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Potential socioeconomic impact of avian influenza in Latin America and the Caribbean: approximate orders of magnitude

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2nd version

**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR LATIN AMERICA AND THE CARIBBEAN
FAO/RLC**

Potential socioeconomic impact of avian influenza in Latin America and the Caribbean: approximate orders of magnitude

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Summary

The fact that poultry farming directly produces about 1% of the region's total GDP makes it possible to envisage loss scenarios arising from avian influenza (e.g. 1%, 10%, 25% of total poultry production). The gross value of all poultry products in 2004 was roughly US\$ 23.5 billion (at constant 1999-2001 prices), representing 12.7% of total gross output of the agriculture sector as a whole. Brazil is by far the largest poultry producer, accounting for almost half of the region's production. The share of poultry farming in the total gross value of agricultural output is largest in Trinidad and Tobago, at 60%. Chicken meat and eggs between them account for 97.9% of gross poultry output in value terms. Poultry products provide 10% of total protein intake and over 25% of animal protein intake; both of these indicators have been trending upwards in recent decades. Poultry farming and slaughter creates roughly 2 million jobs in the region. There is strong linkage with maize production, which provides roughly half of all poultry feed. Feed conversion ratios for chicken meat and eggs have risen sharply; in Brazil, which is close to the global productivity frontier, 1.78 kg of feed was being used per 1 kg of live chicken in 2001.

Background information on avian influenza

The H5N1 strain of avian influenza (AI), which is circulating in South-east Asia, is highly deadly both for birds (70%-100% mortality) and for humans (50% mortality).

Although the H5N1 "bird flu" virus, or highly pathogenic avian influenza (HPAI), has existed since 1996, the crisis in Asia really began in early 2004, when outbreaks in more than 10 countries were declared almost simultaneously,¹ causing the deaths of hundreds of thousands of chickens and ducks. Thus far, more than 100 cases have been recorded in human beings, and over 140 million birds have either died or have been culled. The disease is unprecedented in terms of its geographic spread, its human dimension and its huge social and economic impact. Economic losses in the poultry sector in Asia are estimated at roughly US\$ 10 billion. Avian influenza is currently threatening poultry production both in smallholdings and in commercial operations, and is seriously obstructing trade. (http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_issues.html; November 2005)

¹ China, Indonesia, Vietnam, Cambodia, Laos PDR, Thailand, Japan and the Republic of Korea. Other less pathogenic strains have been identified in Taiwan Province of China, Pakistan, the United States and Canada.

Sanitary prophylaxis

- Avoidance of contact between poultry and wild birds, in particular waterfowl
- Avoidance of the introduction of birds of unknown disease status into flock
- Control of human traffic
- Proper cleaning and disinfection procedures
- One age group per farm ('all in-all out') breeding is recommended

In outbreaks

- Slaughtering of all birds
- Disposal of carcasses and all animal products
- Cleaning and disinfection
- Allow at least 21 days before restocking

Medical prophylaxis

- In the past, it has been considered counterproductive to vaccinate against HPAI as some vaccinated individuals may, nonetheless, become infected and shed virulent virus. However, in the recent outbreaks in Pakistan and Mexico, inactivated vaccines have been employed to combat rapidly spreading disease. (*World Organisation for Animal Health OIE, 2002; http://oie.int/esp/maladies/fiches/e_A150.htm*).

Box: FAO's response to the avian influenza crisis
(FAO-Rome, 19 Sept. 2005, 12 pp.)

Implementation:

Immediate to short term (1-3 years): reduce the risk to humans by preventing further spread of HPAI in those countries that are currently infected by H5N1 (Cambodia, Viet Nam, Indonesia, Thailand, Russia and others). The control measure will be culling, biosecurity and movement control, combined with strategic vaccination of domestic poultry and ducks.

Short to medium (4-6 years): adopting a strategy of wide-scale vaccination in the predominantly commercial and backyard poultry sectors with variable success in reducing the incidence of the disease, strict post-vaccination monitoring, to progressively confine the disease to defined foci and establishing disease-free compartments and zones.

Medium to long term (7-10 years): this strategy will consider all control measures, including vaccination, zoning and compartmentalization as defined in the OIE Terrestrial Animal Health Code. For the long term success of this strategy, restructuring of the poultry sectors in the region will need to be seriously considered.

When first proposed, the implementation of the strategy had an indicative budget of some US\$100 million for the next three years to support the national, regional and international HPAI control programmes as outlined above, but this was before further spread to Mongolia, Russia, Kazakhstan, and other areas in China, had occurred. Today's situation is different.

Source: http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_issues.html

Calculation procedures and results obtained**(1) The share of poultry farming in total agricultural production**

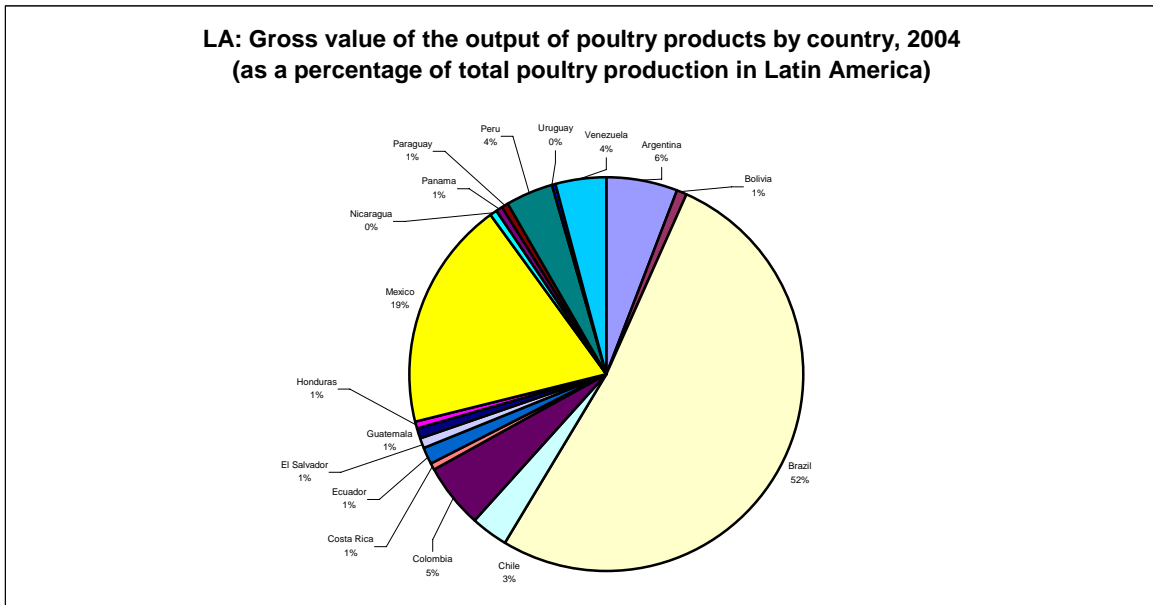
The total gross value of poultry products amounts to US\$ 23.5 billion (in constant 1999-2001 prices), representing 12.7% of total gross agricultural output. Brazil is by far the largest poultry producer, accounting for almost half of the region's output. The share of poultry farming in the total gross value of agricultural output is largest in Trinidad and Tobago, at 60% (see table 1 and figure 1).

Figure 1: Share of poultry farming in the gross value of agricultural output

Country	Gross output of poultry products (US\$ thousand at constant 1999-2001 prices)	Gross value of the production of poultry products as a percentage of total gross agricultural output
Latin America and the Caribbean	23,450,764	12.7
Antigua and Barbuda	378	7.0
Argentina	1,341,440	5.0
Bahamas	7,546	37.3
Barbados	18,422	51.9
Belize	18,433	13.9
Bolivia	189,440	8.8
Brazil	11,770,110	13.9
Chile	712,809	12.8
Colombia	1,196,892	12.6
Costa Rica	132,608	8.6
Cuba	110,002	3.9
Dominica	498	2.4
Ecuador	311,172	8.6
El Salvador	174,450	22.8
Grenada	1,249	9.5
Guatemala	237,294	11.6
Guyana	28,048	11.3
Haiti	14,245	2.2
Honduras	118,989	10.3
Jamaica	99,860	24.5
Mexico	4,294,296	17.5
Nicaragua	86,063	9.3
Panama	114,893	19.4
Paraguay	129,262	4.5
Peru	897,510	17.6
Dominican Republic	268,380	19.3
Saint Kitts and Nevis	349	6.1
Saint Vincent and the Grenadines	774	4.9
Saint Lucia	1,131	3.4
Suriname	8,637	10.9
Trinidad and Tobago	70,252	60.6
Uruguay	94,795	3.8
Venezuela	925,124	23.0

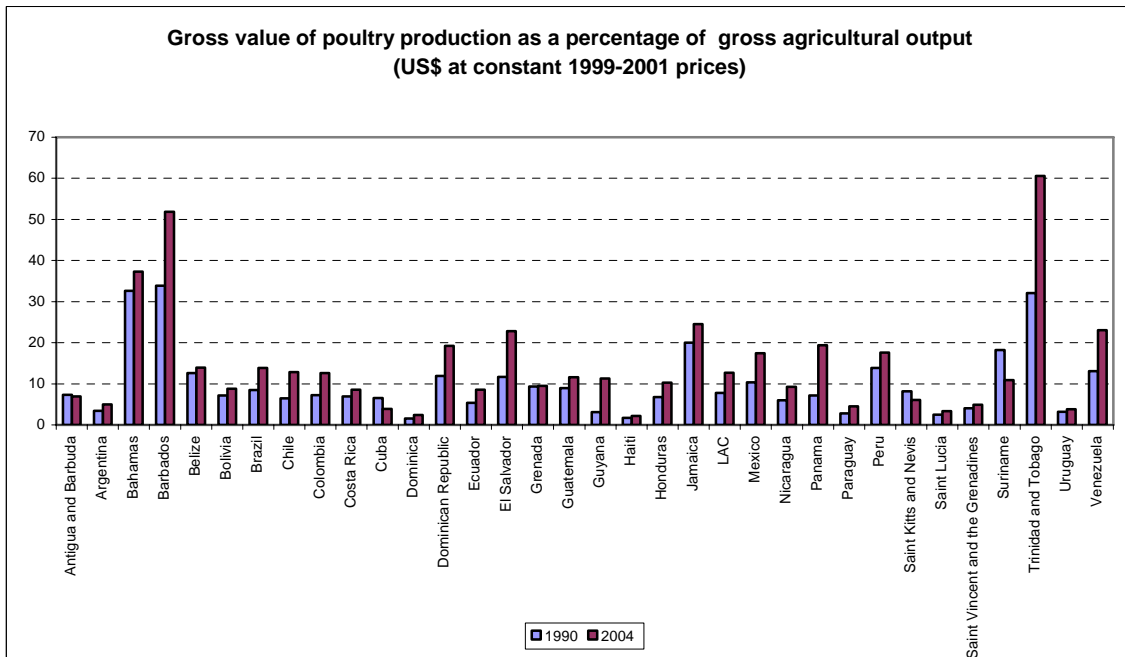
Source: FAOSTAT 2005

Figure 1



As shown in figure 2, the share of poultry farming in the total gross value of agricultural production has increased in the vast majority of countries (the exceptions are: Antigua and Barbuda, Cuba, Saint Kitts and Nevis, and Suriname).

Figure 2



Source: FAOSTAT.

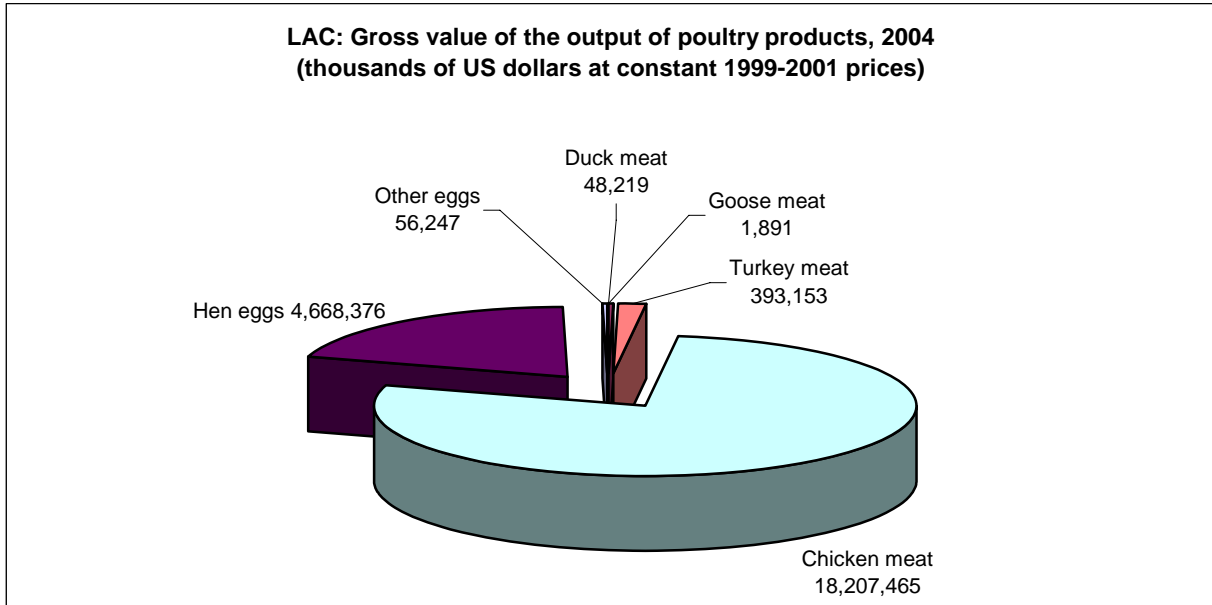
(2) Individual poultry products

Chicken meat and eggs jointly account for 97.9% of total gross poultry production in value terms (see table 2 and figure 3).

Table 2: Value of production of poultry products
(US\$ thousand at constant 1999-2001 prices)

Country	Goose meat	Duck meat	Turkey meat	Chicken meat	Chicken eggs	Other eggs	Total poultry products
Antigua and Barbuda				161	217		378
Argentina	1,030	9,663	38,462	1,031,801	260,484		1,341,440
Bahamas				6,765	781		7,546
Barbados			237	16,511	1,674		18,422
Belize		18	77	15,863	2,475		18,433
Bolivia		384	798	154,673	33,585		189,440
Brazil		9,609	239,929	10,111,110	1,354,517	54,945	11,770,110
Chile			89,935	520,417	102,457		712,809
Colombia				793,142	403,750		1,196,892
Costa Rica				88,836	43,772		132,608
Cuba				41,408	68,594		110,002
Dominica				303	195		498
Dominican Republic				209,684	58,696		268,380
Ecuador	110	220	31	244,822	65,989		311,172
El Salvador				119,185	55,265		174,450
Grenada				450	799		1,249
Guatemala				163,490	73,804		237,294
Guyana				27,644	404		28,048
Haiti	74	161	262	9,330	3,864	554	14,245
Honduras				84,245	34,744		118,989
Jamaica				94,854	5,006		99,860
Mexico		26,361	22,521	2,590,059	1,655,355		4,294,296
Nicaragua				65,933	20,130		86,063
Panama				97,527	17,366		114,893
Paraguay	439	1,405	508	39,334	86,828	748	129,262
Peru				747,512	149,998		897,510
Saint Kitts and Nevis				167	182		349
Saint Lucia				712	419		1,131
Saint Vincent and the Grenadines				231	543		774
Suriname		93		6,373	2,171		8,637
Trinidad and Tobago				67,039	3,213		70,252
Uruguay	238	305	393	62,386	31,473		94,795
Venezuela				795,498	129,626		925,124
Latin America and the Caribbean	1,891	48,219	393,153	18,207,465	4,668,376	56,247	23,375,351
Share of total (%)	0.0	0.2	1.7	77.9	20.0	0.2	100

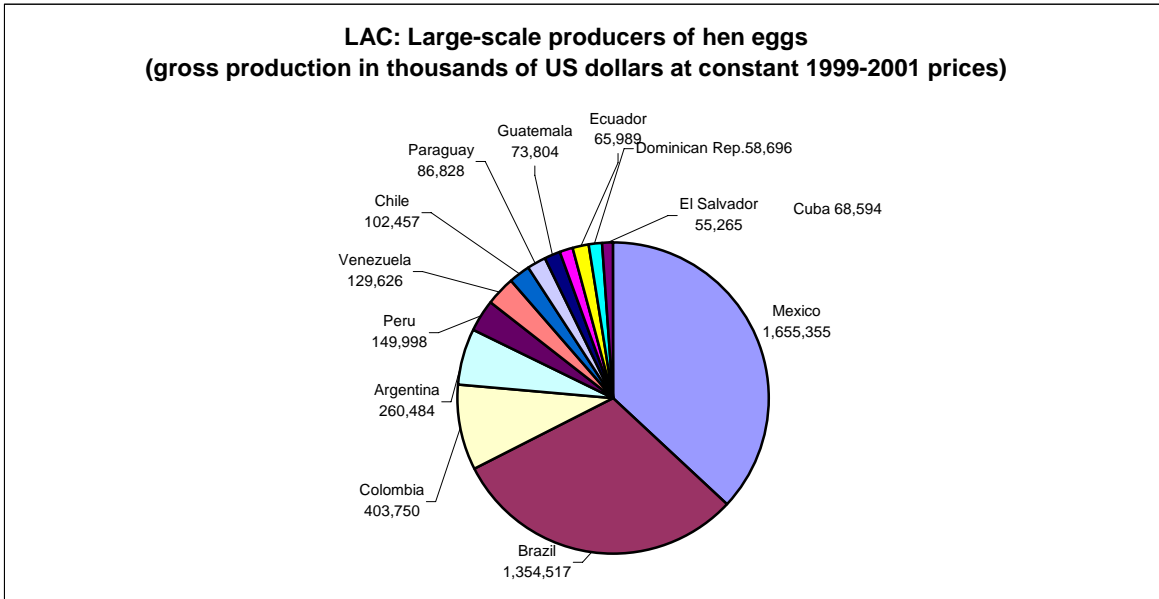
Source: FAOSTAT 2005.

Figure 3

Source: FAOSTAT.

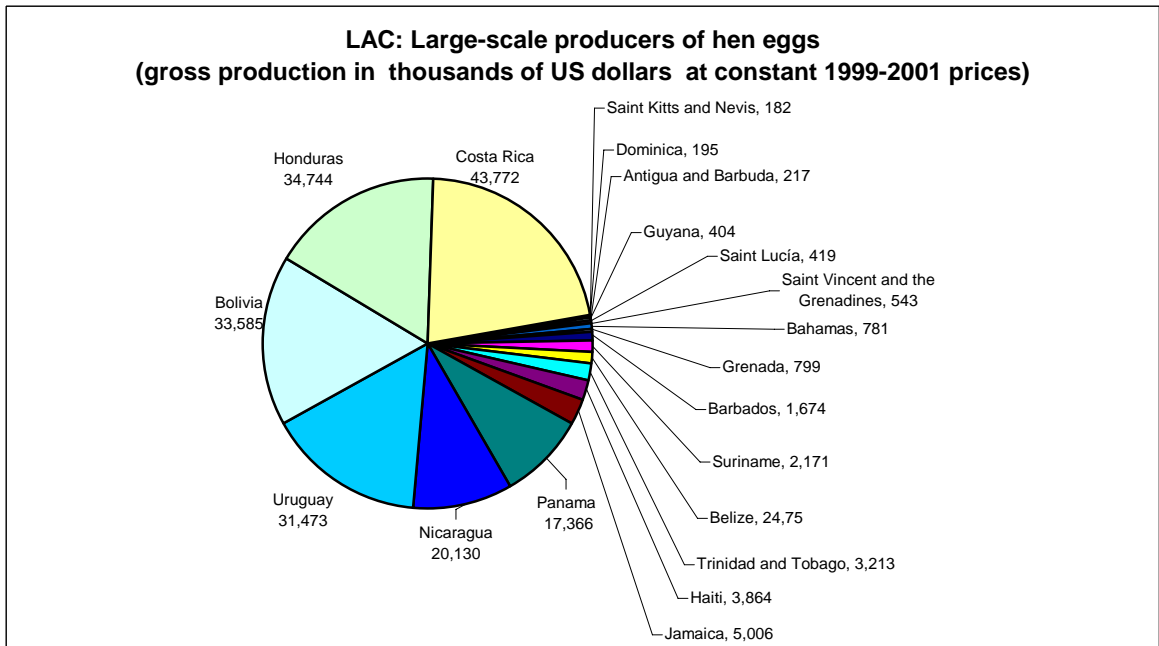
Brazil is by far the largest producer of chicken meat in the region, accounting for 55.5% of the region's gross output of that product in value terms, followed by Mexico (14.2%), Argentina (5.7%), Venezuela and Colombia (4.4% each) and Costa Rica (4.1%). Mexico, in turn, is the largest egg producer, with 35.5% the region's total production in value terms, followed by Brazil (29.0%), Colombia (8.6%), Argentina (5.6%) and Peru (3.2%).

Figure 4



Source: FAOSTAT.

Figure 5



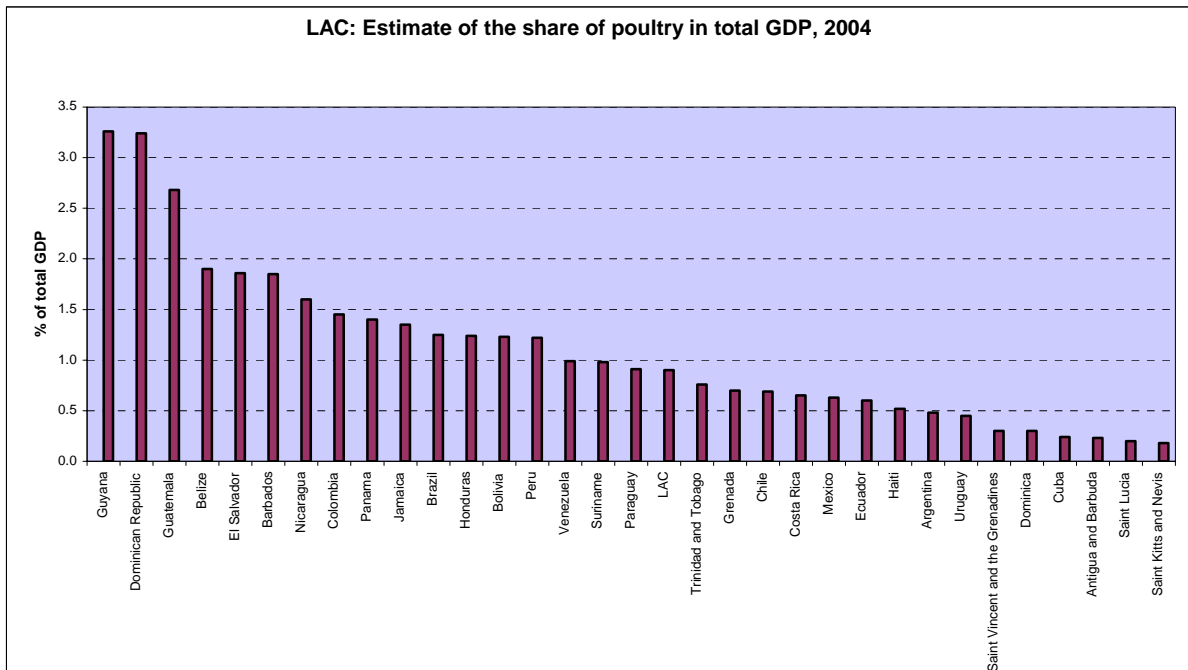
Source: FAOSTAT.

(3) The share of poultry in total GDP

The ratio between agricultural GDP and total GDP (in US dollars at current 2004 prices, ECLAC data)² was assumed valid for the following calculation: gross value of poultry production as a % of the gross value of total agricultural production multiplied by the percentage share of agriculture, forestry, fishing and hunting in total GDP, for each country and the region as a whole.³

Based on a very rough calculation, poultry probably accounts for less than 1% of total GDP as a regional average; but in Guyana, the Dominican Republic and Guatemala the share is over 2.5% (see figure 6).

Figure 6



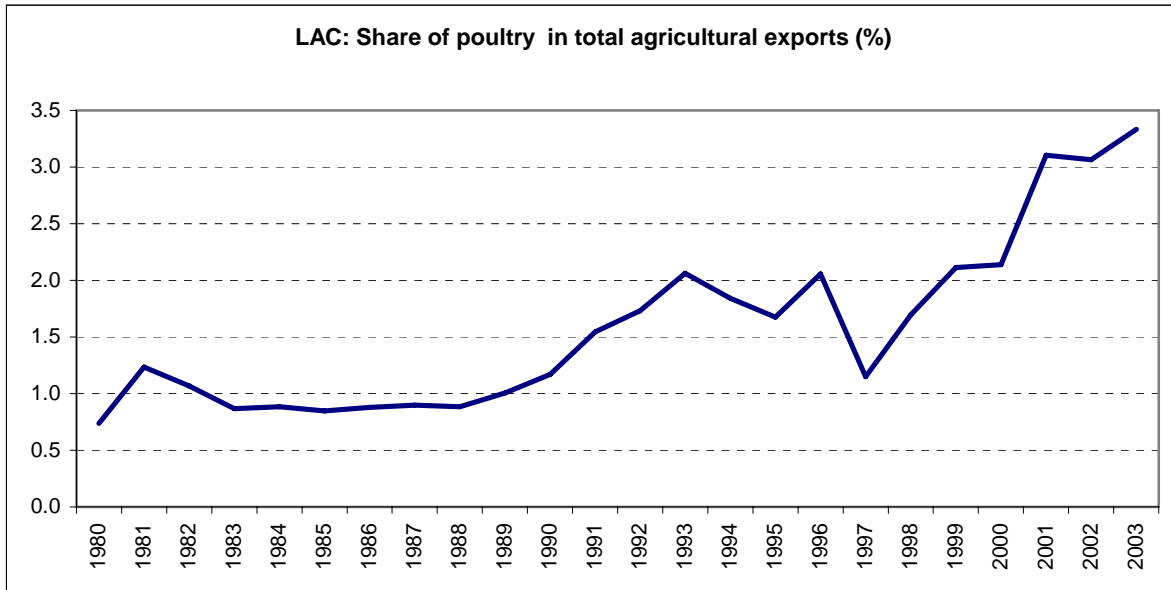
Source: ECLAC, Economic Statistics and Projections Division, and FAOSTAT.

² The proportion of agricultural GDP in total GDP varies widely, depending on whether it is measured in current US dollars, constant US dollars with 2000 as the base year, or constant US dollars with 1995 as the base year. For that reason it was decided to work in current US dollars.

³ These figures do not include the Bahamas, where gross poultry production represents a substantial 37.3% of total gross agricultural production in value terms.

(4) The share of poultry farming in exports

Figure 7



Source: FAOSTAT

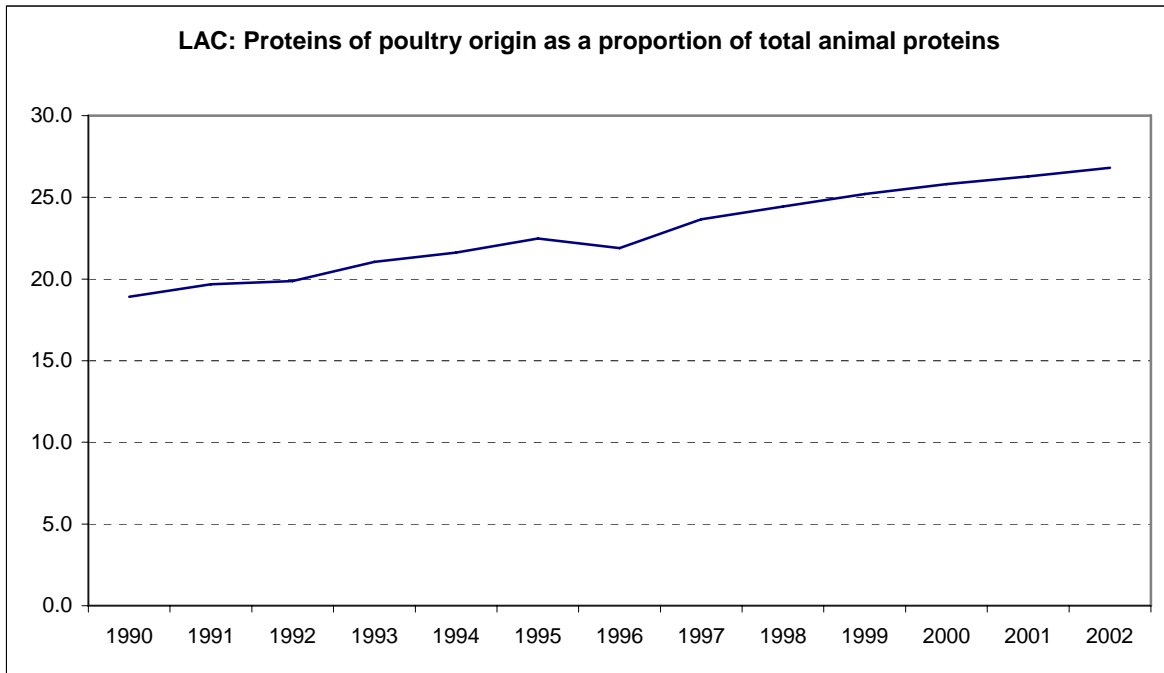
(5) Employment share

According to BNDES (1995), although poultry farming in Brazil is not labour-intensive compared to other agricultural subsectors, it created one million direct jobs in farms, slaughterhouses and other directly related industries. This does not include indirect employment. Once again, in the absence of a better indicator, we extrapolate the ratio of employment/gross value of poultry production for Brazil to the region as a whole, to obtain a (very rough) estimate of the total number of direct jobs created by poultry farming.

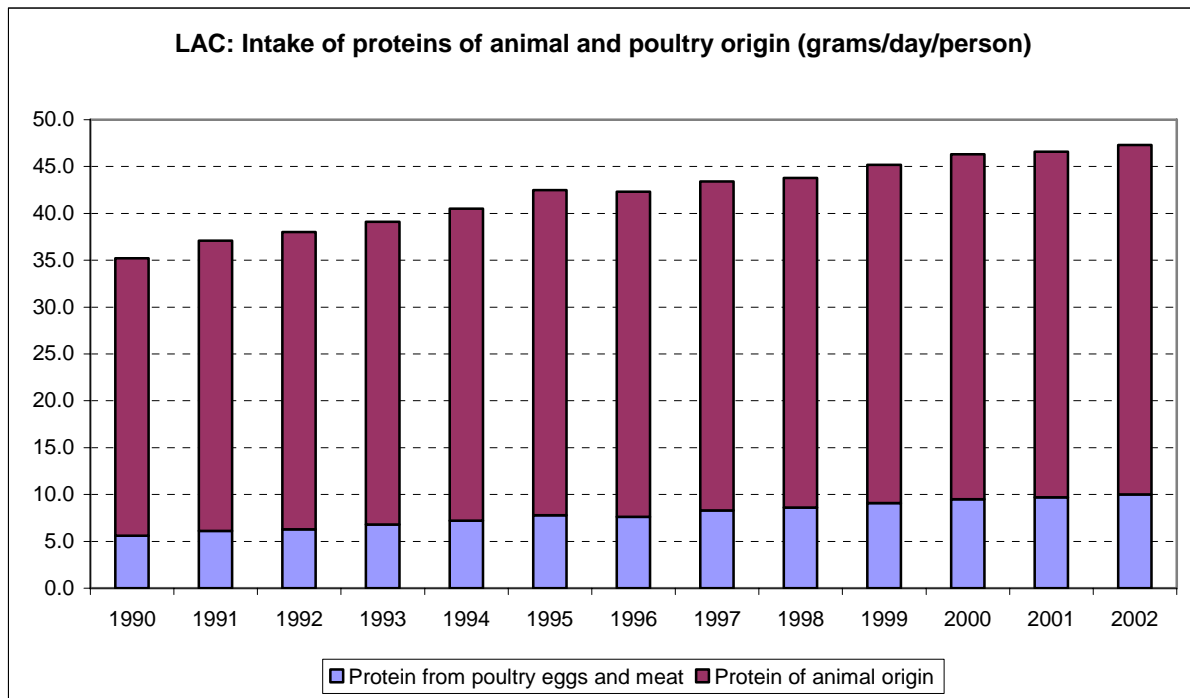
The result (1,992,400 direct jobs created by poultry farming regionwide) is probably an underestimate, given the high level of productivity and mechanization existing in Brazil. On the other hand, poultry meat is partly cut by hand in Brazil, since the ratio of labour cost to the higher quality of the product obtained is positive (or at least it was in 1995).

(6) Importance of poultry products in food

The proportion of the total intake of protein of animal origin provided by poultry has been rising steadily in the region and is currently more than 25% (see figure 8). The share of animal protein in total protein consumption has also increased continuously and is currently just above 35%; 10% of total protein intake comes from chicken meat and eggs (see figure 9).

Figure 8

Source: FAOSTAT.

Figure 9

Source: FAOSTAT

(7) Some of the linkages

The feed-to-meat and feed-to-eggs conversion ratios that the BNDES cites for 2001 in its study on poultry farming in Brazil are as follows: for an average 41-day-old chicken weighing 2.240 kg at slaughter, the feed conversion factor is 1.78; and for a dozen eggs (average weight 57 g, with a production of 318 eggs per hen, per year) the feed conversion factor is 1.40 kg.

Given the share of Brazilian production in the regional total, and the fact that Brazil is close to the global productivity frontier, these conversion factors are considered as a reasonable assumption for the region as a whole in 2005, in the absence of better indicators.

In Brazil, maize was the major component of poultry feed in 1995, and accounted for 57% of total estimated feed costs of US\$ 1.9 billion. Other components of poultry feed were: wheat bran, soybean and cotton residues, various animal by-products, nutrients, minerals and micronutrients such as metionine, an aminoacid).

It would therefore be reasonable to attribute 50% of poultry feed requirements to the production of maize. The results, in terms of tonnes of maize, and the share of production in the region have not been calculated.⁴

⁴ Here we implicitly assume that these products are produced locally, which is not necessarily true. In Brazil, for example, part of the maize used in chicken feed is imported.

(8) Other considerations

The socioeconomic effects of AI include the following:

- The most dramatic effect of the disease is its high mortality rate a few days after it has been contracted. Past experience with other strains of the virus suggests that it may be able to jump from one species to another. In fact, the virus has already been detected in pigs in Vietnam, and an infected leopard was found in Thailand.
- Fear of being in contact with infected birds has caused consumption to drop by up to 80% in some parts of India, even though no infections have been reported there.
- Culling birds to eradicate and control the spread of the disease has adverse effects on bird owners of all types, and on their employees, either as a result of the death of the animals (whether from the disease or because of control measures), or because of the slump in prices. The impact is greatest among small-scale commercial producers for whom poultry farming is their only income source. Singapore has actually banned small-scale poultry farming altogether.⁵
- Researching and evaluating the impact of the disease among small-scale poultry farmers is a complex task, among other reasons because of the large number of such producers (e.g. roughly 3 million in Thailand).⁶
- Several countries, including China, Japan, Malaysia, Singapore and the Republic of Korea, have halted imports of poultry products from the United States, following a reported outbreak of a less virulent strain of the AI virus; and India has banned imports of poultry products from all countries.
- Trade restrictions in several countries (at the local, and regional and international levels;⁷ in Vietnam the transportation of birds has been totally banned) have cut incomes among producers, transporters and traders and reduced the consumption of animal protein among broad sectors of the population (including Hong Kong and Singapore).
- Tourism has also been negatively affected in Thailand and elsewhere. (Source: WATT Poultry Global e-News: 9, 12 and 16/02/2004 and http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_issues.html)

⁵ *In fact, free-range chicken farming is a growing niche in developed countries. In France, for example, the technical specifications require the chicken to have spent 98% of its life in the open air, to be considered a “free-range chicken”.*

⁶ *In Latin America, the census of...*

⁷ *According to 1994 USDA data, even large producers and exporters, such as the United States, Brazil and China, had less than 15% of their total production available as surplus for export.*