become more efficient. Because of the limited space, this paper focuses on ducks only where more research is needed. A special report on native chickens will follow in due course. This paper is organised as follows. First, it provided an overview of the industry, including trends in production, consumption and trade and government policies and regulations that have an impact on the sector. It then identifies key issues facing the duck sector and makes recommendations to the government and the industry on areas that further research is needed. The paper ends with some concluding remarks.

### **‘Balut’ and the smallholder production**

Ducks are raised primarily for meat in the Western countries (eg Australia, USA, Canada and France) and in Asian countries dominated by the Chinese (China, Taiwan, Hong Kong and

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<sup>2</sup> Despite their economic and social significance to the majority of the Philippine population, smallholder production in general has received little attention from either the research community or government until recently when the Republic Act 8435, otherwise known as the Agricultural and Fisheries Modernisation Act (AFMA) was enacted in 1998 as a support to the smallholder poultry and livestock industries (Department of Agriculture 1999).

Singapore). In other Asian countries, such as Thailand, Malaysia, Vietnam and Indonesia, India, and Bangladesh, ducks are raised to produce eggs for table egg consumption and processed into salted and century eggs (Farrell and Stapleton, 1986). But this is not the case in the Philippines.

In the Philippines, about 90 percent of total duck egg production is used for processing (BAS-SRTC 1998). Eighty-seven percent of which is processed into balut<sup>3</sup> and another 7 percent is processed into salted eggs. The remaining 6 percent consists of century eggs, penoy, and other unidentified forms. This means that balut accounts for about 80 percent of total egg production. This emphasis on balut production is a unique feature of the Philippine duck industry.<sup>4</sup> Although unfamiliar to most foreigners, balut and penoy are delicacies in the Philippines for their unique taste and nutritional content. Cooked balut is sold as snacks in the evenings by street vendors, either peddling on the street or stationing on the sidewalk. Most Filipinos speak of balut fondly and proudly.

Although in the Philippines some meat-type ducks are being raised, the majority of duck meat is derived from excess males and culled layers. Consequently, the meat is relatively low in quality, with fishy meat taint and tough and coarse texture (Perez, 2003). Duck meat is often used for making another traditional Filipino duck dish known as “kinulob na itik”, whereby fishy smell and toughness are overcome or disguised by heavy seasonings and deep frying after being boiled for hours (Lambio, 2001). As a result, consumers prefer pork and chicken meat and the demand for “kinulob na itik” is limited to a small segment of the Filipino population (de Castro et al., 2002).

A second feature of the Philippine duck industry is the dominance of smallholders in duck raising. More than 75 percent of the ducks in the Philippines are raised by smallholders or backyard raisers with less than 100 heads per household (BAS, 2002a). Ducks are commonly raised and preferred by smallholders in rural areas because they can subsist under a wide range of climatic conditions and feed on a variety of foods, and are resistant to common avian diseases (Farrell and Stapleton, 1986). Therefore, duck products are good sources of income and low cost animal protein for rural population. Philippine ducks are composed mainly of the Mallard duck (*Anas platyrhynchos* L.) for egg purposes, with only a small number of Muscovy duck (*Cairina moschata* L.) being raised for meat (Lambio, 2001). Duck eggs are

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<sup>3</sup> Balut, which is referred to as “embryonated egg” by the Chinese and as “hot vit lon” by the Vietnamese, is partially incubated duck eggs whose live embryos are harvested between 16-18 days old. The infertile eggs and dead embryos are sold as ‘penoy’ in the Philippines.

<sup>4</sup> Although balut is also produced and consumed in Vietnam and some Chinese provinces, they are not in such a large scale as in the Philippines.

larger in size and have thicker shells and stronger flavour than chicken eggs, all of these characteristics make them more suitable for processing into value-added products.

The emphasis on egg and balut production and the dominance of smallholders mean that the future prospects of the industry depends heavily on the future demand for balut and the ability of the smallholders to compete with other competing products in price and product quality. However, products such as balut and penoy, despite their uniqueness and cultural significance, may face uncertain future because of changing lifestyles and consumer preferences, issues of availability, and concerns over food safety and product quality.

### **Duck distribution**

In 1950, when the inventory of ducks in the Philippines was first taken, there were 709,000 heads of ducks (BAS, 2002b). Since then, the total population has shown a steady increase. It reached 4.67 million heads in 1980 and almost 10 million heads in 2001. The duck inventory is classified into commercial and backyard. A duck operation is defined as “commercial” by Bureau of Agricultural Statistics (2000a) if the farm has more than 100 heads of ducks. Otherwise, it is referred to as “backyard”. Therefore, the classification is based on the number of the birds, regardless of the production methods<sup>5</sup> or whether the outputs are primarily for sale or for household’s own consumption. Nevertheless, it is reasonable to assume that farms with more than 100 heads of ducks are in operation most definitely for business and income generating purposes. Table 1 shows the number and production share of the commercial and backyard sectors during 1991-2001. It can be seen from Table 1 that the percentage share of ducks raised under commercial scale increased from about 10 percent in 1991 to about 22 percent in 2001 (BAS, 2002b). That means in 2001 about 78 percent of ducks are still raised in small scale, backyard operations.

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<sup>5</sup> Ducks can be produced in several different ways: intensive system based on confinement and formulated feeds; semi-intensive system based on a mixture of naturally occurring feeds and supplementary feeding; (back)yarding based mainly on naturally occurring feeds and household scraps; herding based on foraging on the rice fields; and integrated system with fish or pig production (Farrell and Stapleton, 1986).

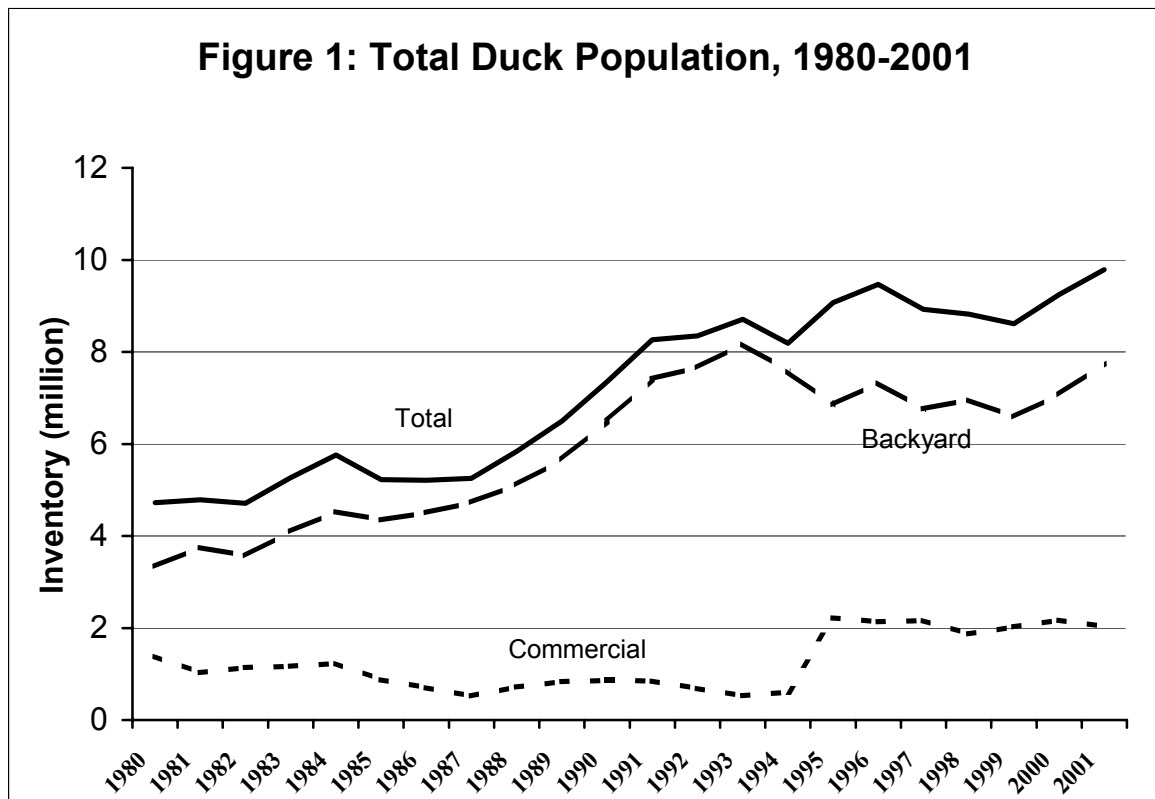
Table 1. Philippine duck inventory, 1991-2001

Year	Total	Backyard		Commercial	
		Heads	%	Heads	%
1991	8,267,690	7,417,520	89.72	850,170	10.28
1992	8,348,291	7,660,895	91.77	687,396	8.23
1993	8,706,783	8,175,475	93.90	531,308	6.10
1994	8,186,877	7,585,108	92.65	601,769	7.35
1995	9,072,203	6,855,460	75.57	2,216,743	24.43
1996	9,469,693	7,335,159	77.46	2,134,534	22.54
1997	8,923,496	6,762,241	75.78	2,161,255	24.22
1998	8,823,566	6,953,335	78.80	1,870,231	22.20
1999	8,613,651	6,589,101	76.50	2,024,550	23.50
2000	9,245,788	7,074,944	76.52	2,170,844	23.48
2001	9,986,803	7,810,034	78.20	2,176,769	21.79

Source: BAS, 2002b

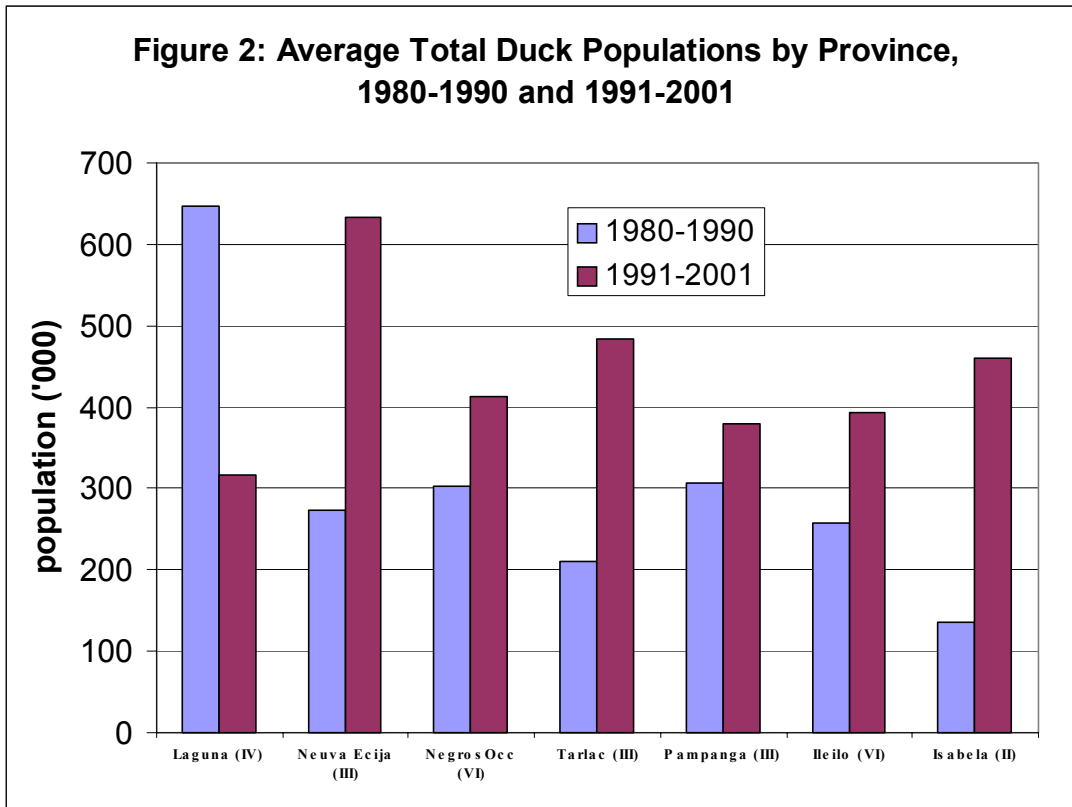
Figure 1 shows the changing trends in the make up of the duck inventory between 1980 and 2001. It can be seen that overall, the total inventory has shown an increasing trend. The numbers of backyard (village) ducks increased gradually from 1980 to 1993 but after 1993 the backyard duck population has shown some decline and fluctuated around 7 million birds. The commercial duck industry shows a different pattern. Numbers from 1980 to 1994 appeared to be declining steadily. In 1995, however, there was a major boost to over 2 million birds, which has been maintained since.

The significant growth in the commercial sector since the mid-1990s could be attributed to the introduction of commercial duck feeds. However, it is not clear what caused the declines in the commercial sector (between 1980-1994) and in the backyard sector (between 1994 and 1999). While the large scale commercial sector uses mainly commercially formulated feeds, smaller farms (including some commercial farms and backyard raisers) use different feeding regimes based on a mixture of naturally occurring feeds, supplementary feeding of corn and dried coconut, and commercial feeds. Traditionally, ducks were raised on naturally occurring feeds in and around rivers and lakes (eg Laguna Lake) and rice producing areas (where herding system is more common). However, the advent of commercial feeds has allowed ducks to be raised in traditionally non-duck areas and has resulted in changes in the geographical distribution of duck population in the Philippines (University of Asia and the Pacific, 1999).



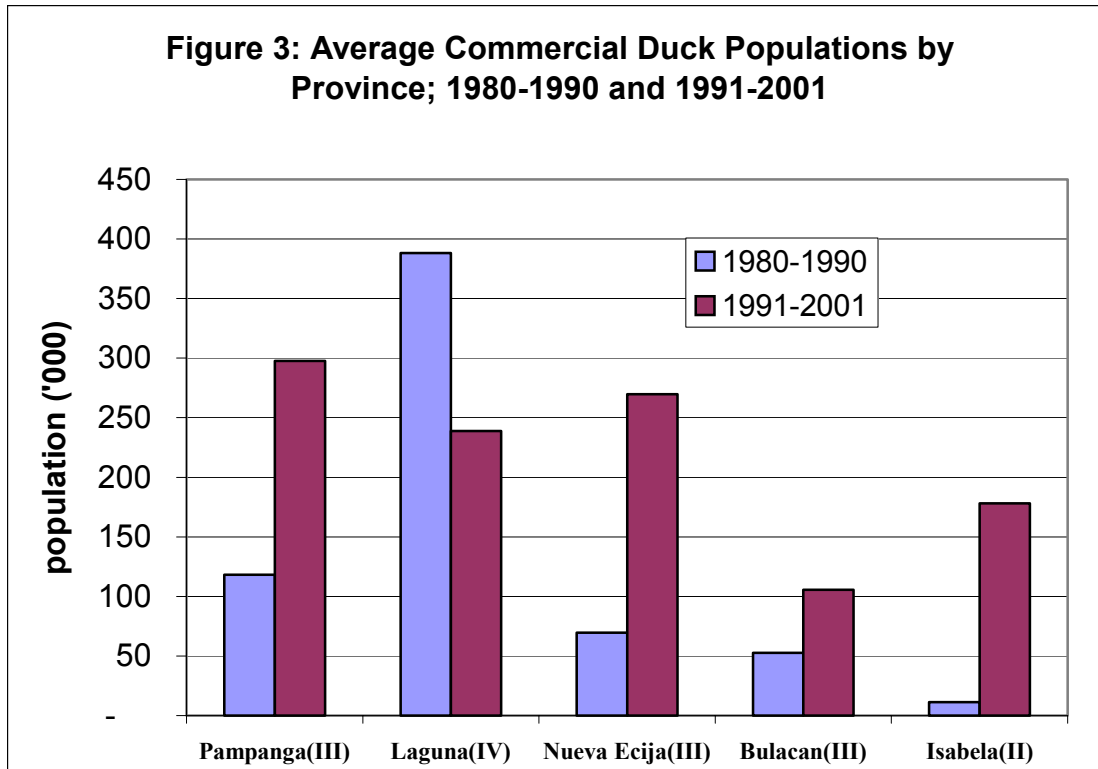
A case in point is the drastic reduction in duck numbers in Laguna province (home to the Laguna Lake), which used to be the largest duck producer of the country for many decades, and substantial increases in Nueva Ecija, Tarlac and Isabela provinces, as can be seen in Figure 2. The most significant increases in population (apart from Nueva Ecija) during the period 1991-2001 have been in Tarlac (Region III) and Isabela (Region II).





In 2001, Nueva Ecija in Region III took over Laguna and became the largest duck producing province. This was followed by Pampanga (Region III), Iloilo (Region VI), Sultan Kudarat (Region XII) and Isabela (Region II).

The major shift in the total duck production from Region IV to Region III mirrors the developments in the commercial duck sector (Figure 3). That is, traditionally the major commercial duck producing area was in the province of Laguna (Region IV), but in the last 10 years the provinces of Pampanga and Nueva Ecija in Region III and Isabela in Region II have become more dominant while Bulacan (Region III) has grown but at a much slower rate. The survey conducted in BAS-SPTC (1998) has shown that the commercial duck egg production in Nueva Ecija, Pampanga and Bulacan is much more profitable than Laguna due to lower costs of production.



The top ten duck producing provinces in 2001 were: Nueva Ecija, Iloilo, Sultan Kudarat, Isabela, Pangasinan, Laguna, Bukidnon, Davao del Norte, Maguindanao, and Leyte (BAS, 2002a). Together they accounted for 46 percent of total duck inventory.

### **Value and volume of production**

In 2002, the total value of duck production amounted to 2.67 billion Philippine pesos, with duck eggs valued at P1.27 billion and duck meat valued at P1.40 billion. The total value is higher than the value of production of carabao (P 2.53 billion), goat (P 2.28 billion) and dairy cattle (P 76.07 million) (Table 2). As indicated, in 2002 the value shares of poultry products were 10.10, 2.69, 0.48 and 0.43 percent for chicken meat, chicken eggs, duck meat and duck eggs, respectively. Note that the value share of the poultry industry has increased from 11.90 percent in 2000 to 12.81 percent in 2001 and to 13.70 percent in 2002 while all other agricultural sectors (crop, livestock and fisheries) have showed some decline between 2001 and 2002. The growth in the poultry sector appeared to come from the chicken meat and the duck eggs, where similar trends were observed.

Table 2. Values of agricultural production by sector, 2000-2002

Sub-sectors	2000		2001		2002	
	In million Phil pesos	%	In million Phil pesos	%	In million Phil pesos	%
Chicken Meat	23,510.38	8.51	25,773.99	9.38	29,717.05	10.10
Duck Meat	1,348.29	0.49	1,473.65	0.54	1,402.91	0.48
Chicken Eggs	6,872.71	2.49	6,794.36	2.47	7,896.94	2.69
Duck Eggs	1,145.27	0.41	1,154.92	0.42	1,270.95	0.43
Poultry Total	32,876.65	11.90	35,196.92	12.81	40,287.84	13.70
Crops	125,961.27	53.28	137,077.89	49.90	146,399.25	49.78
Livestock	48,606.05	17.60	50,441.07	18.36	52,287.96	17.78
Fishery	47,547.34	17.22	52,011.47	18.93	55,131.62	18.75
Total	276,185.49	100	274,727.35	100	294,106.68	100

Source: BAS, 2003a

In 2001, the volume of production for duck eggs is 53,920 Mt and the corresponding figure for duck meat is 10,940 Mt, as indicated in Table 3. Note that although the egg sector is larger in volume terms, the meat sector is actually bigger in value terms, as indicated in Table 2. This means that the emphasis that has been placed on duck egg sector may be overstated and more attention should be given to the duck meat sector particularly in changing consumer perceptions and new product development.

Table 3. Production of duck products (in metric tons), 1991 – 2001

Year	Duck egg	Duck meat (in dressed weight)
1991	33,400	6,513.00
1992	36,750	7,536.75
1993	39,200	8,531.25
1994	41,570	9,009.00
1995	47,690	9,701.25
1996	54,460	10,432.50
1997	52,960	10,393.50
1998	53,100	10,481.25
1999	52,650	10,471.50
2000	53,470	10,520.25
2001	53,920	10,939.50
Average	47,197	9,502.70

Source: BAS, 2003b

### **Per capita consumption**

In 2001, annual per capita consumption of duck egg and duck meat in the Philippines were 0.65 kg and 0.14kg, respectively. The corresponding figures for chicken eggs and chicken meat were 2.91 kg and 7.68 kg, respectively. These figures are relatively low compared to her neighbouring countries. Based on FAO statistics (2003), in 2001 annual per capita poultry meat consumption were 8.1 kg for the Philippines, compared with 34.9 kg in Malaysia and 13.9kg in Thailand while annual per capita poultry egg consumption were 6.1 kg for the Philippines, compared with 11.9 kg in Malaysia and 9.6kg in Thailand.

As can be seen in Table 4, neither poultry product has shown any significant growth in the past ten year, except for chicken meat. In fact, per capita consumption of duck eggs has shown a declining trend since 1996. Price may be one of the main factors contributing to no or low growth in poultry products in the Philippines. In 2002, average farm gate prices for chicken eggs, chicken meat, duck eggs and duck meat were 62.55, 58.19, 46.25 and 54.25 Philippine pesos per kilogram, respectively (BAS, 2003a). The corresponding figures for competing meats such as carabao, cattle, hog, and goat were 41.28, 51.62, 52.34, and 56.08 Philippine pesos.<sup>6</sup>

<sup>6</sup> Ideally, one would prefer to use retail prices for comparison. However, consistent retail prices are not available.

Table 4. Per capita consumption of poultry products (in kg), 1991-2001

YEAR	Chicken egg	Chicken meat	Duck egg	Duck meat
1991	2.50	4.56	0.46	0.10
1992	2.59	5.55	0.54	0.12
1993	2.84	5.57	0.57	0.13
1994	2.63	5.49	0.57	0.13
1995	2.69	5.85	0.66	0.14
1996	2.70	6.51	0.73	0.15
1997	2.87	6.96	0.70	0.15
1998	2.86	6.75	0.68	0.15
1999	2.83	7.03	0.66	0.14
2000	2.93	7.20	0.66	0.14
2001	2.91	7.68	0.65	0.14

Source: BAS, 2003b

Even poultry products are arguably the cheapest source of animal protein, they are still too expensive for most low income Filipino families to be included in their daily diet. To increase consumption, price may have to come down either by allowing more imports or by improving production and marketing efficiency in the current systems. In addition to price, the decade long negative publicity associated with the high level of cholesterol in eggs has also been attributed to the little growth in egg consumption (DA and NAFC, 2002).

Farm gate prices for broiler, native chickens, chicken egg and duck egg over the period 1990-2001 are presented in Table 5. Although prices for broiler chicken and chicken eggs are available at all marketing levels, there are no reported prices at the wholesale and retail levels for native chickens or wholesale prices of duck eggs. Therefore, farm gate prices are presented for consistency. Note also that there is no public price information on duck meat until 2000.

Note that there are price premiums associated with native chickens compared to their commercial counterpart. Price premiums reflect the strong consumer preference for the unique taste of native chickens.

Table 5. Average farm gate prices of poultry products, 1990-2001

YEAR	Broiler	Native chicken	Duck	Chicken egg	Duck egg
	Philippine pesos/kilo, live weight			Philippine pesos/kg	
1990	34.47	38.01	-- <sup>a</sup>	37.38	32.85
1991	45.88	42.96	--	44.1	34.95
1992	53.61	50.10	--	48.09	34.5
1993	50.57	49.90	--	46.2	35.85
1994	55.11	53.64	--	47.46	36
1995	47.78	56.54	--	45.36	38.4
1996	47.89	63.29	--	47.46	39.6
1997	48.12	66.65	--	48.72	40.35
1998	54.91	65.94	--	55.86	45.75
1999	52.55	68.25	--	59.64	48
2000	57.96	--	53.10	56.91	43.2
2001	65.96	--	58.47	56.28	44.25

-- Not reported or not available.

Source: BAS, 2002b,c and 2003a.

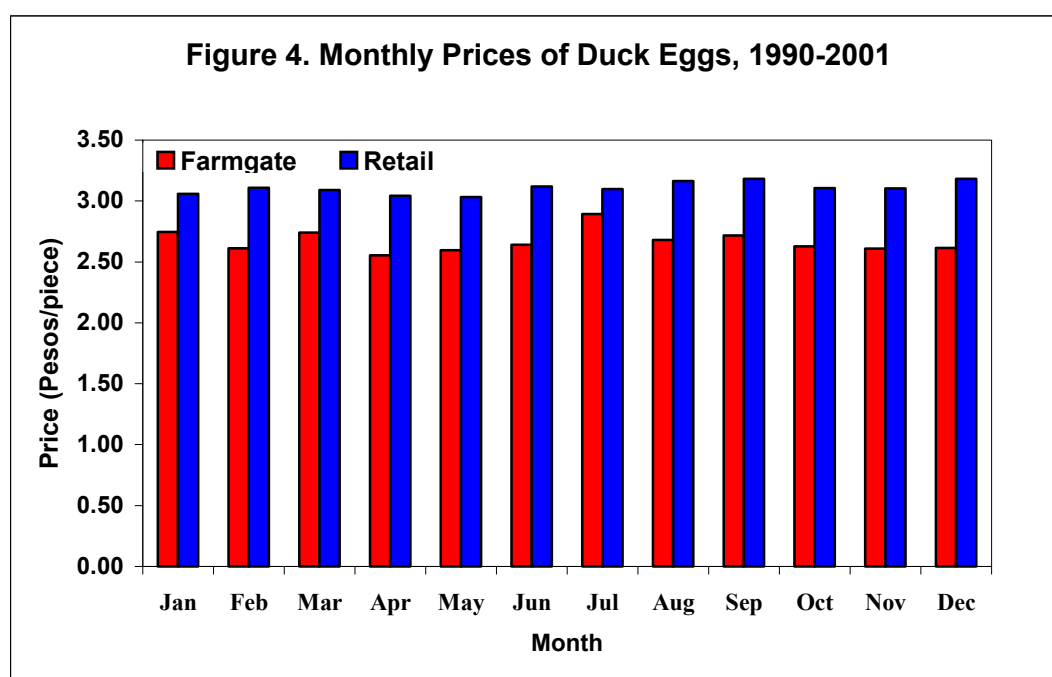
In addition to the low level of, and low growth in, consumption, another marketing issue facing the Philippine duck industry is the seasonal variations in demand and supply and hence fluctuating prices. Price fluctuations and marketing margins (price differentials between different marketing levels) over a 12-month period are illustrated in Table 6 and Figure 4. They are calculated based on monthly averages over the observation period from 1990 to 2001.

Table 6. Monthly prices of duck eggs (in pesos per piece), 1990-2001

Month	Farm gate	Retail	Margin
Jan	2.75	3.06	0.31
Feb	2.61	3.11	0.50
Mar	2.74	3.09	0.35
Apr	2.55	3.04	0.49
May	2.60	3.03	0.43
Jun	2.64	3.12	0.48
Jul	2.89	3.10	0.21
Aug	2.68	3.16	0.48
Sep	2.72	3.18	0.46
Oct	2.63	3.11	0.48
Nov	2.61	3.10	0.49
Dec	2.61	3.18	0.57
Average	2.67	3.11	0.44

Source: BAS, 2002a

As illustrated, the farm gate price is highest in July and lowest in April. The retail price is highest in September and December and lowest in April and May. Marketing margin is the highest in December and lowest in July. The reasons behind these fluctuations in prices and marketing margins are not clear and warrant further investigation to determine whether they are a true reflection of demand and supply balances or merely data abnormality.



## Imports and exports

Government intervention in the trade of poultry products in the forms of tariff and quantitative restrictions has always been an important part of the agricultural policies in the Philippines because of the desire to be self-sufficient. However, quantitative restrictions have largely been abolished (except for rice) and tariffs reduced since the mid-1980s as a result of tariff reforms and the accession to WTO in 1995 (Cororaton and Suenca, 2000).

The new tariff-quota regimes under WTO allow in-quota volumes at the normal applied tariffs and out-quota volumes at much higher tariff rates. For example, the in-quota volumes (or MAV) for fresh/chilled/frozen poultry were set at 22,525 Mt in 1995/96, 16,160 Mt in 1997, 16,701 Mt in 1998, 17,746 Mt in 1999, 18,790 Mt in 2000), 19,834 Mt in 2001, 20,879 Mt in 2002, and 21,923 Mt in 2003 (Department of Agriculture, 2003a). The utilisation rates ranged from 4.3 percent in 1995/96 to 90.9 percent in 1999, maintaining around 60 percent in more recent years. Note that imports have not reached the allocated MAVs under the new regime. The reason for the low rates of utilisation is that consumers prefer fresh poultry products over frozen poultry imports (SEARCA, 1999). Table 6 shows the change in tariffs over time for chickens and ducks as a consequence of trade liberalisation. Note the substantial reductions in the tariffs under the agreements. For the period 1993 to 1994, the tariffs were 50 to 70 percent but these were reduced to 40 percent by 2003.

Table 6. In-quota and out-quota tariff rates for selected poultry products, 2002-2004

HS CODE (Commodity)	2002		2003		2004	
	In quota	Out quota	In quota	Out quota	In quota	Out quota
0207 (Poultry)						
Frozen Chicken (Whole)	40	60	40	40	40	40
Frozen Chicken (Liver)	40	60	40	40	40	40
Frozen Chicken (Cuts/Other Offals)	40	50	40	40	40	40
Frozen Ducks (Whole)	40	50	40	40	40	40
Frozen Ducks (Cuts/Other Offals)	40	60	40	40	40	40

Source: Department of Agriculture, 2003b

Imports of poultry products have increased since the removal of quantitative restrictions and the reduction in tariffs. Table 7 shows imports of duck eggs and duck meats in the past 10 years, both in terms of volume, value and unit import value. As indicated, imports of duck



eggs averaged 156.58 Mt over the past decade (1991-2001), accounting for on average 0.33 percent of total duck egg supply. Import volumes appeared to be rather unstable, having fluctuated between a low of 56.12 Mt in 1991 to a peak of 218.62 Mt in 1994 over the 10-year period. Duck eggs are imported mostly for breeding purposes in the form of live embryos at about 20 days old. China was the dominant supplier, with 92 percent import share in 1999 (University of Asia and the Pacific, 1999). Other suppliers included Hong Kong, India and France.

Table 7. Importation of duck eggs and meat, Philippines, 1991-2000

Year	Volume of duck eggs (Mt)	Value fob ('000 \$US)	Unit import value (\$US/kg)	Volume of duck meat (Mt)	Value fob ('000 \$US)	Unit import value (\$US/kg)
1991	56.12	14.55	0.26	6.30	12.00	1.90
1992	103.80	34.52	0.33	8.60	35.00	4.07
1993	212.04	123.74	0.58	60.95	146.00	2.40
1994	218.62	125.26	0.57	150.94	302.00	2.00
1995	157.87	169.66	1.07	189.03	248.00	1.31
1996	175.74	193.18	1.10	260.79	328.00	1.26
1997	156.49	177.09	1.13	421.84	413.00	0.98
1998	167.71	215.38	1.28	329.80	422.52	1.28
1999	171.92	173.84	1.01	302.21	322.00	1.07
2000	161.22	97.83	0.61	189.75	182.00	0.96
2001	140.84	--		118.28	--	
Average	156.58			185.32		

Sources: National Statistics Office, 2002; BAS, 2003b

In the case of duck meat imports, they averaged 185.32 Mt during 1991-2001, which accounted for on average 1.9 percent of total supply. Like duck eggs, duck meat imports have also fluctuated between a low of 6.30 Mt in 1991 and a peak of 421.84 Mt in 1997. The majority of duck meat was imported either in whole frozen form or in frozen cuts. China was the largest duck meat supplier to the Philippines in 1999, accounting for 85 percent of total whole frozen duck imports (University of Asia and the Pacific, 1999). Australia, on the other hand, was the major supplier of frozen cuts, enjoying a market share of 68 percent in that product category. Other major suppliers included USA, Taiwan, Hong Kong, and Canada.

It is also evident from Table 7 that there are also substantial fluctuations in the unit import values during the observation period. For example, the unit import values of imported duck eggs range from US\$0.26 to US\$1.28 while the unit import values of imported duck meat range from US\$0.96 to US\$4.07. The reason behind the fluctuations is unclear. But some of the fluctuations can be attributed to the more liberal trade regimes since the mid-1990s, the devaluation of Philippine pesos and an unstable economy, particularly following the Asian financial crisis in the late 1997. Nevertheless, they appeared to have become cheaper compared to domestically produced products in the past few years, eg farm gate prices for duck eggs and duck meat were 46.25 Philippine pesos/kg (US\$0.93/kg) and 54.25 Philippine pesos/kg (US\$1.09/kg) in 2002 based on the exchange rate being 50 Philippine pesos in a US dollar.

In 2000 and 2001, 11.07 Mt and 10.41 Mt of duck eggs, respectively, were exported either as hatching eggs or as balut to countries where most Filipino expatriates or overseas workers lived, such as Saudi Arabia, Hong Kong, Singapore and Europe. No duck meat exportation was reported during the observation period.

These trade figures indicated that trade is currently a very small component of total demand for, and supply of, duck products in the Philippines. However, as trade liberalisation continues, the Philippines will no doubt be facing increasing competition from imports as well as threats to her overseas markets most possibly for balut. Indeed, strong demand for duck products from overseas Chinese, Filipino and Vietnamese has been recognised as emerging marketing opportunities (Laux, 2004; VWM and ZAC, 2002; Metzferfarms, 2004; Wondu Holdings, 2001). Of particular mentioning is the demand for balut by Filipino and Vietnamese communities in North America. Although many observers in the Philippine duck industry believe that balut is too unique to be influenced by trade liberalisation, this assumption ought to be tested by further market research. Another area for market research is to determine the market potential for the domestic industry to invest in the meat-type duck production and new product development.

### **Marketing channels**

The Philippine duck industry is fragmented because of the large number of small scale producers and traders involved in the production, processing and marketing of duck products. Unlike their commercial chicken counterparts, the duck sector tends to rely on traditional and much less efficient production and marketing methods.

Because more than three quarters of the ducks in the Philippines are raised in small scale backyard production, there are no dominant players in the duck industry at the national or regional level. However, balutans may enjoy some market powers in the local areas. By comparison, the broiler chicken industry is dominated by five major integrators at the national level,<sup>7</sup> including San Miguel Corporation, Swift Foods, Vitarich Corporation, Pure Foods, and Tyson Agro-Ventures. Together, they captured 80 percent of broiler chicken supply in the Philippines, as reported in the Broiler Master Plan (DA and NAFC, 2002b). Broiler production is concentrated in Central Luzon (40 percent) and Southern Tagalog (20 percent). However, in recent year, there is an increasing number of quasi-integrators emerging in the duck industry, employing similar strategies (contract growing and upstream or downstream integration) as the commercial chickens, although on a much small scale (eg 75,000 for layer chickens versus 10,000 or less for layer ducks per production cycle) and to a lesser degree of integration. In 1998, the BAS-SRTC survey found that out of a total list of 1957 commercial duck layer farms, 57 of them were identified as “integrators”. The main advantage of an integrated operation is better control over demand and supply, as well as price and product quality.

There are five identified marketing channels for fresh and processed duck eggs (balut, penoy, salted eggs and century eggs), day-old ducklings and ready-to-lay pullets. The key players in the duck products supply chain are producers, balutan operators, viajeros (itinerant traders), retailers and consumers (PCARRD, 1991; BAS-SRTC, 1998). Major marketing channels, as described in PCARRD (1991), are outlined below, along with discussion of associated marketing issues.

**Fresh eggs: Egg producer → Viajero/Trader → Retailer → Consumer.** In this distribution channel, fresh duck eggs in the producing areas are collected by viajeros/local traders, who then on-sell to retailers in the local markets. Retailing of fresh duck eggs occurs mainly at wet markets and sari-sari stores (small mom and pop grocery stores), as well as in some supermarkets. Duck eggs are sold by pieces at the wet market and grocery stores while in the supermarkets they are sold in dozen or half dozen carton. Eggs are sorted on farm into “good” and “rejects” based primarily on personal experience and judgement of the traders or farmers (Malabayabas et al. 2002; Perez 2003). Rejects include eggs that are cracked, soiled, off-sized, twin-yolk, and thin-shelled. There are no official product standards or grading systems for fresh duck eggs. Throughout the marketing channel, eggs are usually not kept in

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<sup>7</sup> In the chicken industry, Integrator is defined as companies that integrate production of inputs (chicks, feeds, etc.) with production, processing and marketing of outputs.

cold storage or protective containers (except for those sold through supermarkets) and can be subjected to extreme heat and other weather elements before reaching consumers. As such, breakage, quality deterioration and spoilage are high during shipping and handling. All of these have contributed to lower quality and higher costs products, as well as dispute and mistrust between sellers and buyers.

**Processed eggs: Egg producer → Viajero/Trader → ‘Balut’ Operator → Retailer → Consumer.** From the farms the viajero/trader the fresh duck eggs and delivers them to a ‘balutan’ or balut processor, who generally produces balut as the main product and penoy, salted and century eggs as by-products using infertile eggs or off-size eggs. Once the processed eggs are ready for sale, the retailers procure the eggs directly from the balutan and sell them to consumers on the streets. In some areas, there may also be viajero/trader in-between balut operators and retailers. This type of channel (*Producer → Assembler/trader → Balutan operator → Trader-Retailer → Retailer → Consumer*) is generally the longest and understandably is only used in remote areas and for more distant or dispersed markets. In other cases, the balut operators may bypass the viajero/trader and buy directly from large scale egg producers or even integrated backward to egg production. As such, the channels are shortened.

‘Balut ‘ and ‘penoy’ are sold only at the night time by street ‘balut’ vendors while salted and century eggs, can be found alongside fresh eggs in the wet markets, grocery stores and supermarkets. No sorting or grading is applied to any of the processed egg products discussed so far (de Castro et al. 2002) and they are also sold on a piece by piece basis, except in the supermarkets.

**Day-old Ducklings: Egg producer → Balutan/Hatchery → Producer/Ready-to-lay Pullet Raiser.** Day-old ducklings (DOC) are mainly supplied by balutans because there are no specialised hatcheries for ducks in the Philippines. Generally, balutans accept orders from the duck raisers, source and hatch the eggs, and then sells them to the duck raisers. DOC are either ordered by egg producers to be used as replacement stocks, or by ready-to-lay pullets producers to be raised and on-sold to egg producers later. Because there are no breeder farms, eggs for DOC are obtained from the same sources (ie commercial farms) that produce eggs for balut making and incubated together with balut. As such, no distinction is made between the eggs that are used for balut and those for DOC until on the 17<sup>th</sup> day/18<sup>th</sup> day when those egg with “more vigorous” embryos are retained and set back for hatching while the rest are sent away to balut markets. The more vigorous embryos are identified through candling by

experienced balutan operators. Since this is the only selection process involved in choosing the replacement stocks and it is not clear how effective and rigorous this process is in picking the winners and what the impact is on the long term overall performance of the industry.

Because DOC is only a side business to balut making, balutans tend to give first priorities to meeting demand requirements for balut even during the hatching season when DOC are in high demand. That means day-old-duckings may either not be available or be rejects from balut. As such, the so-called “replacement stocks” are not selected based on known progeny or any performance indicator and the quality of the replacement stock is not at all fully guaranteed. Often, the ducklings obtained this way do not have the genetic make-up that is necessary for good performance. The lack of professional breeding farms and specialised hatcheries has been cited to be the main reason for lack of quality replacement stock and declining productivity in duck egg production (Lambio 2001; Coligado 1985).

In addition, there are two common complaints from the egg producers who acquire ready-to-lay pullets from the market. Firstly, there is no record or information on the stocks being acquired in terms of age, breed, breeding and disease history, past management or feeding practices. As such, the new flocks usually perform poorly during transition because no proper adjustments can be provided to the newcomers. Secondly, the ready-to-lay pullets that are being acquired are not always what they ought to be. That is, rather than new layers, they are so-called “balikbayan” which have already undergone at least one laying cycle (and hence have lower laying efficiency and shorter productive life). Often, “balikbayan” is re-cycled into the market by unscrupulous traders and farmers (Malabayabas et al. 2002). In this case, incomplete and asymmetric information has contributed to the inefficient working of the market for ready-to-lay pullets.

## **Cost structure**

To survive or succeed in a liberalized market, it is important that a production unit is cost competitive since costs are the only element in a profit equation that is under the control of the producers (price is determined largely by market demand and supply). This section compares the cost structure and relative profitability across different poultry sub-sectors (ducks, broilers, and layers) and, within each sub-sector, across different scales of production (small, medium, and large). The comparisons are based on the results presented in SIKAP/STRIVE Foundation (2001), which are reproduced in Table 8.

As can be seen from the costs and returns, there appear to be significant economies of scale in duck production. That is, the larger the duck farms, the lower the cost of production and the

higher the returns. However, this is not the case for chicken production. As shown, the farm costs are 19.02, 16.94 and 12.29 per dozen of eggs for small, medium, and large duck farms, respectively. Farm costs for broilers are lowest for medium size farms at 35.29 per kilogram live weight, followed by 35.56 for large farms and by 45.40 for small farms. Similarly, the costs of production for layers are 22.92, 19.50 and 20.02 per dozen eggs for small, medium, and large farms, respectively. This means for broilers and layers, the medium size farms are more efficient than the large size farms.

Returns to producers or net farm income, which is the difference between the farm gate price and the farm costs, also vary with farm size. Given that the farm gate prices are not the same for all farms, lower farm costs does not necessarily imply higher returns to producers. For broiler and duck producers, the returns are higher the larger the farm size while for layers, the medium size farms have the highest returns, followed first by large size farms and then by small size farms. In terms of wholesale costs, it appears that for broilers and layers, medium size operations have lower wholesale costs than the large size farms, which is, in turn, lower than the small size farms. By comparison, the bigger the duck farms, the lower the wholesale costs. Since the wholesale prices are the same for farms of all sizes, returns to wholesalers are higher the lower the wholesale costs. From Table 8, it is also evident that the duck egg operations, both at the farm and wholesale levels are much more profitable than chicken eggs on a per dozen eggs basis. When converting returns to producers in per kilogram terms (assuming 15 pieces duck eggs in a kilogram and 21 pieces of chicken eggs in a kilogram), returns to producers (based on medium size farms) are the highest for ducks (21.75/kg), followed by layers (15.37/kg) and broilers (14.74/kg).

Based on the discussions, it is clear that duck raising on a commercial scale can be profitable and is more profitable than the commercial chickens. These results suggest that economies of scale and the relatively high profitability in duck egg production may attract new entrants into the industry, It may also encourage the existing farms to become larger, but perhaps not to the scale reached by boilers or layers where diseconomies of scale appear to have set in at a very large scale. The relevant research questions are: where is such expansion is likely to occur and what is the implication for marketing infrastructure? can such expansion be absorbed by consumer demand without causing a glut in the market? And what is the likely impact of such expansion on smallholder producers?

Table 8. Farm to wholesale cost and returns of poultry production in the Philippines, 2000

ITEM	Broiler			Layer			Duck		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Ave. no. of birds per production cycle	363	7,231	25,560	460	2,245	26,633	317	691	2,620
Production (in kg for broiler or dozen for eggs)	3,341	60,544	245,516	7,781	40,902	592,059	6,422	13,815	59,643
Fixed Costs									
Land Acquisition Dev't and Building	0.43	0.41	0.20	0.85	0.69	0.20	1.25	0.45	0.29
Operation and Maintenance									
Cost of Feeds	30.67	23.47	24.67	18.45	14.15	14.80	8.30	7.23	6.24
Cost of Day Old Chicks/layers	10.09	9.03	8.78	1.69	4.21	4.60	3.93	3.79	3.76
Labor	3.67	2.04	1.72	1.73	0.35	0.33	4.69	3.86	1.74
Overhead	0.53	0.34	0.20	0.20	0.11	0.09	0.85	1.61	0.26
<b>Farm Costs (P/kg or P/dozen egg)</b>	<b>45.40</b>	<b>35.29</b>	<b>35.56</b>	<b>22.92</b>	<b>19.50</b>	<b>20.02</b>	<b>19.02</b>	<b>16.94</b>	<b>12.29</b>
<b>Farm Gate Prices</b>	<b>49.97</b>	<b>50.03</b>	<b>51.19</b>	<b>30.18</b>	<b>28.28</b>	<b>26.72</b>	<b>34.34</b>	<b>34.34</b>	<b>34.34</b>
Transport and Handling to Manila	2.06	2.06	2.06	2.02	2.02	2.02	1.05	0.63	0.73
Processing (P/kg or P/doz egg)									
Slaughtering	2.00	2.00	2.00						
Packing/Packaging	0.00	0.00	0.00	1.20	1.20	1.20	1.20	1.20	1.20
Cold Storage	3.00	3.00	3.00						
Shrinkage	3.00	3.00	3.00						
Losses				1.80	1.80	1.80	1.80	1.80	1.80
Ex-Dressing Plant, Manila (P/kg or P/doz. egg)	55.46	45.35	45.62	24.94	24.51	25.04	23.07	20.57	16.02
Transport and Handling	0.25	0.25	0.25	0.21	0.21	0.21	0.21	0.21	0.21
Trading Costs and Margins	4.00	4.00	4.00	1.42	1.42	1.42	1.42	1.42	1.42
<b>Wholesale Costs (Ex-Manila)</b>	<b>59.71</b>	<b>49.60</b>	<b>49.87</b>	<b>29.57</b>	<b>26.14</b>	<b>26.67</b>	<b>24.70</b>	<b>22.20</b>	<b>17.65</b>
<b>Wholesale Prices</b>	<b>66.00</b>	<b>66.00</b>	<b>66.00</b>	<b>36.00</b>	<b>36.00</b>	<b>36.00</b>	<b>54.00</b>	<b>54.00</b>	<b>54.00</b>
<b>Farm Return (per kg or per dozen eggs)</b>	<b>4.57</b>	<b>14.74</b>	<b>15.63</b>	<b>7.26</b>	<b>8.78</b>	<b>6.70</b>	<b>15.32</b>	<b>17.40</b>	<b>22.05</b>
<b>Wholesale Return (per kg or dozen eggs)</b>	<b>6.29</b>	<b>16.40</b>	<b>16.13</b>	<b>6.43</b>	<b>9.86</b>	<b>9.33</b>	<b>29.30</b>	<b>31.80</b>	<b>36.35</b>

- a. Broilers and layers: Small commercial (100-900 birds/layers); Medium commercial (1,000-10,000 birds/layers); Large commercial (11,000-80,000 birds for broilers) and 11,000-45,000 layers for layers). Ducks: Small commercial (100-500 layers); Medium commercial (501-1,000 layers); Large commercial (>1,000 layers).
- b. Overhead cost (electric, water, rent, tax); Cost of feeds (feeds, vitamins, minerals supplements and other feed ingredients; Cost of Layers (day old chicks, pullets, layers).
- b. Culling Rate (includes sold and consumed pullets or layers)

Source: Adapted from SIKAP/STRIVE Foundation, 2001

## **Problems and issues**

Ducks had played a prominent role in Asian history and cultures. They were a common scene in the countryside especially around rice producing areas and along the shores of rivers and lakes where naturally occurring feeds were abundant. And because ducks are hardy and required low or no maintenance, they have been ideal for subsistent farmers and rural poor to supplement their income and protein needs. However, as the economy develops, industrialisation and urbanisation mean a decline in agricultural land, the disappearing of ducks' natural habitats, and an increase in commercialisation of duck production.

It is fair to say that commercialisation will continue and eventually smallholder backyard operation will become either a thing of the past or a niche sector. Recent developments in the duck industry everywhere in Asia are exemplary. Take Taiwan for example. Despite the modernisation of the duck sector, with the establishment of the Duck Research Centre, specialised breeder farms, hatcheries and processing plants, and the developments in new products and product grading, the demand for duck products continues to decline, accounting for a smaller and smaller share of total meat and poultry consumption. And the trend is expected to continue.

The main reason for the decline is the intense competition from most notably the commercial chicken sector that has a marketing advantage in price, product quality and convenience and versatility in preparation. Although the demand for most food products generally increases as income increases, this is not the case for products that are perceived to be of low or dubious quality, "traditional" or "old-fashioned". More affluent consumers nowadays are known to be wanting quality and varieties in their diet and not interested in things that are too familiar or traditional, and hence are most likely not to be included in their shopping list too often. Most traditional duck products may fall into this too familiar and old-fashioned category. Another reason is that in the past government-led research and development programs has focussed on production and little attention has given to marketing research and consumer demand. Finally, the Taiwan duck industry has suffered from trade liberalisation, eg competition from China in its export markets especially after the economic reform in China since the late 1980s. The competition is expected to intensify with China's and Taiwan's accession to WTO in 2002.

With continuing trade liberalisation and increased global competition, the Philippine duck industry may be significantly affected, depending on policy response from the industry and government. Given its lower stage of development and the dominance of smallholder



backyard production, the Philippine duck industry does appear to be vulnerable. However, given the relatively high level of profitability enjoyed by the commercial duck sector and continuing strong consumer demand for balut, the industry may be able to survive or succeed if the key issues (including the lack of quality breeder stock, high cost, inconsistent quality, and inefficient marketing system) identified in the past (eg Caligado, 1985; Lambio, 2001) can be adequately addressed. A close examination of some of these issues suggests that they are essentially a manifestation of an imperfect market due to the absence of grading and quality standards and market information, which, in turn, is a reflection of an under-developed and under-regulated marketing system. The issue of breeder stock is analysed below to illustrate the importance of well-designed product standards and grading system and how it will help resolve the decade old issue.

Lack of quality breeder stocks has been cited as the major issue in egg-type duck production in the Philippines in the 1980s (Coligado, 1985; Arboleda et al., 1985; Lambio, 2001; Department of Agriculture, 2001; PCARRD, 2000). There are several reasons for it. Firstly, there is no market signal for quality products and therefore no economic incentive to provide quality breeder stock or to improve the quality of the flock. This is because the demand for quality breeder stock is a derived demand for quality end products, especially balut in the Philippines. Therefore, if there is no demand for quality balut, there will not be a demand for quality breeder stocks. Without the demand for quality breeder stocks, there will be no supply, ie no specialized breeder farms. Previously, the lack of professional breeder farms and specialised hatcheries was cited to be the main reason for lack of quality replacement stock and declining productivity in duck egg production (Lambio 2001; Coligado 1985). Indeed, unlike the commercial chicken sectors, there are very few specialised breeder farms/hatcheries in the Philippines. The 1998 BAS-SRTC study found that three out of a total list of 1957 commercial duck layer farms surveyed were identified as “breeder/hatchery”. And even when they existed, they were not equivalent to the breeder farms for commercial chickens because they did not have organised breeding or selection programs in place that were necessary for producing quality breeder stocks (BAS-SRTC, 1998). But, the lack of professional breeding farms and specialised hatcheries is only a symptom, not the cause.

The real problem is that although balut accounts for about 80 percent of the total egg production, there is no established product standards or grading system for balut or fresh eggs. That is, there is only one price for balut, regardless of the size, age and quality and there is

only one price for fresh eggs that qualify for balut making.<sup>8</sup> Without a quality-based pricing scheme, there is no incentive for farmers to improve the quality of the eggs and hence there is no demand for better quality breeder stocks. In short, unless the demand for good quality balut exists, there will be no demand for, and hence no supply of, good quality breeder stocks. Secondly, duck raisers in general appear not to attach any importance to breeds or the quality of stocks when it comes to finding replacement (BAS-SRTC, 1998). The reasons are: (1) unavailability of good quality stock, particularly for farmers in remote, isolated areas; (2) higher costs associated with sourcing better quality stocks; and (3) lack of the technique/know-how for identifying good quality stocks. As a result, replacement stocks are often obtained from own flock or cheaper sources with unknown origins or genetics. This is another example of market failure due to imperfect information. In the absence of good quality replacement stocks, what farmers tend to do is to resort to the use of expensive external inputs, such as formulated feeds and veterinary medicines, in order to improve performance and combat diseases. This practice not only increases costs but leaves the real problem of poor genetics untouched.

If a demand for high quality breeder stocks can indeed be created as suggested earlier, a related policy question is: how can such a demand be filled? There appear to be two alternatives. One is based on the importation of breeding animals from overseas. This particular strategy had been tried both in the Philippines and overseas before but failed. The reasons for those failures were that (1) the imported stocks were inappropriate either for smallholder production or for Philippine conditions; (2) they are input intensive and possibly import dependent; and (3) they were too expensive for smallholders (Department of Agriculture 2001). Furthermore, balut produced from imported breeds was rejected by consumers for poor taste. The other option is to select and upgrade the existing and native breeds. This strategy has gained support from the government and the academics in recent years with the advantage of being less expensive, more suitable for local conditions, better utilisation of local resources and maintenance of biodiversity and conservation of local germplasm (Department of Agriculture 2001). However, more research is needed to review existing policies and develop strategies that improve the productivity of the local breeds and smallholder producers.

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<sup>8</sup> In the current system fresh eggs are sorted into “good” and “rejects”, based on personal experience and judgement with seemingly arbitrary criteria. “Good” eggs are eggs deemed suitable for balut making (with the right size and no defects) and command higher price. “Rejects” are eggs that are too small (or too big), soiled, thin shelled or cracked and will be sold as table eggs or processed into salted and century eggs. However, there is no further quality grading within the category of “good” eggs.

In addition to poor genetic make-up, long and inefficient marketing chain also contribute to higher production costs and poor product quality. As shown in Figure 2, the industry is fragmented, consisting of a large number of smallholder producers and traders. Each of them individually, often being resource-poor, cannot afford, or do not have access, to better marketing infrastructure with respect to transportation, storage or processing. As a result, incidence of product wastage and quality deterioration is high, resulting in higher costs and poor quality products.

### **Policy recommendations and research needs**

In general, the food marketing system in the Philippines is in the hands of the private sector, including poultry, where government intervention, whether direct or indirect, is minimal. This may help explain why some of the marketing services which have the public good characteristics are not sufficiently provided by the market, such as research and development, market information, product standards and marketing infrastructure. In a sense, the food marketing system in the Philippines may be under-regulated.

One possible solution to market failure as a result of imperfect market information is for the government or/and the industry to develop and promote appropriate product standards and grading and labelling schemes, for individual duck products. Not only can standardisation and grading facilitate trade and reduce marketing costs, but it also helps reduce the market powers enjoyed by bigger players who may be able to take advantage of more arbitrary or less rigorous grading and pricing systems. As the Philippine duck industry is rather unique because of the focus on balut production, existing product standards and grading systems for fresh table eggs (eg the USDA Grading system) may not be suitable and a system that is specific to balut will have to be developed. This will involve, first of all, defining “quality”, or “eating quality”,<sup>9</sup> for balut and secondly, developing some quality indicators that are objective and measurable. To introduce a new system, more needs to know about the working of the exiting (unofficial) grading systems and the suitability of those grading systems that have been applied overseas. More research is also needed to establish the links between the quality of the breeder stock, the quality of fresh eggs and the quality of balut, however quality is defined. These linkages are important in determining the market value of each of these key products and making sure their prices are consistent with their values to the supply chain.

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<sup>9</sup> Meat Standards Australia for beef is possibly one of the first grading schemes that are based on eating quality (such as flavour, juiciness, tenderness, etc) in addition to more conventional physical measurements (such as breeds, muscle scores, age, sex, etc).

In addition, there ought to be systematic collection and dissemination of market information on prevailing prices and quantities supplied and demanded on a regular basis. Since between 80 to 90 percent of the duck eggs produced in the Philippines pass through balutans, it is reasonable to consider balutans as the hub of a network, connecting egg producers and traders with balut traders and vendors. They can also be considered as the channel leader in the supply chain with ready access to market information and the potential to control the demand for, and supply of, key products. This is particularly true for balutan operators who have integrated backward into duck raising and egg production. It is envisaged that as the industry develops further and become more specialised, balutans will play an increasingly important role in shaping the structure of the Philippine duck industry. More research is needed on this very important player to better understand their current operations and future plans and the impact of a changing industry structure on smallholders.

Thirdly, an efficient marketing system also depends on infrastructure that facilitates the creation of time, place and form utilities. This means basic infrastructure such as processing, storage and transport facilities must be put in place or improved so that value can be created at the least cost. Since some of the marketing infrastructure has public good characteristics, there is a role for government direct involvement as well as providing incentives for private investment. Moreover, quality assurance programs also ought to be an integral part of the marketing infrastructure to provide guarantee of food safety and quality to final consumers. More research is required as to how existing quality assurance can be applied to products such as balut and ready-to-lay pullets.

## **Conclusion**

Ducks had traditionally played a prominent role in the history and cultures of rice producing countries in Asia, including the Philippines. However, it appears that as the economy develops, a traditional sector such as ducks is increasingly facing steep competition from other food products, especially commercial chickens and other meats, both in the domestic market and from overseas. Statistics have shown that the demand for duck products in the traditional duck producing countries has been in decline. The Philippine duck industry is likely to be affected in the similar way. Although the Philippine duck industry is rather unique and what had happened in other Asian countries may not be quite as applicable, lessons still can be learned from the experiences of other countries, especially on the recent developments in the production sector, changes in consumer demand, and competition from other products and overseas in the most recent decade.

In addition to potentially facing a declining demand for its products occurring elsewhere, the Philippine duck industry has a few more problems of its own due mainly to the dominance of smallholder backyard production. The crucial issues identified for ducks are: the lack of supply of quality breeder stocks and an inefficient marketing system. Many of the problems, on close examination, are in fact a manifestation of market imperfection and a reflection of an under-regulated marketing system. This is particularly true with respect to the establishment of official product standards and grading systems and the provision of reliable market information and marketing infrastructure. Since an efficient marketing system depends on market information and marketing infrastructure, the absence of pertinent marketing services has prevented the market from functioning properly and resulted in misallocation of resources and market inefficiency. In either case, the Philippine duck industry is not reaching its potential and is less prosperous than it otherwise would be.

Finally, the future of the Philippine duck industry appears to be hinged largely on the demand for balut, which is, in turn, depends on its price and quality relative to other food products, especially chicken and pork. Competitiveness of the Philippine duck industry, in turn, depends on efficient production and marketing systems that can deliver the right product at the right price to the right market. However, to improve efficiency, more research is needed in several areas. Areas for duck research should focus on identifying issues and solutions facing the commercial sector and the smallholders, better understanding of consumer demand, developing product standards, and improving generation and dissemination of market intelligence. Research should also focus on the selection of breeds, disease control, feeds and feeding and waste management that suit smallholders and different scale of duck production, as well as utilization of by-products and new product development.

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