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FAO ANIMAL PRODUCTION AND HEALTH

livestock country reviews

POULTRY SECTOR

Mozambique

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Foreword

The poultry sector continues to grow and industrialize in many parts of the world. An increasing human population, greater purchasing power and urbanization have been strong drivers of growth.

Advances in breeding have given rise to birds that meet specialized purposes and are increasingly productive, but that need expert management. The development and transfer of feed, slaughter and processing technologies have increased safety and efficiency of poultry production, but favour large-scale units rather than small-scale producers. These developments have led the poultry industry and the associated feed industry to scale up rapidly, to concentrate themselves close to input sources or final markets, and to integrate vertically. One element of the structural change has been a move towards contract farming in the rearing phase of boiler production, allowing farmers with medium-sized flocks to gain access to advanced technology with a relatively low initial investment.

A clear division is developing between industrialized production systems of large and medium size, feeding into integrated value chains, and extensive production systems supporting livelihoods and supplying local or niche markets. The primary role of the former is to supply cheap and safe food to populations distant from the source of supply, while the latter acts as a livelihood safety net, often as part of a diverse portfolio of income sources. Extensive small-scale, rural, family-based poultry systems continue to play a crucial role in sustaining livelihoods in developing countries, supplying poultry products in rural but also periurban and urban areas, and providing important support to women farmers. Small-scale poultry production will continue to offer opportunities for income generation and quality human nutrition as long as there is rural poverty.

In order to develop appropriate strategies and options for poultry sector development, including disease prevention control measures, a better understanding is required of the different poultry production systems, their associated market chains, and the position of poultry within human societies.

This review for Mozambique is part of a series of Country Reviews commissioned by the Animal Production and Health Division (AGA). It is intended as a resource document for those seeking information about the poultry sector at a national level, and is not exhaustive. The statistical data that are included from FAOSTAT are partly unofficial data or FAO estimated data. For details the reader is advised to consult the official FAOSTAT database at http://faostat.fao.org/. Some topics of the review are only partially covered or not covered at all and this document is subject to ongoing updating. The author and FAO/AGA[1] welcome your contributions and feedback.

[1]For more information visit the FAO website at: http://www.fao.org/ag/againfo/themes/en/poultry/home.html or contact either Philippe Ankers or Olaf Thieme, Animal Production Officers. Email: Philippe.Ankers@fao.org and Olaf.Thieme@fao.org Food and Agriculture Organisation, Animal Production and Health Division, Viale delle Terme di Caracalla, 00153Rome, Italy

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Contents

Acronyms and Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
CVL	Central Veterinary Laboratory
DNSV	Direcção Nacional dos Serviços de Veterinária
FAO	Food and Agriculture Organization of the United Nations
HIV	Human Immune-Deficiency Virus
HPAI	Highly Pathogenic Avian Influenza
MINAG	Ministry of Agriculture
ND	Newcastle Disease
NGOs	Non Governmental Organizations
PEDSA	Strategic plan for agricultural development
TIA	Trabalho de Inquerito Agricola
UGC	Cooperatives Union
USD	United States Dollars

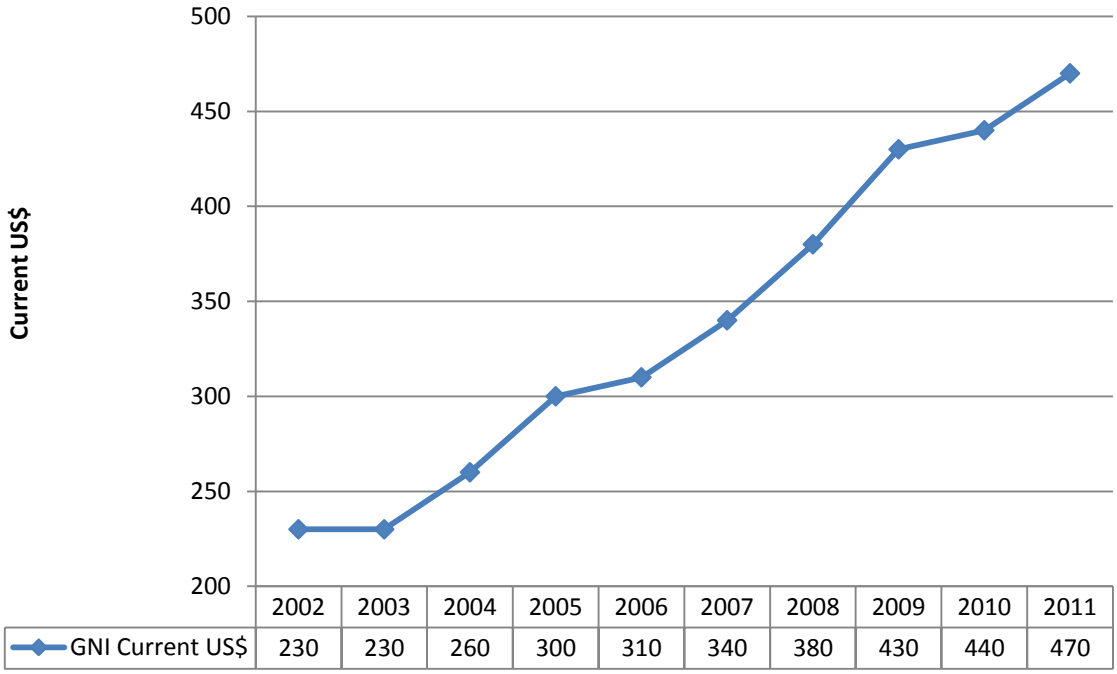
Chapter 1

The country in brief

Country	Mozambique
Location:	South-eastern Africa, bordering the Mozambique Channel, between South Africa and Tanzania
Area	786 380 km^2
Population	23 929 708 (2011)
Population density:	29.7/Km^2
Population growth rate	2.23 %
Economy group	Low income
GDP	12 797 754 231
Gini coefficient	0.457
Population below poverty line USD 1.25 a day	59.6% (2008)
Currency	1 USD = 30.5 Mozambique New Metical, 1 Mozambique New Metical = 0.0325 US dollars (January 2013)

Source: World Bank, December 2012

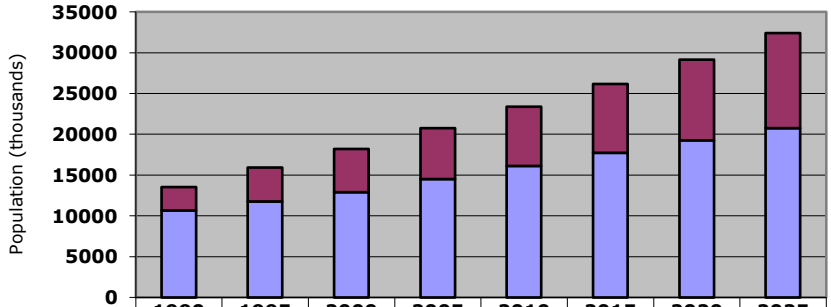
FIGURE 1: **Gross national income (GNI) per capita (Atlas method, current US$)**



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GNI Current US$	230	230	260	300	310	340	380	430	440	470

Source: World Bank, January 2013

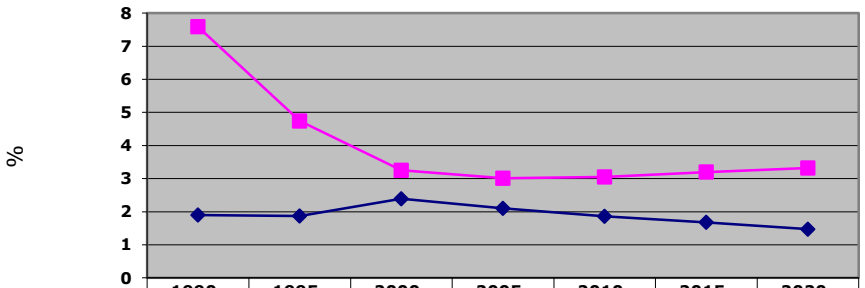
FIGURE 2**: Demographic profile**



	1990	1995	2000	2005	2010	2015	2020	2025
Urban population	2858	4178	5296	6231	7241	8436	9898	11685
Rural population	10689	11756	12905	14539	16149	17726	19279	20754

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision and World Urbanization Prospects: The 2011 Revision, http://esa.un.org/unup, August 2013

FIGURE 3: **Annual population growth rates**



	1990-1995	1995-2000	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Rural annual growth rate	1.9	1.87	2.39	2.1	1.86	1.68	1.47
Urban annual growth rate	7.59	4.74	3.25	3.01	3.05	3.2	3.32

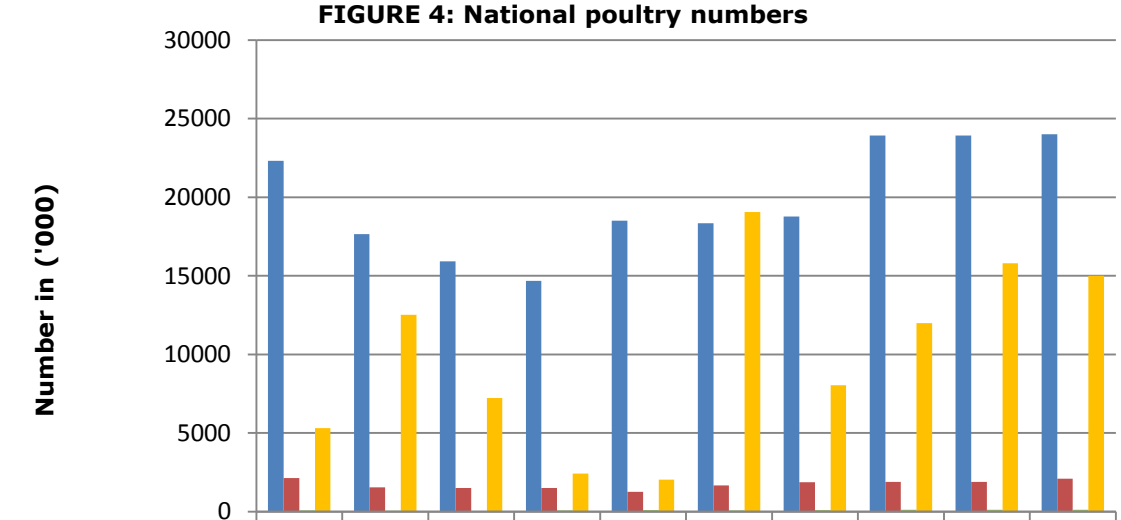
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision and World Urbanization Prospects: The 2011 Revision, http://esa.un.org/unup, August 2013

Chapter 2

Profile of the poultry sector

2.1 National poultry flocks

FIGURE 4: National poultry numbers



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Chickens	22319	17647	15932	14677	18508	18341	18778	23922	23922	24000
Ducks	2128	1538	1500	1507	1254	1671	1865	1882	1882	2100
Turkeys	83	61	20	65	97	78	90	113	114	120
Geese and guinea fowls	5319	12517	7224	2413	2029	19054	8034	12000	15792	15000

Source: FAOSTAT, August 2013

In 2011 the estimated total number of poultry was about 41 220 000. Chickens represented 58.2 percent of the total number of poultry, followed by guinea fowls and geese (36.4 %) ducks (5.1 %), and turkeys (0.3 %) (FAOSTAT, 2013). These numbers are based on estimates.

2.2 Geographical distribution of poultry flocks

According to the figures from the 2009-10 agricultural census (INE, 2011) the national chicken population was estimated at 23 922 192 birds (Table 1). The highest concentration of chickens was found in the central part of the country (Sofala Manica, Tete and Zambezia) with 49.6 percent of the total national flock. The share of the northern part of the country was 27.0 percent of the national flocks and the South had a share of 23.4 percent.

TABLE 1:
Distribution of poultry by provinces in 2009 ('000 birds)

Region	Province	Chickens	Ducks	Geese	Turkeys	Guinea fowls
South	Maputo	1 921 900	506 159	1 488	22.091	126.402
	Gaza	1 284 164	144 496	1 165	3.242	58.802
	Inhambane	2 395 580	306 508	3 456	47.005	42.919
Center	Sofala	2 459 246	143 367	1 397	4.762	169.457
	Manica	3 253 206	52 693	383	19.503	120.477
	Tete	2 042 535	52 764	107	0.033	36.967
	Zambezia	4 108 424	194 882	1 897	10.716	129.363
North	Nampula	3 587 519	260 967	5 797	1.621	62.952
	Cabo Delgado	1 633 460	140 441	49	0.138	5.663
	Niassa	1 236 158	79 450	0	4.392	14.709
TOTAL		23 922 192	1 881 736	15 739	113.503	767.711

Source: INE 2011

Ducks as the second most important poultry species are mainly found in the South of the country (50.9 %) and guinea fowl have the highest concentration (59.4 %) in the central region of the country. The largest number of turkeys (41.4 % of total national) is found in the Inhambane province of the South and the highest concentration of geese (38.8%) is found in the southern part of the country.

The Table 2 shows the importance of small units for all poultry species.

TABLE 2:
Number of poultry farms by species and size

Poultry Flock	Small units	Medium units	Large units	Total
Chickens	2 303 947	20 409	444	2 324 800
Ducks	311 632	5 219	199	317 044
Gees	2 698	439	56	3 193
Turkey	22 033	1 287	86	23 406
Guinea Fowls	123 777	3 102	0	126 879

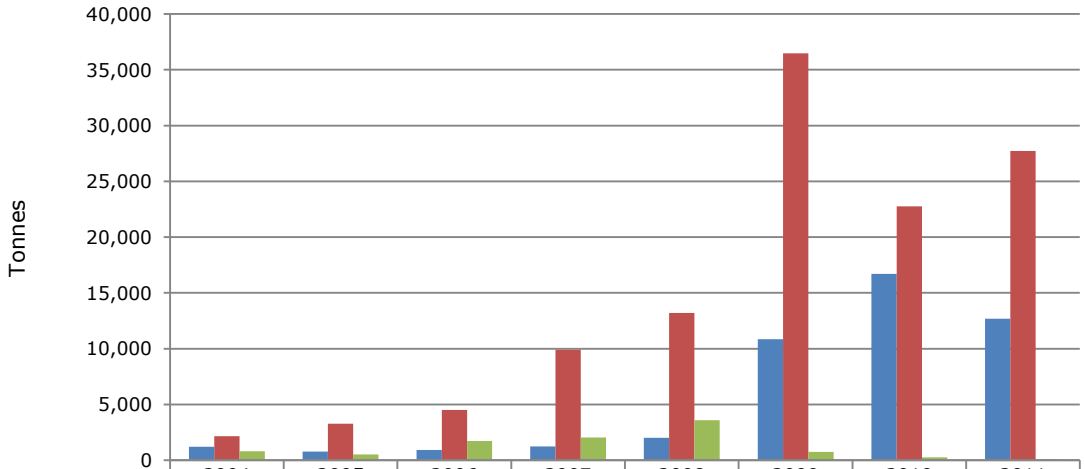
Source: INE, 2011

2.3 Production

The Figure 5.1 shows the production of chicken meat from 2004 to 2011. In 2011, the local production of chicken meat reached 40 503 tonnes, 12 680 tonnes of which were derived from the smallholder family sector, 27 717 tonnes from the private sector, 96 tonnes from the cooperative sector and small quantities from other sources (DNSV, 2012). According to ILRI (2011), the majority of the officially marketed poultry meat comes from broiler chickens produced by the co-operative and private sectors. The largest producers include General Union of Agricultural and

Livestock Cooperatives (UGC), Mozambique Farms, the Mozambique National Poultry Association (AMA) in the South of the country, Frangos de Manica, Abilio Antunes in Manica province in the central part of the country, and Novo Horizonte and Pintainhos Stewart in Nampula province, in the North of Mozambique (ILRI, 2011). In 2011 the total chicken meat production represented 73% of the total meat consumed in the country (DNSV, 2012).

FIGURE 5.1: **Chicken meat production 2004-2011 (DNSV 2012)**



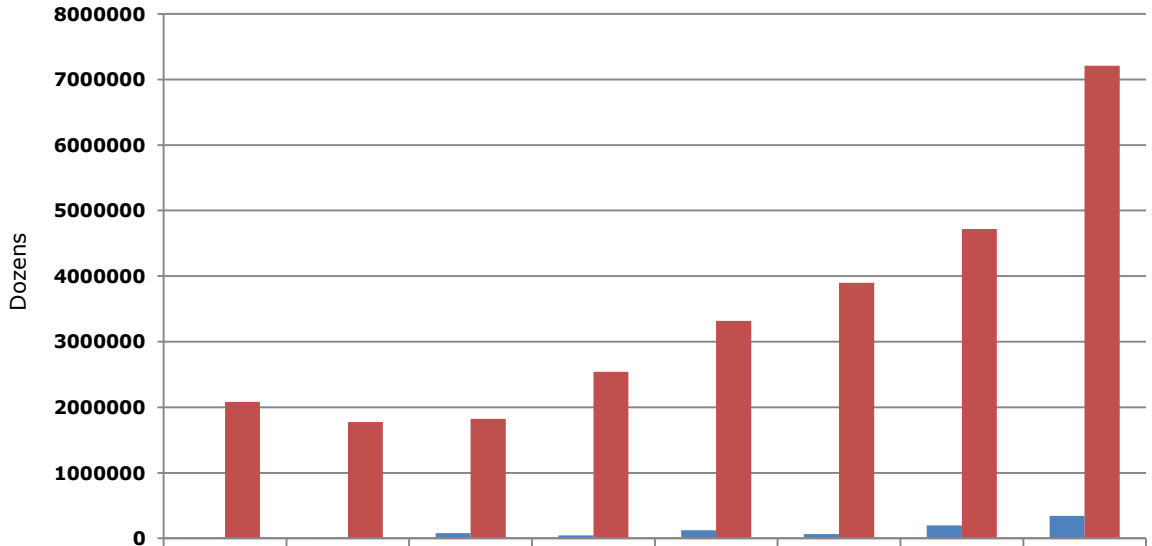
	2004	2005	2006	2007	2008	2009	2010	2011
Family	1,199	769	910	1,252	2,018	10,844	16,705	12,680
Private	2,146	3,272	4,504	9,903	13,209	36,472	22,773	27,717
Cooperative	811	525	1,740	2,043	3,595	746	257	96

According to AMA (2011) reported by ILRI (2011) there was a considerable increase in poultry meat production starting from 2006 and 2007 due to (i) increased hatchery capacity in the northern region; (ii) establishment of new hatchery companies in Maputo region; and (iii) an increase in the production of day-old chicks by the main producer in the central region to 60 000 per week. The increase of chicken meat production was mainly the result of the Government's support for the development and reform of chicken production through greater control on imported chicken, financing of the National Poultry Farmers Association (AMA) and the Maputo Farmer Association (ADAM) through TechnoServe and banking corporation involvement through establishment of credit lines to poultry farmers. It important to mention that in 2011, 31.3 percent of the total meat production in the country was from the small farmers in the family sector (DNSV, 2012).

In 2011, Maputo province was the lead producer of poultry meat with a production of 25 519 tonnes (63.0 percent of the total production), followed by Manica province, with 8 752 tonnes (21.6 %) and Nampula province with 4 206 tonnes (10.4 %). The provinces of Niassa, C. Delgado, Zambezia, Tete, Sofala, Inhambane and Gaza only had a share of the total production between 0.02 percent (Zambezia) and 1.7 percent (DNSV, 2012).

The Figure 5.2 shows in increase of egg production from 2004 to 2011. In 2011 the total egg production was 7 550 765 dozens or 90.6 million (DNSV, 2012). Maputo province was the chief producer of eggs, representing 51.3 percent of the total egg production in the country, followed by Manica province with 41.4 percent, and Nampula with 5.4 percent while the other seven provinces contributed only 1.9 percent to the egg production. In 2011 the family sector had contributed with 342 470 dozens of eggs.The quantity of local egg production is increasing but still low. Recent (February 2013) information regarding egg production from Dr. Isabel Lopes (managing partner of the veterinary company Ibavet) indicate that very few farmers are producing eggs due to the high cost of layers, feed and facilities (layer houses). She estimated that about 90 percent of the eggs consumed in the country are imported from neighbouring countries. Nevertheless egg production in 2012 continued to increase, reaching 10 135 259 dozens of which 1 446 054 dozens (14.3% of total egg production) were produced by the family sector (DNSV, 2013)

FIGURE 5.2: **Production of table eggs 2004-2011 (DNSV 2012)**



	2004	2005	2006	2007	2008	2009	2010	2011
Family	4681	3825	81211	43134	123435	65795	198592	342470
Private	2082443	1772113	1820669	2540433	3316839	3896298	4717751	7208295

2.4 Consumption

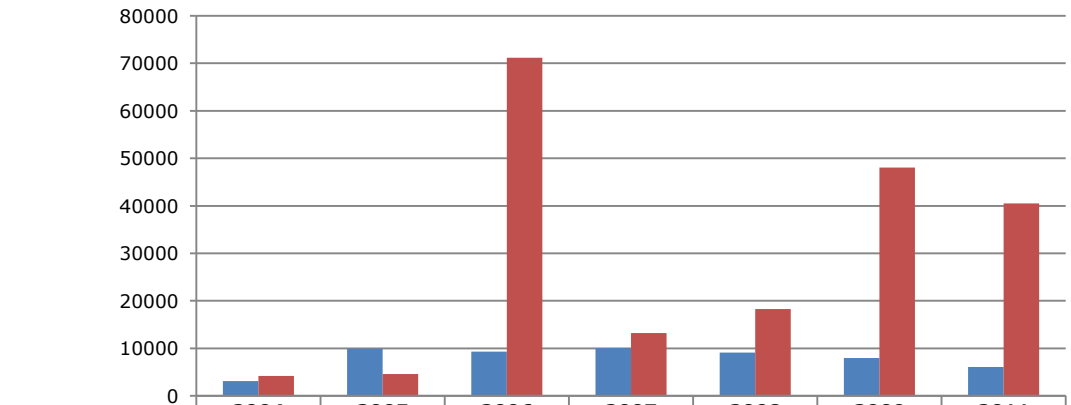
According to DNSV (2012) the total volume of meat consumed was 46 572 tonnes, of which 6069 were imported, representing about 13 percent of the total consumption. Considering a human population of 24 million this would relate to an average availability of 1.94 kilogram of poultry meat per person and year.

From 2009 to 2011 there was an increase of the domestic egg production of 52.49 percent (DNSV, 2012). The total quantity of eggs consumed in 2011, including those imported, was 7 990 998 dozens (DNSV, 2012), which corresponds to an average availability for consumption of about 4 eggs per person and year.

2.5 Trade

The importation of chicken meat decreased from 2009 (7 992.3 tonnes) to 2011 (6 069 tonnes) by 24.1 percent (DNSV, 2012).

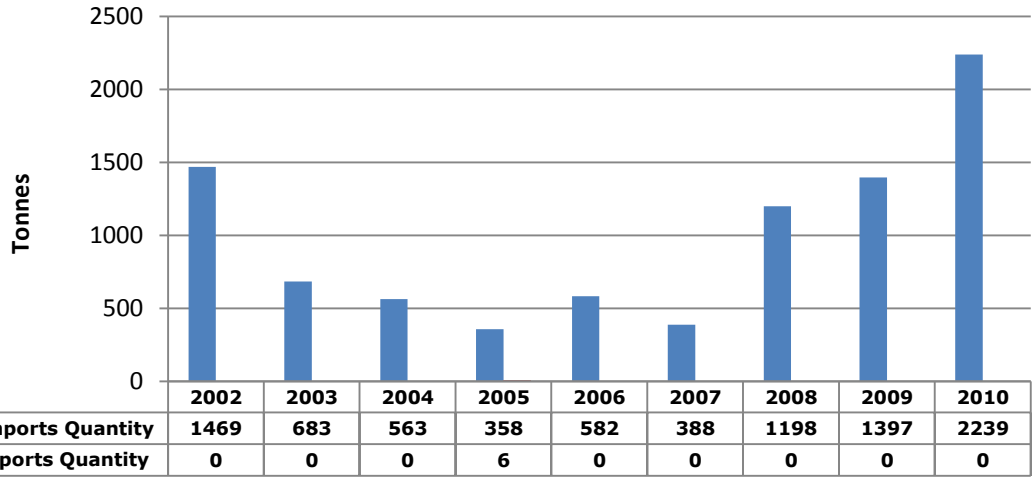
FIGURE 7a: **Chicken meat production/importation (tonnes)**



	2004	2005	2006	2007	2008	2009	2011
Imported Meat	3089.8	9908.8	9324	10076.5	9075.2	7992.3	6069
Produced	4156.1	4565.3	71154	13197.6	18241.1	48061.1	40503

Source: DNSV, 2012

FIGURE 7b: **Import/Export of hen eggs (with shells)**



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Imports Quantity	1469	683	563	358	582	388	1198	1397	2239
Exports Quantity	0	0	0	6	0	0	0	0	0

Source: FAOSTAT, January 2013

The eggs consumed in the main urban centres come almost exclusively from neighbouring countries. Recorded domestic production is tiny, at around 5 percent of the total eggs consumed in formal marketing circuits, and comes from the peri-urban areas. There is no systematic information on egg production or consumption in the rural areas (PEDSA, 2010). It is estimated that only 20 percent of the households consume eggs from their own chickens while the remaining use eggs only for hatching (ILRI, 2011).

TABLE 3**:**
Import of feed and feed ingredients (tonnes)

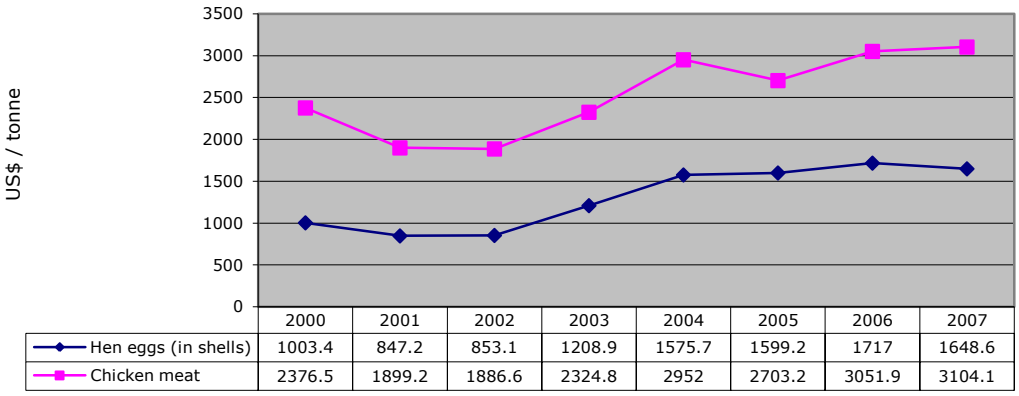
Product	2004	2005	2006	2007	2008	2009
Concentrates*	12292	1976	5120	2294	8211	9400
Feed	122	1780	3410	4515	7741	15147
Soybean cake	660	1814	4190	2008	1934	7543
Sunflower cake	192	836	2360	9806	0	0
Fish meal	1777	1264	3207	1948	21	0
Meat meal	26	270	30	0	0	0
Calcium phosphate	18	0	0	149	911	845

*Concentrate: a mixed source of protein and micronutrients
Source: DNSV, 2009

2.6 Prices

The producer prices (USD/tonne) for selected poultry products are shown for the period 2000-2007 by Figure 8.

FIGURE 8: **Producer price (USD/tonne)**



	2000	2001	2002	2003	2004	2005	2006	2007
Hen eggs (in shells)	1003.4	847.2	853.1	1208.9	1575.7	1599.2	1717	1648.6
Chicken meat	2376.5	1899.2	1886.6	2324.8	2952	2703.2	3051.9	3104.1

Source: FAOSTAT, January 2013

The chickens from commercial production systems are sold alive or slaughtered and prices are variable. Live birds are sold in the urban or sub-urban markets for an equivalent of about 5 USD dollars per unit, while the slaughtered and frozen chickens are sold in supermarkets and through butchers, at about 5 USD per kg (2012). The eggs are sold at the door of the producers on a cardboard container of 30 eggs for about 4-5 USD and in supermarkets and butcher shops packed in boxes containing 6 to 12 eggs at a price of 1.6 USD per dozen.

The local type birds are sold alive at the door of the households or in urban markets. The price is higher compared to the commercial birds and varies from 6.6 USD to 8.3 USD. The local eggs are not sold to customers.

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Chapter 3

Poultry production systems

TABLE **4:**
FAO classification of poultry production systems

Sectors (FAO/definition	**Poultry production systems**			
	Industrial and integrated	**Commercial**		**Village or backyard**
		Bio-security		
		High	**Low**	
	Sector 1	**Sector 2**	**Sector 3**	**Sector 4**
Biosecurity	High	Mod-High	Low	Low
Market outputs	Export and urban	Urban/rural	Live urban/rural	Rural/urban
Dependence on market for inputs	High	High	High	Low
Dependence on goods roads	High	High	High	Low
Location	Near capital and major cities	Near capital and major cities	Smaller towns and rural areas	Everywhere. Dominates in remote areas
Birds kept	Indoors	Indoors	Indoors/Part-time outdoors	Out most of the day
Shed	Closed	Closed	Closed/Open	Open
Contact with other chickens	None	None	Yes	Yes
Contact with ducks	None	None	Yes	Yes
Contact with other domestic birds	None	None	Yes	Yes
Contact with wildlife	None	None	Yes	Yes
Veterinary service	Own Veterinarian	Pays for veterinary service	Pays for veterinary service	Irregular, depends on govt vet service
Source of medicine and vaccine	Market	Market	Market	Government and market
Source of technical information	Company and associates	Sellers of inputs	Sellers of inputs	Government extension service
Source of finance	Banks and own	Banks and own	Banks and private[2]	Private and banks
Breed of poultry	Commercial	Commercial	Commercial	Native
Food security of owner	High	Ok	Ok	From ok to bad

Sector 1: Industrial integrated system with high level of biosecurity and birds/products marketed commercially (e.g. farms that are part of an integrated broiler production enterprise with clearly defined and implemented standard operating procedures for biosecurity).

Sector 2: Commercial poultry production system with moderate to high biosecurity and birds/products usually marketed commercially (e.g. farms with birds kept indoors continuously; strictly preventing contact with other poultry or wildlife).

Sector 3: Commercial poultry production system with low to minimal biosecurity and birds/products entering live bird markets (e.g. a caged layer farm with birds in open sheds; a farm with poultry spending time outside the shed; a farm producing chickens and waterfowl).

Sector 4: Village or backyard production with minimal biosecurity and birds/products consumed locally.

[2] Money lenders, relatives, friends, etc.

3.1 Background information

Mozambique has been one of the top economic performers in Africa in recent years, achieving an average annual growth rate of 8 percent during the period 1994-2007. The growth rate fell to 6.7 percent in 2008, as a result of the price increases in food and oil. In 2009 it was 6.1 percent, and the projection for 2010 was 6.3 percent (PEDSA, 2010). The agriculture sector contributed in 2009 to the country's GDP with 21 percent and with an annual growth rate of 7.9 percent (Mozambique Government, 2009).

Poultry production in Mozambique can be categorized into two broad systems: small-scale village or scavenging system, which is the dominant system and the intensive (commercial) system. The two systems vary widely with respect to numbers, types of birds, bio-security practices and management. The commercial system involves production with improved hybrid breeds under intensive confined management, with uniform stocks and age-groups mainly for commercial purpose. The huge majority of the poultry industry is located in the South, but this will likely change with the increasing importance of the North and its proximity to feed inputs. As northern markets become increasingly more lucrative relative to the southern market, it will be more profitable to produce near feed inputs and ship the chickens to markets.

In Mozambique, as in many other African countries, eggs and poultry meat are important sources of animal protein. Poultry and chickens in particular are fast growing and prolific animals which produce meat and eggs over a short time-span. In a country such as Mozambique, where two thirds of the territory is infested with tsetse fly which limits cattle production, poultry production is of great importance (Mata *et al*., 2000). By 2009, Mozambique's poultry industry accounted for 0.3 percent of its GDP. This percentage could easily double in the near future if projected private investments are implemented. At least two of those investments are being made by American companies, facilitated by TechnoServe as part of an USDA program, including one in a large egg laying operation in Nampula province (Cipriano, 2011). However, the development of this production is still far from meeting the needs of the Mozambican population. The poultry industry faces a number of challenges, in particular management, nutritional deficiencies, diseases and adverse climatic conditions.

3.2 Sector 1: Industrial and integrated production

The intensive poultry industry was developed in the early 1960s in Mozambique. The industry has emerged in the South and expanded into the Centre and the North in the 1970s with the entry of multinational companies (MINAG, 1979).

In its early stages, commercial farming was practiced by small-scale producers in limited urban and peri-urban areas in the provinces of Maputo and Manica (Nicholau, 2008). In 1974 (a year before the independence of Mozambique) the installed capacity for broiler production was an area of 71159 m^2, of which 56 percent were located in the South (Maputo), 36 percent in the Centre (Manica) and 9 percent in the North (Nampula). For egg production, the capacity was 115 038 m^2, of which 75 percent were located in the Southern, 21.7 percent in the Central and 2.8 percent in Northern regions. The area dedicated to parent stocks was 15 043 m^2 and located in the Central region of the country. A slaughterhouse had the capacity to process 2000 birds per hour and the capacity for producing feed was 245 tonnes per day (Nicholau, 2008).

After the independence of Mozambique, the poultry industry underwent several crises. The first was the departure of former producers which led to a sharp reduction of meat and egg production. This situation led to the involvement of the state, which created the company Avicola EE. This company was aimed at restoring and enhancing chicken production and expanded this activity to all regions of the country. The company had a complete chain of infrastructure to perform all activities such as reproduction, incubation, rearing, fattening and egg production. Thus, for many years after the independency, poultry production was run by the state, and the state farms produced around 95 percent of the poultry products consumed in the 1980s (Garcês, 2000).

With the collapse of the existing political system in 1987, some of the government run farms were privatised and others discontinued operating (Garcês, 2000). The newly emerging private sector only partly replaced the previous state production, so that the meat output had by 1991 declined by 44 percent and the egg production by 92 percent. During the following eight years poultry meat production increased in the peri-urban zone of Maputo in small units of up to 200 broilers per batch which were owned by women (Garcês, 2000).

In 2005, the national chicken industry was on the brink of a disaster. Avian flu outbreaks in South Africa and inflation in the local currency sparked the crisis, but it was also the importation of Brazilian chicken that led to a 221 percent surge in official imports between 2004 and 2005 (Cipriano, 2011).

TechnoServe saw an opportunity to promote economic growth by developing the poultry industry through launching a comprehensive program in 2005 that brought together public and private partners (TechnoServe, 2011). In 2005, there were two imported chickens for every one domestically produced. Today, Mozambican local broiler production has a share of more than 85 percent of the total consumption.

Currently one farm in Manica province (Empresa Avicola Abilio Antunes) has very high bio security measures that qualify for the FAO classification as a sector 1 producer. This farm is characterized by a vertical integrated production with different units: a. Breeders; b. Incubator and hatchery; c. growers, d. abattoir; and e Feed mill for raising commercial layers and/or broilers.

The poultry company Novos Horizontes (New Horizons) in Nampula province, also runs a vertical integration from the breeders to the abattoir, employing the out grower method and operating a feed mill to create its own chicken feed (Whiting, 2010). The outgrowers are generally subsistence farmers who live on less than 2USD a day. Contracted outgrowers received training from company extension workers who travel into the villages on motorbikes to supervise the growing process. The outgrowers are required to build their own chicken houses under guidance with their personal funds. The house is generally 5x25 meters and made from local material, including thatch, wood, and sand. Each farmer receives approximately 1 600 day old chicks and feed. These are provided on credit with the debt being paid off if the outgrower's flocks reach a profitable weight (Whiting 2010).

The day old breeder's chicks come from surrounding countries such as Zimbabwe, Zambia and South Africa (Marbelis Parde, Personal interview, Maputo, January 2011) for producing eggs for broiler production.

3.3 Sectors 2 and 3: Other commercial production

Commercial poultry production provides a considerable amount of poultry meat to urban markets and contributes significantly to the income of many families. While of considerable economic importance, this business is usually practiced outside the formal economy and so does not appear in national statistics. It is normally practiced in the peri-urban and urban areas of the country and uses intensive production techniques.

The system is characterized by two types of producers: Those who develop the entire production chain from the day old chicks to the slaughterhouse and others that only grow day old chicks and sell them alive or for slaughter. The production is carried out on private poultry farms using intensive production methods, with purpose-built premises and established nutritional and health management practices. Generally, broiler chicks are reared for a period varying from 35 to 42 days. Most birds are currently vaccinated against Newcastle Disease (ND), and some farmers also vaccinate against Infectious Bursal Disease and Infections Bronchitis, although the calendar and vaccination schemes vary among the farmers.

Including all farm sizes there are about 5 000 famers whose primary source of income is the production of eggs or poultry for sale. Overall, 55 percent of producers are farmers who keep about 300 birds per cycle (small-scale farmers), 30 percent are rearing 500 to 2 000 birds/ cycle (small-scale commercial farmers) and 15 percent are large-scale commercial farmers. In Maputo Province, 10 percent of operations are classified as very small farms, 46 percent are small scale farmers, 16 percent are medium scale and 28 percent are large scale (Alcinda Gaspar, personal communication, March, 2011).

Private livestock feed and veterinary companies sell day old chicks imported from South Africa, Zimbabwe and Malawi which are generally raised indoors for 35 days. The feed quality is high, although variability in feed quality is a major problem. Poultry houses are made by using baked bricks with a tin roof and in each house, there are feeders and drinkers. Generally there is minimum health care based on vaccinations against ND, Gumboro and Infectious Bronchitis, but this varies considerably.

The system can be classified into the following categories based on the scale of production:

- **Large scale units** which are mainly breeders with hatching facilities and capacity of over 20 000 birds per cycle. Currently, there are about three in this category.

- **Medium scale units** owned by individuals, companies or farmers with a capacity of 2000-20 000 broilers. Bio security levels are not high at these units and they can be categorized as FAO sector 3. After reaching maturity at around day 35, the full grown broilers are transported to abattoirs or slaughterhouses, before being packaged and shipped to consumer markets.

- **Small-scale units** categorized under FAO sector 3. Mainly household /family owned farms of 100-2000 birds. Parts of this group are supported by poultry companies (large firms mainly involved in feed milling, slaughterhouse and producers.) through an out-grower program. This program promotes the construction of poultry houses and poultry equipment made with local materials, which greatly decreases the total investment costs. These small producers receive technical support from extension agents, who give advice and make regular visits to monitor production. Others are independent small broiler farms of broilers. They buy chicks and feed for the whole production. Sometimes the chicks travel long distances by public buses. This group can be further divided into the following categories:

    - Small-scale commercial farmer that are typically semi integrated. They buy some of their inputs like poultry feed, and they produce their own chicks and sell grown birds to abattoirs. This kind of farmer is or could be an emerging large-scale commercial farmer. They can produce 500 to 2 000 birds/ cycle.

    - Small-scale farmers that produce on average 300 birds per cycle. They buy all their inputs and they sell grown birds to the live market.

3.3.1 Breeding stocks and hatching eggs

The genetic material (day old breeder chicks) for this production system is imported from neighbouring countries like Zimbabwe, Zambia and South Africa (Marbelis, personal communication, 2011).

There are two farmers: one in the Centre of the country and another in the South who are responsible for rearing the parent stocks and they have around 100 000 birds (Nicolau, 2008).

In 2008, 70 percent of the total hatching eggs was imported through "Irvine's Day Old Chicks", which is the official distributor for the Cobb Vantress breed in Africa. The remaining 30 percent were provided by the representative of Hubbard in Africa.

Presently there are nine hatcheries producing day old chicks, six in the southern region (Maputo province) producing about 35 000 day old chicks per week and three hatcheries in the Centre (Manica province) and the North (Nampula province) of the country, producing from 40 000 to 135 000 birds per week (Nicolau, 2008 and Marbelis oral communication, 2011)

Currently, the majority of day old chicks are provided by the various existing incubators in the country. The hatchery of the TM Holding Company located in Maputo produces day old chicks for two clients, Manmart and Kharafa enterprises who then sell them to local poultry farmers. In 2010 they produced 3 206 096 day old chicks, which represents 77.9 percent of the total fertile eggs that were incubated (TM holding, 2011). The TM Holding Company could produce about 8.7 million day old chicks per month; however production is lower depending on the contracts with the Manmart and Kharafa enterprises.

The Cooperatives Union (UGC), which has membership of thousands of family producers, has an incubator with a weekly capacity of 11 400 eggs. In an interview the executive director Dr. Domigos Fernades explained that in 2006, over 1.9 million chicks were produced by UGC. At the moment the incubator is being managed by the Irvines Mozambique enterprise, which also sells chicks to private producers. Due to insufficient breeders the numbers of eggs are insufficient to meet the demand and the enterprise therefore also imports eggs from Zambia and Zimbabwe.

HIGEST, a Portuguese company with an outlet in Mozambique, operates a hatchery with a capacity of 300 000 eggs (Emprenda, 2005). There are two other hatcheries located in Maputo province; one in Moamba (which produces 62 000 chicks each month) and another in Albazine (with a monthly production of 134 000 chicks) (Gaspar, 2007, oral communication). In Manica province, the farmer Abilio Antunes has breeders and a hatchery with a capacity to produce 420 000 chicks

each month. He manages to produce for restocking and also for selling day old chicks to small farmers in the central region of the country. The Table 5 shows the number of incubators and their capacity.

TABLE 5:
Distribution of incubators in the country

Province	Incubators	Capacity	Chicks Produced (2009)
Maputo	6	31 137 736	13 711 961
Manica	1	7 280 000	6 115 279
Nampula	2	4 149 600	2 613 391
Total	**9**	**42 567 3360**	**22 440 631**

Source: CEPAGRI, May 2010

3.3.2 Broiler meat

According to AMA (2011) the total broilers meat in 2010 was 39 789 691 kg, 76.4 percent being sold alive and 23.6 sold frozen. The largest production of broilers meat was in the Center of the country representing 53 percent, followed by south region with 24 percent and finally the northern region with 14 percent. The average monthly production was 3 315 808 kg of broilers meat from birds of 1.4 kg of the body weight and there were 5 percent of mortalities (AMA, 2011).

The poultry meat production is higher during the summer time, from August to December, and lower from January to August, due to the high cost of heating for the chicks (Henriqueta Dama, Personal communication, 12 March, 2013)

3.3.3 Hen table eggs
This information has not yet been sourced.

3.3.4 Other species
This information has not yet been sourced.

3.4 Sector 4: Village or backyard production

3.4.1 Chickens

In Mozambique, village poultry production is an important component of rural development. The majority of chicken are kept in small-scale extensive traditional systems in rural areas; they supply most of the poultry meat and eggs consumed in rural areas. Poultry constitutes almost the only source of animal protein and is an important source of income for the majority of rural families (Mavale, 2001).

The majority of families in rural area keep between 6-15 chickens (Mabunda-Matola-, 2003), all of them are of indigenous strains that are multi-coloured and in some cases crossed with exotic breeds and they have not been genetically evaluated. In general, their productivity expressed in terms of egg production and growth rate is low, but this rate is achieved with few or no inputs from the farmers.

On average, each hen lays three times a year producing about 13 eggs per clutch. Hatchability is estimated to be about 85 percent, but after two months only approximately five chicks will survive. The harvest season from April to July is the time of highest production and the lowest from July to December (Harun and Massango, 2001). In 2001, some interviews with the producers (in three districts in Gaza province) showed that households keep flocks between three to twenty chickens with the average of 9.2 chickens consisting on average of 1.6 cocks, 3.5 hens, 2.2 growers. The number of eggs per clutch was 10-15 and the inter-clutch period was between two and three months. Another study indicates that most of the hens lay and hatch eggs during the rainy season and very few chicks are seen during the dry season. Hens lay 40-50 eggs/year in three to four

different periods and almost all the eggs are destined for incubation. They usually hatch about eight to twelve chickens (GRM International 2001). Fertility and hatchability seems to be satisfactory, but the survivability of the hatched chickens is a serious constraint since each hen raises only two to four chickens to maturity (Mavale, 2001).

Apart of village chickens, farms keep also backyard production of broilers and layers, with an average of about fifty birds per family. The same producers sometimes also rear pigs, ducks, turkeys and guinea fowl.

Housing

The overall standard of husbandry in rural areas is usually poor. Chicken housing varies widely depending on the area. In the Angónia and Tsangano District in the Centre of the country, Harun and Massango (2001) reported that most farmers provide housing for their chickens, varying from a house on the ground to an elevated house. The houses on the ground are made from mud, rocks or baked bricks, with a roof made of straw. They may be located in the backyard of the family house or attached to the verandah of the house. The interior is small, dark and does not provide a healthy environment. However, houses of this type do conserve heat, which is important in the colder season (Harun and Massango, 2001). The elevated house may be made of bamboo, reeds and straw. They are raised about one meter above the ground and a small ladder or simple pole is provided to allow birds access. They are therefore unsuitable for hens with chicks, but easy to clean and provide good protection from predators (except snakes). Sometimes housing is not provided and chickens shelter wherever they can, including in bushes, trees and under grain storage huts. The lack of housing for chickens is an important factor that causes bird losses through predation.

Feeding

Generally poultry scavenge in the vicinity of the house and additionally they may be given broken grains, maize bran or other household waste products as additional feed. Although Harun and Massango (2001) found that farmers usually fed their chicken once or twice a day, the supplementary feed is usually maize waste or leftovers from the family meal that are mainly a source of energy. Consequently the protein and vitamin requirements of the birds must be met by scavenging. In many circumstances they are not given any feed at all but have to walk long distances (up to 4 km per day) to find feed and water. The availability of feed and water is often a constraint to higher production. The feed supply for scavenging rural poultry is relatively stable when the environment is able to provide abundance of worms, insects and post harvest leftovers and water during the rainy season (Mavale, 2001). The farmers reported that the high mortality is due to disease and lack of feed, mainly when harvests are poor.

Disease

The most significant disease constraint to rural poultry production in Mozambique is Newcastle disease (ND). The disease affects village chickens with high pathogenicity, causing high mortality (60-100 %t) (Mavale, 2001). In addition to ND, Fowl Pox is also a concern for farmers. The mortality of chickens is being gradually reduced through ND vaccination campaigns carried out by the government and NGOs (CARE *et al*, 2006). This intervention has contributed to an increase in the number of birds per family. Langa (2001) reported that under a VETAID project using community livestock workers, following the vaccination campaign carried out in seven districts in Gaza Province there was an increase in chicken numbers. For example, in Chibuto District of Gaza Province, the average number of adult hens raised by household increased from 5 to 6 and the roosters increased from 1 to 2 from April to October 2005 (IRPC 2006). The increase in bird numbers following the successful implementation of ND vaccination campaigns provides an opportunity to further improve husbandry activities to ensure that this gain can be maintained. Once farmers are convinced that they will no longer lose their birds due to ND, they become more receptive to new practices that require an investment of their time and a small amount of cash. Where the scavenging feed resource base is limited, farmers can either cull poorer performing birds or provide supplementary feed. Improved low-cost sanitary practices can reduce the incidence of other diseases such as Fowl Pox and infestation with internal and external parasites.

3.4.2 Other species

Some households will keep other poultry such as ducks, geese, pigeons, turkey and guinea fowls.

3.4.3 First case study

Characterization of family poultry production in the administrative post Nalazi of Guijá, district, Gaza province (a survey)

Date of the case study:	11- 19 November 2010
Localization of the zone:	Guijá district
Human population:	63 048 inhabitants
Poultry flock:	520 birds

Description of the locality:

Guijá district is located in Gaza province and covers an area of 3 589 square kilometers, with a density of approximately 18 inhabitants per square kilometers. The total population is 63 048 inhabitants. Guijá is divided into four localities: Chivonguene, Mubanguene, Nalazi and Vila de Caniçado. The Government is represented by the District Directorates of agriculture and fisheries, education, sports, culture, health and social action coordination. The climate of the study area is dry semi-arid. The annual average temperature is 24-26°C. The rainy season runs from October to April and the dry season from May to September. Most of the rural population practice subsistence farming to provide food security and cash income. Keeping of livestock is quite common and the most widely kept livestock is poultry.

Description of the poultry sector in the area:

The data collected at the livestock office in Guijá district show that there are about 520 birds in Nalazi. It was found that 21 percent (8/39) of the chicken producers began their activity from 2003-2007, followed by 18 percent in the years 1997-2002 and 15 percent between 1993 and 1996. 26 percent of those asked did not know when they started the activities.

With a rooster and a hen started 36 percent of these producers their activities followed by others who started just with a hen (26 percent) or with a rooster and two hens (18 percent). The remaining 20.5 percent poultry farmers did not know with how many birds they had started.

The main objectives of keeping chickens are for consumption and sale (59 percent), followed by only consumption (29 percent) and for consumption, sale and use in ceremonies (13 percent). None of the respondents keep birds solely for the purpose of selling.

Poultry husbandry

The birds scavenge for their food and seek shelter in the natural surroundings in trees and bushes under a free-range management system. Some are provided with different forms of housing that vary from staying with the owners in the family houses or kitchens, in small shelters specifically made for them or they are roosting in trees. Indigenous chickens are predominant in the villages despite the introduction of exotic and crossbred types, because farmers are not able to afford the high input requirements of introduced breeds. In most villages, the birds have no regular health control programme, may or may not have shelter, and scavenge for most of their nutritional needs.

Average flock size

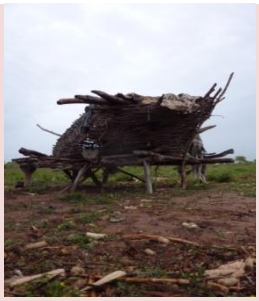
Most of the households keep flocks with a size of 11 to15 birds, followed by those with flocks between 15-20 birds or with 6-10 birds. One of the respondents had only 2 birds, 5 farmers had more than 30 birds and one had 50 birds.

Flock characterization

The flocks are characterized by having between 1-5 cocks (75 percent), 6-10 hens (36 percent) and 6-10 chicks (73 percent). None of the respondents mentioned the chickens by classes of birds.

Housing

It was found that 79 percent of the respondents did not have housing for chickens. Out of 11 (29 percent) respondents who had poultry housing 64 percent were made with local materials, 27 percent of mixed material and 9 percent of conventional material.


Feeding

With regard to supplementary feeding, 23 percent of the respondents provide feed for their chickens. The number of respondents (31 percent) who never give food lies between those who give when they can and those who always provide food. Eight percent buy food for the birds, and the remaining 6 respondents who always give food stated that they do not need to buy some because there is always food available. 67 percent buy the feed in exchange of goods (eg. salt for Bran) and 33 percent purchase bran using money.

The frequency of feeding is variable. The majority of the farms (56 percent) feed their poultry once per day, 29 percent twice a day and 19 percent three times a day.

In generally there are no feeders, only 35 percent of the respondents had feeders. Concerning the availability of feed, the respondents say that during the dry season there is a lack of feed. During the scarcity period, 9 percent of the household feeds with corn and bran and 91 percent do not feed the birds. It was found that 51 percent did not have drinkers and they did not give water to the birds. When they give water they do it once a day (32 percent), twice a day (21 percent) and some farmers (47 percent) reported that they give water when the water container is empty. The drinkers and feeders are made of scrap materials like tires and bottles cut in half.

Heath management

In general, the households who had feeder and drinkers are used to clean all the equipment. 67 percent of the respondents clean the equipment daily, 17 percent clean it twice a day and 17 percent do it once a week. 57 percent do not clean the feeders and drinkers. Only 36 percent of the respondents clean the poultry house when it is is very dirty. 75 percent reported that they buried the droppings and the others scattered in the field.

Only 5 percent of the respondents said they had paid for their own veterinary assistance, and 95 percent do not had assistance. The reasons given by 51 percent of the houseoulds were the lack of funds and 21 percent do not know how to have access to veterinary care.

16 percent of the households know plants to treat chickens and 11 percent are not aware about the fact that there is veterinary assistance for chickens. Prophylaxis is done by 13 percent of the respondents, of these, 20 percent buy ND vaccine, other are using medicinal herbs.

The respondents were also asked about chicken mortality. The majority (69 percent) reported that high mortallity occures during the dry season, 21 percent at any time of year and 10 percent stated the rainy season. The signs of the disease mentioned by respondents are shown in Table 6 :

TABLE 6
Disease symptoms reported

Signs	**No (%) of respondents**
Apathy, they don't eat, shiver	23 (52%)
Fleas, lice	2 (5%)
Sudden Death	4 (9%)
Sleepiness, swelling eyes	3 (7%)
Bristly feather, nasal discharge	7 (16%)
Diarrhoea	3 (7%)
Blindness	2 (5%)

28 percent of the respondents take measures against the disese symptoms, 55 percent use medicinal plants, 9 percent mix soap in water and 36 percent use amitraz for fighting fleas and lice. 95 percent knew the Newcastle disease.

Conclusions

The production system found in Nalazi is the typical family system of small scale extensive poultry production in Mozambique, where animals walk freely. The system has few inputs and outputs. The purpose of keeping chicken is the consumption and sale for subsistence of their families. The average number of birds in the flock varies from 11 to 15 animals. The rearing of chickens is often combined with other animal species. Birds sleep in trees, increasing their vulnerability to disease and predation. The feed consists of agricultural waste, such as bran in times of plenty and the scratch/graze. Little or no veterinary assistance is provided to birds.

Farmers reported seasonality losses due to predations and other causes. According to them, during the hungry season (wet season, from October to February) there is a lack of feed, and chickens tend to go far from the houses for scavenging of feed, making them more vulnerable to predators than in the dry season.

The main constraint regarding poultry production is the occurrence of Newcastle disease. However, more studies are needed in order to identify the occurrence of other diseases. Despite the fact that the farmers know the disease, they do not take steps to minimize itys impact; only few of them use plants. The efficacy of these plants is not proven. Other limiting factors are the losses by predation, lack of feed and inadequate access to medicines and veterinary services.

In generally farmers want to increase their flocks in order to eat and sale more chickens.

3.4.4 Second case study

Characterization of Mozambique Irvine's Hatchery program

Date of the case study: 11 July 2011

Localization of the zone: Rua de Manjacaze, 1560, Bairro da Liberdade, Matola Municipality
Human population in Liberdade neighbourhoods (n°) 43.295 inhabitants

Day old chicks (n°): 120000 birds/ week

Description of the locality:

The Matola Municipality is located in the southern part of Mozambique, within the province of Maputo. It occupies an area of 368.4 km^2 and lies approximately between parallels 25° 41' 36"and 25° 50' 36" South latitude and between the Meridian 32° 24' 02"and 32° 35' 12" East longitude.

The city of Matola is divided into three Administrative Posts, including the administrative post of Matola Headquarters; Administrative post of Machava; Administrative post of Infulene;

Part of Matola Headquarters are the following neighbourhoods: Matola, Matola, Matola C, Matola, Matola D F G, Matola, Matola, Matola J, Fomento, Liberdade, Mussumbuluco, Malhanpsene and Sikwama; The Matola Municipality has the largest industrial park of the country.

IRVINE'S is located in the Liberdade neighbourhood.

Irvine's History in Mozambique

Irvine's Mozambique is part of Cobb Africa the key supplier of Cobb broiler breeders and hatching eggs for the Sub Saharan Africa region. Cobb is the world's oldest poultry breeding company, beginning in 1916 in Massachusetts, USA. With the growth of the Cobb brand as well as the market area in Africa it was decided to form a new company to handle Cobb sales, marketing and technical support. Cobb Africa was formed in 2009 in order to supply the Sub Saharan African market (excluding South Africa).

The Irvine's company in the South of the country had its beginning in 2006. At the beginning of the activity they rented for two years the incubators of the oldest Mozambican poultry company UGC (União Geral das Cooperativas), working to launch the Cobb brand. The Cobb broiler hatching eggs were supplied from contract growers in South Africa.

In October 2008 the Irvine's had their own facilities to incubate eggs and also the Parent Stock for the production of hatching eggs. Today it has an installed capacity for the production of 200 000 chicks per week. The objective for 2012 is to reach a capacity of 500 000 chicks per week. The current production of chicks is 120000 per week. Another great challenge of Irvine's is to expand its activities so that they can work throughout the whole poultry production chain to sell 100 tons of frozen broiler chickens.

Description of the out-growers model:

Currently Irvine's is working with two groups to promote the broiler production. The first group is composed of 21 poultry farmers who are connected to the credit line created by the Mozambican Agricultural Development fund (FDA) to re-establish the chicken production chain in the capital city. In generally the farmers produce between 4000 and 18500 broilers per cycle, and are able to produce 6-7 cycles per year. The farmers received chicks, feed and vaccines through credit and they sell the product after 35 days to the abattoir linked to the program.

The second group consists of 100 small farmers (former TechnoServe group) who produce 700 broilers chickens per year. The farmers are receiving chicks, feed and vaccine and sell the product onto the live market. The assisted small-scale broiler producers were trained in bio-security, disease prevention and best practices. The out-growers model integrates three companies. The Irvine's is responsible for the supply of chicks, Companhia Industrial da Matola for feed and Lactopaiva for the slaughterhouse. The three companies monitor the farmers as follows:

a) IRVINE does the monitoring of the birds from 0 to 14 days

b) Companhia Industrial da Matola does the monitoring of the birds from 14-25 days

c) Lactopaiva does the monitoring of the birds from 25-35 days

In general, the outgrowers program is going well, farmers are happy and willing to increase the number of chickens per cycle.

3.5 Poultry marketing chain analysis

Poultry marketing channels vary according to producer. The Figure 10 below represents the roles of the various stakeholders in the production and sale of broilers and eggs.

3.5.1 Day-old chicks

The day-old chicks are purchased in two ways. Either from hatcheries, breeder farmers with hatcheries, large poultry companies and/or breeding inside the country or by importing them from neighbouring countries.

In 2010, the total production of day-old broiler chicks in Mozambique was 30 737 462, with 19674569 (64%) produced in the South, 7 662 684 (25%) in the Centre and 3 400 209 in the North (AMA, 2011).

3.5.2 Chicken meat

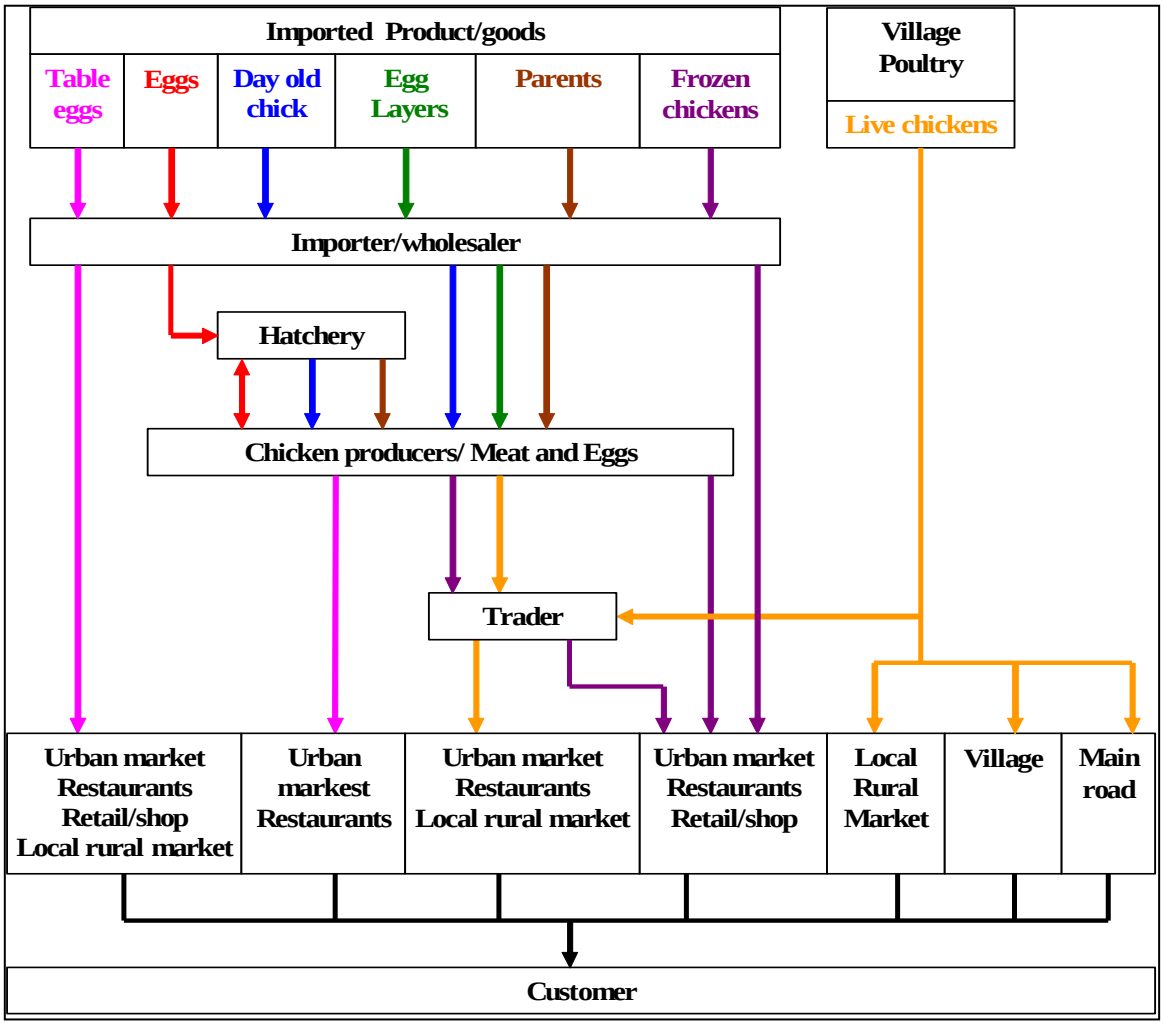
Marketing of commercial poultry

In general, broilers are sold alive or processed and reach the consumer through different ways. Live broilers are sold by their own producer at the poultry house itself either to consumers or to resellers. In Mozambique there is a strong group of women traders called "Mukero/Mukeristas", who buy large quantities of broilers for selling at urban markets, to restaurants or kiosks, commonly called "barracas". At the vegetable markets, these women are owners of mixed purpose open market tables or sell the birds to other stall-owners. The "Mukeristas" sometimes visit several poultry farms in search of the best price for quality and some of them have pre-established agreements with farmers. In some cases the farmers have contracts for supplying their products to the markets.

Some farmers have slaughter houses and cold storage facilities at their farms and therefore they supply the broilers already processed and frozen to the markets and restaurants. Other farmers use the services of the slaughterhouses to process their products and sell them afterwards.

Another group sells their products directly to slaughterhouses and which are then subsequently sold in different markets

FIGURE 10: **Poultry marketing chain**



Source: Anjos, 2007

The Cooperatives Union (UGC) sells 50 000 broilers to the market every week. About 40 percent is processed and frozen and the remaining 60 percent is sold alive in different markets in Maputo. They are also sold to traders of the Gaza and Inhambane provinces. The "Mukeristas" purchase the products at the UGC sales posts in Maputo. In order to run this activity, UGC has trucks to deliver the products to Maputo markets.

For the small scale production system, the marketing chain involves the sale of live chickens in the market either by the owner or a trader. The selling price to the consumer varies according to the area. In the province of Sofala, usually the trader buys 100-200 chickens for 2.2 USD each and sells them at the market for 2.4 or 2.6 USD. In Maputo, the chickens are sold at the market for a price of 3.5 USD per chicken. Sometimes these birds are sold after slaughter.

Marketing of village chickens

The selling of village chickens is a long-established practice. In Mozambique, there is no formal marketing of scavenging chickens or eggs. Chickens are mainly sold live and the eggs are preserved for reproduction. The main marketing channels for village chickens are from farmer to farmer or to consumer, another one is from a farmer to a trader and then to consumers. Some farmers sell directly to restaurants, while others sell to traders who take the chickens either to a secondary market or to the urban market. These channels fall into two types:

Chickens sold within villages

Rural chicken producers sell chickens from farmer-to-farmer or to travelling traders. Sometimes fellow farmers who need a hen or a cock for breeding may request one from a neighbour. Some farmers give birds to children to take them to the roadside for selling, in areas where highways are located. Informal traders move to the rural areas to buy chickens or to barter them for second hand clothes (Bagnol, 2001; Mussa, personal communication).

Chickens bought in the rural areas and sold in the urban centers by traders

Within villages there is usually a small market where several households go to sell their chickens and also to buy various household items with the income from the sale of their birds. For instance, in Beira City market, chicken traders sell birds that were bought from Gorongosa and Maringue Districts. The purchase prices vary from USD 1.60 to 2.00 and they are re-sold at the urban market at a price of USD 3.00 or 3.40. In general, these resellers buy about 100-150 chickens. These birds belong to the households that join together to sell their own birds for cash or to barter for basic household items. It is worth noting that the trader may travel for about 200 km and stay at the place of the purchase for about one week.

The traders may also go from household to household to buy chickens. When the trader has purchased a sufficient number of chickens (usually around 30-50 birds), he/she leaves the village and returns to the city to sell them in live poultry markets. In the districts of Mabalane and Massingir traders arrive by train or by road to buy chickens, sometimes they also travel to quite isolated areas (140 km from the main city). This activity occurs approximately once a week. The price paid for chickens depends on the size of the chickens. Birds purchased for USD 1.00 were resold for USD 1.40 in the major cities. Often traders prefer to exchange goods for chickens in remote areas (i.e. two three-liter aluminum pans for 3 chickens) (Langa, 2001). The price of chickens in Maputo increased from 4.80 USD in 2011 to 8.3 USD in early 2013.

The period of major poultry sales varies also according to the zone. In Guro District (Manica province), for instance, most of the chickens (61%) were sold during the months of March, April and May. In Beira, major sales occur in June and July, because it is the period in which many traditional ceremonies are conducted.

Both men and women are involved in the marketing of free-range chickens, with some differences from zone to zone. In the centre of the country, trading is mainly done by men; while in the south women are involved in farm gate sales and in larger markets in town.

According to a study by Gondwe *et al.* (2005) for Malawi, middlemen at Mitundu brought their chickens from farmers and trading centers in surrounding villages and from Mozambique. One can therefore conclude that trading of village poultry also involves neighbouring countries.

3.5.3 Table eggs

As mentioned before, egg production is not significant. In Maputo, the largest egg producer has a daily output of 70 000 eggs for consumption. Some of these eggs are sold in different Maputo markets and others are taken to the provinces of Gaza and Inhambane. The eggs are sold either fresh, at markets and shops, or cooked, on the streets.

3.5.4 Other species

This information has not yet been sourced.

Chapter 4

Trade, marketing and markets

4.1 Domestic market

This information has not yet been sourced.

4.2 Import

There is "great potential" for the trade of imported products, such as eggs for consumption and for hatching, breeders, layers, day old chicks (for broilers and layers) and frozen chicken. However, there are risks attached to these trade channels, for example in 2005 large quantities of frozen broilers were sold in Mozambique, provoking a crisis among private producers due to the strong competition caused by the low price of the Brazilian product. Unfortunately good information and data about this topic are either not available or not consistent. Table 7 shows some of the products imported into Mozambique during the years 2004-2009.

TABLE 7:
Importation of poultry meat and eggs into Mozambique (2004-2009)

Item	2004	2005	2006	2007	2008	2009
			Meat (tonne)			
Chicken meat	3 090	9 908	9 324	10 077	9 075	7 992
Turkey meat	16	276	316	789	882	924
			Eggs (dozen)			
Table eggs	2 304 528	9 779 025	17 556 701	10 109 763	9 897 574	9 949 162
Fertile eggs	141 210	479 566	2 595 081	3 003 710	7 299 993	23 510 154

Source: DNSV, 2009

4.3 Export

This information has not yet been sourced.

4.4 Slaughtering facilities

There are 12 slaughter houses in Mozambique; six of them are located in Maputo, four in Manica, and two in Nampula (DNSV, 2009).

TABLE 8:
Poultry slaughterhouses by province

Provinces	Numbers	Installed capacity	Produced (2009)
Maputo	6	33 820 800	3 599 103
Manica	4	11 012 400	3 112 000
Nampula	2	10 608 000	729 926
Tete	1	1 144 000	144 300
Total	12	56 585 200	7 585 329

Source: CEPAGRI, 2010

4.5 Poultry feeds

The feed industry is located in the provinces of Maputo, Manica, Tete and Nampula. In Maputo there are three large factories, HIGEST, CIM (Companhia Industrial da Matola) and UGC. UGC has got two plants, one with a capacity of six tons per hour and another able to produce ten tons per hour. The system is automatic and is able to present the final product either in the form of pellets or powder. Monthly these units produce 769.8 tons of different types of feedstuffs.

In the province of Manica, the farmer Abilio Antunes produces 780 tonnes per month in his factory. In Nampula the three existing factories produce 3006 tonnes monthly.

In 2006 the total compound feed production of several types was 114 804 tonnes, of which 53.4 percent were poultry feed. From the total amount, 89.7 percent were produced in Maputo and 7.1 percent in Manica province (DNSV, 2006). The Table 9 shows the production of the different types of feed in 2006.

TABLE 9:
Production of compound feed 2006 (tonnes)

	Maputo	Manica	Tete	Nampula	Total
Poultry	49 614	8 104	16	3 602	61 336
Swine	3 817	0	0	0	3 817
Other ration	49 557	0	0	94	49 651
Total	102 988	8 104	16	3 696	114 804
Ration for poultry	48.2%	100%	100%	97.5%	53.4%
Ration for Swine	3.7%	0%	0%	0%	3.3%
Others	48.2%	0%	0%	2.5%	43.2%

Source: DNSV, 2006

The production during the following years showed a large fluctuation. In 2007 production of different feeds increased by 166 percent to 305 874 tonnes with chicken feed representing 92.2 percent of the total feed produced in that year (NDVS, 2007). In 2009 there was capacity to produce 619 494 tonnes of feed however, only 81 834 tonnes (13.20 percent) were actually produced (see Table 10) due to shortage of ingredients most of which are being imported (Table 11). The total production of compound feed in 2011 was 74 987 tonnes with a share of poultry feed of 90.7 percent

TABLE 10:
Compound feed factories, their capacity and production in 2009

Province	Factories	Installed capacity (tonnes)	Production (tonnes)
Maputo	5	514 320	62 031
Manica	1	63 630	9 920
Nampula	2	41 544	9 883
Total	8	619 494	81 834

Source: CEPAGRI, 2010

The largest producer of chickens is located within the areas of lower production of corn and soybeans. The Figure 11 shows where chickens and soybeans are produced.

TABLE 11
Imported feed and feed ingredients (tonnes)

Items	2004	2005	2006	2007	2008	2009	Change 2008/09
Concentrates	12 292	1 976	5 120	2 294	8 211	9 400	14.5%
Different Feed	122	1 780	3 410	4 515	7 741	15 147	95.7%
Soy meal	660	1 814	4 190	2 008	1 934	7 543	290.0%
Sunflower cake	192	836	2 360	9 806	0	0	.
Fish meal	1 777	1 264	3 207	1 948	21	0	-100.0%
Meat meal	26	270	30	0	0	0	.
Dicalcium Phosphate	18	0	0	149	911	845	-7.2%
Molasses	0	0	0	109	0	0	

Source: DNSV, 2009

FIGURE 11: Locations of poultry producers and Major Soybean Production

Source: Whiting, 2010- TechnoServe

Quality control is essential at all stages of the production of compound feed if the maximum and the most efficient returns are to be obtained by the feed compounder and livestock producer. In Mozambique, the control of feed quality is regulated by government legislation. Routine analysis is carried out in the veterinary laboratory, but this is not done regularly because of the shortage of reagents.

Chapter 5

Breeds

5.1 Exotic breeds

The common commercial breeds for broilers are: Ross, Arbor Acres, Hubbard and Cobb.

The farmers who produce table eggs use breeds like Lohman Brown, Isa Brown, Brown Nick, Hy-Line Brown and Hy-Line White

There are parent stocks for the breeds of Cobb, Ross and Arbor Acres.

5.2 Local breeds

In Mozambique there is very little information available about local chicken breeds. Matilde-Mabunda (2003) described three different phenotypes such as those with normal feathers, naked-neck chickens and those with frizzled feathers. In Southern Mozambique these are called Huku, Nhancolwane, and Xithalo, respectively. Apart from these another type has been differentiated which is called Xigondzo with com shape/crested- head (Personal communication Ana dos Santos, 16/1/2013). The Xithalo is mainly used for traditional medicine and sometimes salesmen use hair spray to give chicken the appearance of Xithalo for selling more chickens for that purpose.

Chapter 6

Veterinary health, public health, biosecurity measures

Diseases constitute one of the major constraints to the development of livestock production, limiting the increase of livestock numbers and in some cases the trade. Lack of knowledge of the epidemiological situation, the weak impact of control measures, prophylaxis and treatment are the main reasons for huge economic losses through death or disease in the small scale farmer's producers and in the commercial sector.

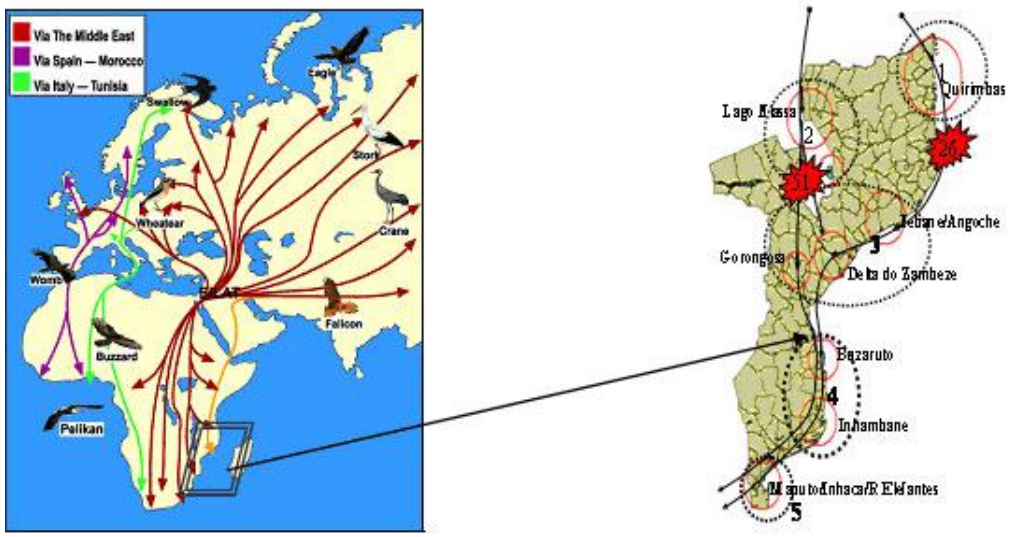
6.1 Highly Pathogenic Avian Influenza (HPAI)

Risk areas for avian influenza transmission in Mozambique

Mozambique is like other African countries at risk of the introduction and spread of HPAI. In Mozambique, poultry are kept everywhere and biosecurity standards vary from reasonable to low. The most common production system is family poultry, which consists of the extensive (or scavenging) system where all birds move freely within the village, mixing with other animals or the small scale intensive poultry production where the birds are fenced in and fed. Most birds are sold alive throughout the country, on markets or by traders, which constitutes a risk of spreading disease (Lennström, 2009)

Major weaknesses to identify and control HPAI include: Weak diagnostic capabilities at the national and sub-national level for detecting and confirming the disease in both animals and humans; difficulties in providing compensation for the compulsory culling of poultry (which may discourage individuals and communities from reporting suspected cases); a weak rural veterinary network; and other risky behaviours due to poverty and lack of awareness.

FIGURE 12: Migratory routes of birds related to Mozambique



Source: Ministry of Health and Ministry of Agriculture, 2006

Major risk factors that were identified for avian influenza transmission include:

- Mozambique is part of the major migratory routes of birds from Europe and Asia (DNSV, 2006). Seventy seven species of migratory birds regularly visit the country and some of them appear in large numbers leaving large amounts of faeces. Five areas of high susceptibility for Avian Influenza outbreaks have been identified based on high poultry density, high pig density, high human density, high poultry/human ratio and wetlands. The areas of greatest risk identified on the basis of these factors are:
    1. Southern Cabo Delgado Province and northern Nampula Province in the coast,
    2. Zambeze River delta;
    3. Lake Urema region in Sofala Province;
    4. Intermediate areas of coastal Inhambane Province;
    5. Gaza and Maputo provinces.
- Presence of ponds and stagnated waters used by both ducks and wild birds that could be reservoirs of the H5N1 virus;
- Areas with high density of humans and poultry: Commercial poultry production is concentrated in urban and peri-urban areas where a high human population density exists. The country is very large with several districts with places where domestic birds are assembled, traded and distributed to different locations. The live marketing system allows areas where domestic birds coming from different places mix before they are taken to different areas of the country;
- Eggs and day old chicks purchased from different countries with unknown poultry health status;
- High bird mortality which is associated with home consumption or sale of sick or infected birds;
- Inadequate disposal of poultry carcasses and material from incubators;
- High bio-security measures can easily be adhered to in commercial poultry farms; however they are still far from what is desirable; and
- The major structure of poultry production in Mozambique consists predominantly of family poultry production, which includes scavenging free-range poultry with little or no bio-security and small-scale intensive poultry production with frequent introduction of new birds from a relatively unknown and unverifiable source. This means that the impact of HPAI is unpredictable. People shared their living spaces with poultry due to the lack of poultry house and low level of awareness.

The risk factors for the different production sectors can be summarized as follows:

- **Commercial production**

A report, dated 2007, evaluating the biosecurity measures on commercial poultry farms stated that over 90 percent of them did not respect the sanitary measures recommended in order to avoid the entry and propagation of diseases (Fabret, 2007). The same report indicated that 81 percent of the farms do not have foot-baths, or when they exist, that the disinfectant is not applied. Another concern is related to hatcheries, which do not have sanitary waste containers or places for burial or incineration. None of the hatcheries visited during the study were performing biologic control over the rooms before and after incubation and hatching. There were also no rooms for washing and disinfection of materials and no control over movement of persons. In case of disease or mortality, about 78 percent of the producers did not send samples to the laboratory for diagnosis of the death causes. In the markets where live birds are sold, there were no hygienic conditions and there is a shortage of running water. Moreover, the birds were sold on tables where other products are sold. Sometimes sick birds were sold, and birds of different species and ages acquired in several farms are put together. The marketing system therefore constitutes a great risk for the propagation of Avian Influenza. The Mukeristas go from one poultry farm to another to buy broilers without taking necessary bio-security measures.

According to Lennström (2009) the prevalence of Avian Influenza in the areas around Maputo was just around 3.5 percent, and in Zambezia in the north of Mozambique, the preliminary results pointed at a prevalence of about 10-12 percent.

- **Small-scale intensive poultry production**

There are the following risk factors in this sector:

- Purchase of eggs and day old chicks from different countries where the poultry health status is not fully known;
- Purchase of raw materials for commercial feed from different countries;
- Low or moderate biosecurity;

- Slaughter of poultry without reliable health inspection (before and after slaughter) or biosecurity;
- Inadequate disposal of poultry carcasses and material from incubators (i.e. sometimes disposed of via the municipal garbage bins);
- Lack of information about the location of small-scale poultry farms, slaughterhouses and hatcheries; and
- High bird mortality which may lead to home consumption or sale of sick or infected birds.

- **Scavenging free-range poultry**
  There are the following risk factors in this sector:
- Rearing of poultry of different species and different ages together in the same area;
- Housing is not always provided, and when it does exist it is small and does not always provide a healthy environment;
- Free-range scavenging chickens are prone to different diseases, including parasitic infections;
- Uncontrolled livestock (mostly pigs and goats) and poultry movement within the country as a consequence of a lack of enforcement of animal disease control law and regulation; and
- High bird mortality which may lead to home consumption or sale of sick or infected birds

Mozambique Preparedness and response plan for Avian Influenza

In response to the occurrence of Avian Influenza which affected several countries, including some African countries the Mozambican Government prepared a contingency plan for the prevention and control of HPAI. This National Strategic Plan for the Prevention Control and Eradication of Highly Pathogenic Avian Influenza (H5N1) includes a number of key actions to be carried out by different sectors having key roles in the prevention of infection and propagation of the virus, monitoring of virus evolution and prophylaxis (Ministerio da Saúde e Ministério de Agricultura, 2006). Furthermore, the main objective was to reduce morbidity and mortality in case of a pandemic emergency and minimize the socio-economic disruption in Mozambique. The contingency planning includes a number of key actions to be carried out by different sectors having key roles in the preventive measures against infections and propagation of the virus, monitoring of virus evolution and medication. The framework of the plan is organized along strategic areas clearly defining the key objectives and action of each of them such as:

- Provide a national guideline for any action;
- Identify national priorities and define immediate actions;
- Facilitate the multi-sectorial coordination of the activities in order to make a good use of the scarce financial resources; and
- Create the capacity for prevention and eradication of the disease in poultry.

The pillars of this strategy were:

- Prevention and preparedness;
- Early warning and early reaction (Surveillance and Diagnosis);
- Containment and eradication;
- Build capacity to cope with the pandemics; and
- Operational research.

Proposed actions to mitigate the impact of the disease include:

- Establish a national task force;
- Increase the support from the provincial authorities to the provincial veterinary services, through regular meetings of the task force;
- Establish strategies for compensating farmers for the loss of birds caused by the disease and by compulsory culling;
- Acquire protective equipment and reacting agents for laboratory testing;
- Regular participation of national experts at regional and international forums related with avian influenza;
- Strengthen the surveillance system and laboratory diagnostic techniques;
- Promote a community based surveillance program (build the capacity of health and veterinary personnel and train extension agents);
- Maintain a pro-active attitude in the detection and communication of suspected cases; and

- Establish specialized teams at the provincial level; conduct public/community awareness campaigns about the Avian Influenza.

Donors contributed towards increasing the capacity of the laboratories to deal with the diagnosis of HPAI; and both the Central Veterinary Laboratory (CVL) and the Provincial Veterinary Laboratories (PVL) have benefitted from such support. For instance, FAO provided support for the establishment of some laboratory tests (haemaglutination inhibition test, CelAgrid), for the purchasing of reagents and staff training outside the country (Kenya, South Africa, Malawi and the USA). USAID financed the rehabilitation of the virology laboratory of the CVL for the performance of the ELISA test, for purchasing of laboratory consumables and protective equipment. The World Bank also provided funds for building technical capabilities. A short training session took place in the USA, as well as short training courses within the country, for veterinarians, doctors and laboratory technicians. Technicians in the provincial laboratories were also trained in the collection of samples to improve the diagnostic conditions at the CVL. Those funds also covered the purchase of laboratory equipment and consumables and some of them were distributed to provincial veterinary laboratories. Technicians from all provinces were trained in the epidemiology of Avian Influenza in order to contribute to the dissemination of information on the disease throughout each province. To strengthen the technical capacity of the Veterinary Services, two experts were recruited; one biologist and one expert in poultry biosecurity.

It is worth mentioning that the national veterinary authorities are pursuing the necessary measures in order to control highly pathogenic avian influenza by *improving animal health and bio-security* according to Kofi Annan (2006) recommendations. This involves designing programs that address the technical, socio-economic, institutional and policy aspects of controlling HPAI; ensuring the provision of national and regional level laboratory diagnostic and epidemiological surveillance through regional networks; and strengthening National Veterinary Services to bring animal health and bio-security up to international regulations and OIE standards.

Coordination and communication are key to the success of these programs and cooperation between government and private sector is required. Concerning to communication, donors made funds available for the preparation of the Preparedness and response plan for Avian Influenza

Following the occurrence of Bird Flu (H5N2) in ostriches in South Africa in 2004, the Department of Animal Health of the Veterinary Services (DINAP) stressed the need for all poultry producers to be increasingly vigilant in relation to avian diseases (A Galinha, 2004). However, the knowledge of both producers and consumers about the recent disease events is limited, despite the radio messages on HPAI transmitted by the Institute for Social Communication through a community radio system. A common understanding of the problem and effective education and communication components are important elements of the control strategy (Alders and Bagnol, 2007). In order to support the national strategy for Avian Influenza, UNICEF contributed with USD 214 000, especially through communication campaigns to inform the public on prevention and detection practices (UNICEF, 2007).

Potential impacts of HPAI

No nation is immune to Avian Influenza and a human pandemic could threaten our world (Kofi Annan, 2006). The occurrence of Avian Influenza in Africa is of major concern, placing in immediate risk the livelihood of millions of people relying on family poultry for income generation and source of protein (Baba, 2006).

Two thirds of Mozambicans live in absolute poverty, surviving on less than 0.25 USD per day. Like other sub-Saharan African countries, Mozambique has been seriously affected by AIDS, which makes the population more vulnerable to food insecurity. Most of the rural population practice subsistence farming to provide food security and cash income. Keeping livestock is common and the most widely kept species is poultry (raised by over 72 percent of rural households, including the poorest). The poorest families tend to keep poultry for sale whereas less poor families also raise poultry for home consumption (Bagnol 2001). In general, families sell their live chickens for money or in exchange for food and clothing. In this regard, rural chickens are important because they are the most commonly owned livestock of the poorest members of society and are a common source of income and food for marginalized groups including widows, HIV/AIDS orphans and HIV/AIDS-affected households.

In Mozambique where 80 percent of the population lives in the rural areas and the consumption of poultry meat is common in peri-urban and urban areas, an outbreak of HPAI would without doubt provoke negative socio-economic impacts. The resultant loss of birds, loss of disposable income and reduced food security in rural communities could be described as a national disaster for the rural poor whose livelihoods depend on these birds. Although no cases of HPAI have been observed in Mozambique, economic losses due to the death and culling of domestic poultry, market closures and trade restrictions have been studied.

6.2 Other major poultry diseases

The Directorate of Animal Sciences (DCA) has a Central Veterinary Laboratory (CVL) and three regional veterinary laboratories (RVL). The CVL carries out the diagnosis of animal diseases, the production of some vaccines for animal use and the quality control of feedstuff and food of animal origin for human consumption.

In 2006 a total of 40 outbreaks of Newcastle disease were diagnosed in Mozambique, 21 of which were from Maputo province, one from Gaza, 17 from Sofala and a single case in a pigeon was diagnosed in Manica province. Besides the outbreaks of Newcastle disease, there are other common diseases that affect poultry, mainly Fowl Cholera and parasites.

For regularly updated information on the status of notifiable and other transboundary poultry diseases, please refer to:

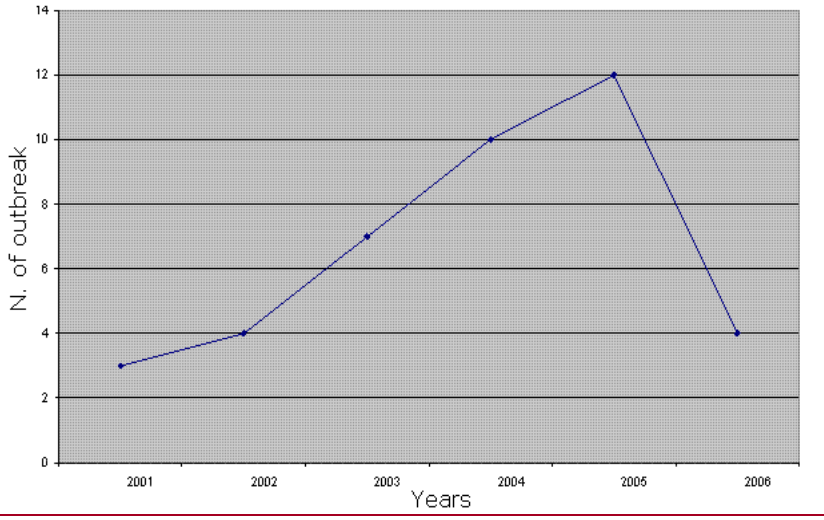
The FAO Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases available at www.fao.org/ag/againfo/programmes/en/empres/home.asp

The OIE World Animal Health Information Database (WAHID) available at www.oie.int

In terms of bacterial diseases colibacillosis was the most frequent diagnosis from the bird samples in 2006 and other isolations made include Salmonellosis, Mycoplasmosis and Pasteurellosis. Besides the isolation of disease agents, serological examinations were made in commercial poultry farms in Maputo town and its surroundings, where cases of Mycoplasma sp have been found.

Figure 13 shows the evolution of Newcastle Disease outbreaks during the period 2001-2006. From 2005 onwards the number of outbreaks decreases and although vaccination coverage is weak, the figures show that some degree of ND control has been achieved.

FIGURE 13: Occurrence of Newcastle disease 2001-2006



Source : DNSV, 2006

Chapter 7

Current policies, legal framework

The government of Mozambique faces the challenge to design poverty reduction and rural development strategies that deliver three-dimensional growth: *rapid* growth to reduce poverty incidence quickly, *sustainable* growth to ensure that people permanently escape poverty, and *broad-based* growth to ensure that as many families as possible benefit from it (Boughton*, et al.,* 2006).

The state veterinary services, embodied by the National Directorate of Veterinary Services (DNSV) is the Veterinary Authority, responsible for disease surveillance and control. This responsibility is established by law (Regulamento de Sanidade Animal , Decreto nº26/2009 de 17 de Agosto).

The responsibilities of this directorate are related to the quality of animal products, and also the preparation, definition, evaluation and coordination of norms inherent to the programs of surveillance, control and eradication of infectious and parasitic diseases. However, the compliance with the norms is still far from the desired level.

Despite the fact that the movement of animals and their products is regulated, animal movements from one region to another occur without permission from the veterinary authorities. As far as the control of poultry diseases is concerned, the regulations (Section 25) describe the actions to be taken in the case of suspected diseases. However, the same regulation has several limitations. For example, Section 19, which refers to animal movements, indicates in point 2 that live birds and their carcasses do not require authorization for movement if the total number is less than twenty. This fact may contribute to disease dissemination. However, if a disease outbreak is declared by the veterinary authorities, they may prohibit the movement of the affected animal species.

Section 3 of the legislation describes the requirements for imports, but the Veterinary Authority is not present in all border regions, thereby increasing the probability of the entry of forbidden products. The compulsory inspection of animals and their products, by-products and biological at the entry points of the national territory is not carried out systematically. The lack of proper inspection services is aggravated by the shortage of well prepared and motivated staff to deal with all matters concerning regulations and their compliance.

Chapter 8
Analysis

8.1 Current Strengths and Weaknesses of the Poultry Sector

Strengths

According to Livestock Strategy Plan (2005.), poultry will constitute the second pillar of the development of the commercial livestock. Priorities to expansion of broilers chickens in Mozambique are:

- Completion of feasibility studies of local production of raw materials for the feedstuff, such as soy bean , fishmeal;
- Intensification of quality control measures of products including feed, day old chicks and frozen chickens;
- Promotion of production agreements with contracts of production by the family sector;
- Promotion of poultry farmers association, and increased dialogue with institutions and public sector; and
- Information technique and training of producers

The production of eggs in large units is not possible, because of the complexity of the solutions needed for production of breeding, layers and the competitive prices of imported products. On the other hand encouraging the development of this activity should be based on the following strategy:

- Medium and small scale egg production based on specialized birds and or dual purpose birds with high performance;
- Promotion of models based on partnerships between private producers and family sector; and
- Research on alternative feed and genetic lines that give sustainability to production models.

Weaknesses

- The high cost of poultry feed, medicines and nutritional supplements. Feed is made from imported pre-mixes as no alternative cheap source of protein is available.
- Control of Newcastle disease is being addressed but remains a risk.
- Local supply does not meet seasonal demand hence the government is forced to permit imports. However some importers manipulate the period of imports as well as quantities imported. Dumping is evident.
- Hatcheries exist but there not sufficient fertile eggs. Investment in reproductive units is required i.e. layers, hatcheries/incubators.

8.2 Prospects of the poultry sector over the next five years

Currently, the government works with AMA to continue to improve the environment for the poultry industry. For instance, a credit line of approximately USD 620 000 with low interest rates was created through a partnership with a major bank to benefit poultry producers in the South of the country. The pilot has been quite successful and this credit program will be expanded to the producers in the rest of the country (Cipriano, 2011).

Furthermore AMA introduced the strategic plan for 2011-2015 where they stressed that the prevision of consumption chicken meat will increase 25.8 percent per year compared to the increase of 12 percent from 2007-2009.

Annex I

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Ricardo Souto:	Veterinarian in Mozambique farms
Salvador Safo:	Poultry farmer in Maputo

Annex II

List of major projects – poultry sector

The Ministry of Agriculture, through its Directorate of Veterinary Services, sets out the development of the livestock sector in its strategy and policy. It aims to contribute to food security by making rational and sustainable use of the available resources. By the end of the 1990s, the Government had started to focus more on the production of and disease control in small species, in particular smallholder chickens.

Newcastle Disease (ND) is endemic in Mozambique, occurring every year in the rural poultry sector. In order to reduce the impact of this disease, the National Veterinary Research Institute (INIVE) initiated the production of an attenuated and thermo-stable live vaccine in 1995 (Dias *et al*., 2001). Since then, the Government and NGOs have performed vaccination campaigns in the rural areas. Besides the control of ND, improvements in feeding and housing are being promoted by the government through extension services and by donor agencies.

USAID is financing a 2 year programme (2006-2008) which aims to achieve the sustained income growth of small-scale farmers and commercial poultry producers in the Nacala-Nampula and Beira corridors.

Non Governmental Organizations (NGOs) such as VETAID also contribute to the development of broiler production and eggs amongst the most vulnerable populations, in particular women and persons infected with HIV.

Cross-border disease surveillance - View Project

In June 2010, the International Rural Poultry Centre of the KYEEMA Foundation signed an agreement with FAO to collaborate in a multi-disciplinary approach to common border HPAI surveillance sampling. During the two month mission IRPC/KYEEMA Foundation will implement a sociological investigation of the behaviour of people engaged in poultry production, trade and processing in selected border areas in Malawi, Mozambique, Zambia and Zimbabwe.

IRPC working with INFPD to support Smallholder Poultry Development - View Project

The Smallholder Poultry Development program aims to build local capacity to develop, lead and implement innovative solutions for the improvement of livelihoods through poultry production and marketing related to small-scale poultry production. IRPC personnel are contributing to the training of promising poultry scientists working in the field of poultry development in developing countries, the development of decision-making tools and are members of the Program Steering Committee comprising representatives from IFAD, INFPD, FAO, and IRPC. The program runs until October 2012.

Strengthening Livelihood options for vulnerable rural households in Gaza Province, Mozambique - View Project

In February 2010, the International Rural Poultry Centre (IRPC) of KYEEMA Foundation received EC funding, through Save the Children Mozambique, to provide support to the Mozambican Ministry of Agriculture's national program for Newcastle disease (ND) control and to improve low-cost poultry husbandry practices in Gaza Province. The aim of the 22-month project is to strengthen livelihood resilience and reduce vulnerability to food insecurity resulting from high food prices. The IRPC/KYEEMA Foundation will be implementing a component targeted at improving rural livelihoods through improving village poultry production, increasing participation in the ND vaccination campaigns, and improving low-cost poultry husbandry practices.

Strengthening rural livelihoods and food security through improving village poultry production in Malawi, Mozambique, Tanzania, and Zambia - View Project

In July 2009, the International Rural Poultry Centre (IRPC) of the KYEEMA Foundation was given a one-year grant by the Australian Agency for International Development (AusAID) to continue project activities in Mozambique, Malawi and Tanzania, and to set up a new program in Zambia for

Newcastle disease (ND) control in village chickens. The project aims to increase village poultry production in project areas to contribute to food security and poverty alleviation. The purpose of the project is to strengthen the capacity of the Governments of Malawi, Mozambique, Tanzania and Zambia to develop and implement efficient and sustainable ND control and village poultry extension programs to improve the welfare of rural communities

AHEAD Mozambique View Project

With the aid of the USD 45 550 USD AHEAD Great Limpopo Transfrontier Conservation Area Seed Grant, the International Rural Poultry Centre (IRPC) will undertake the project "Improvement of village poultry production by communities in the Limpopo National Park Support Zone in Gaza Province, Mozambique". The project aims to contribute to food security and poverty alleviation through the improvement of husbandry practices and disease control related to village chickens.

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Annex IV

Role of poultry in household food security

Undernourishment, especially protein deficiency, constitutes one of the largest problems confronting the African continent today. Malnutrition provokes not only immediate health problems but also a long-term reduction in the mental capacity and physical strength of those affected by it (Pinstrup-Andersen *et al.*, 1993). Mozambique is not yet self-sufficient either on crop or livestock and poultry production. This scarcity is relevant mainly when related to animal protein sources, since energy requirements are easily supplied by carbohydrates and lipids of vegetal origin. Besides fish resources, poultry and pigs are those which give faster animal protein of high biological value for human consumption. Pig production, known for its religious barriers in many parts of the country, remains very limited, while poultry production may constitute the sole origin of animal protein (Almeida and Cardoso, 2001), namely in those regions infested with tsetse fly and far from water sources.

In Mozambique, there are few available studies related to the role of poultry in household food security, however its role in improving the nutrition status and incomes of the population is well recognized. Village chickens are the most commonly owned livestock of the poorest members of the society, and a common source of income and food for marginalized groups. Village poultry are particularly valuable resources to local populations as they contribute to animal protein intake (meat and eggs) and can be sold or bartered to meet essential family needs such as medicine, clothes and school fees. Village poultry are generally owned and managed by women and children and are often essential elements of female-headed households (Bagnol 2001). The implementation of effective village poultry production programmes in Asia, Africa and Latin America has resulted in increased poultry numbers, household purchasing power, home consumption of poultry products and decision-making power for women (Alders *et al*., 2010). This is also important in the context of HIV/AIDS mitigation, as women are typically responsible for caring for those who are ill (Alders *et al*. 2005). Despite the benefit of village poultry production there are several constraints in the development of this sector. Newcastle disease is one of the most significant and major constraints to village poultry production. Commercial ND vaccines have been a success in commercial flocks (Spradbrow, 2005). The use of commercial ND vaccine which requires a good cold chain system is a problem for village poultry production because in many cases there exist neither electricity nor good cold conditions to preserve the vaccine. In order to overcome these problems the improvement of village poultry production was done through controlling ND. To implement ND control for village chickens, the National Directorate of Livestock (DINAP) has established a ND control strategy for the rural areas, to reduce the incidence of ND through immunization using thermotolerant I-2 vaccine (Cambaza *et al*., 2005). In general, the vaccination campaigns were considered to be successful (Cambaza *et al*., 2005; Harrison and Alders, 2009) by the increased average flock size and decreased incidence of chicken mortality due to Newcastle disease. A study carried out in Chibuto supported the efficacy of the I-2 Newcastle disease vaccine as shown by the increased average flock size and decreased incidence of chicken mortality due to Newcastle disease. The level of farmer involvement and ongoing commitment by community vaccinators suggest that the Chibuto vaccination program is likely to be sustainable in the medium- to long-term (Harrison and Alders, 2009).

According to Tomo, for households with flocks above 10 chickens, the vaccination is shown to be profitable, even for low levels of ND infection. In general, vaccination of chickens using the I-2 vaccine results in a 481 MTN (equivalent to 19 US dollars) increase the annual household income from poultry production (Tomo, 2009).

According to Florence Cipriano (Head of Veterinary Services, 2011) in 2005, the national chicken industry was on the brink of disaster. From 2005 on TechnoServe, an international development organization working in Mozambique developed a poultry industry strategic plan with local stakeholders through training and funding with the support of USAID.

TechnoServe secured additional resources from the donation of agricultural commodities from the USDA Food for Progress program to support a multi-year poultry industry development effort that included:

- capacity building for small poultry producers, poultry companies and government agencies,
- matching grants to incent investments in bio-security and
- a national advertising campaign to promote the benefits of locally grown chicken.

The program supported the creation of a national poultry association named A.M.A. The association provided a united front to voice common industry interests to the government and to market the domestically produced chicken (Cipriano, 2011).

In commercial poultry production, poultry contributes significantly to the incomes of both urban and suburban farmers. There are three subsystems for commercial poultry production: there are very large farmers with more than 30 000 birds per flocks, medium farmers and the outgrower scheme with approximately 1 600 birds per cycle located at the homes of rural families. The outgrower's scheme is based on credit composed of chicks, feed and vaccines and medicines, with the debit being paid off only if the outgrowers' flock reaches a profitable weight (1.5kg in 35 day). The outgrower's scheme supposed that after chickens reaching maturity around day 35, the fully grown broilers should be transported to the abattoir, or slaughterhouse, before being packaged and shipped to market.

The system is highly advantageous for the rural farmers because they can participate in a large-scale business operation with substantial income-earning potential without high-interest loans. The grower invests the capital for the chicken house, which in effect gives the ownership of the flock. However, there are some challenging weaknesses in the outgrower scheme. According to Andrew Cunningham (oral communication, 2010) cited by Whiting, 2010, some farmers are unfair; they can for example take a bag of feed and just sell it or they can take part of the chickens and sell them rather than give them back according to the contract. However the best farmers are getting 1.7 feed conversion ratio, they get birds at 1.4, 1.45 kilos at 28, 29 days, so they are really hitting the marks that you need. One of the key determinants in the success of the outgrower system seems to be choosing the right outgrowers from the beginning and training up those with the competency to succeed. According to TechnoServe the outgrower farmers are making money. On average farmers are earnings per flock: 5 000 MT (USD 167) with some earning up to 13 000 MT (USD 433) with in average 7 flocks per year the total average income would be USD 1 169 (Whiting, 2010).

By 2009, Mozambique's poultry industry accounted for 0.3 percent of its GDP. The national poultry consumption has had an annual growth average of 80 percent. The industry has created more than 90,000 direct jobs, including tens of thousands of small-scale farmers who produce soy and corn for poultry feed, plus many more in supporting industries (Cipriano, 2011).

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Annex V

Maps

No maps available