

Poultry sector country review



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This review is based on the following report:
The structure, marketing and importance of the
commercial and village poultry industry:
an analysis of the poultry sector in Tanzania

Dr. Halifa Msami

Central Veterinary Laboratory
P.O. Box 9254
Dar es Salaam, Tanzania
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Foreword

The unprecedented widespread outbreaks of Highly Pathogenic Avian Influenza (HPAI) that occurred in many countries in Asia, Europe and Africa since 2003 have been asking for rapid and active response on a national, regional and international level. The HPAI crisis had to be addressed worldwide at the source, which is the poultry population.

The main danger of this disease, like others, lies in the way in which humans interact with and handle the production, distribution, processing and marketing of live poultry and poultry products. The direct and indirect socio-cultural and economic impacts of disease outbreaks influence policy measures and disturb markets, causing the loss of assets. There are strong negative impacts on the livelihoods of rural communities for all producer groups including small holders. Assessment and guidance on measures along the poultry chain for a safe poultry production is therefore of great importance. Specific consideration should be given to strategies and measures that ensure a sustainable pro poor supporting approach and development.

Better understanding of the specific situations of the different poultry sectors and the related market chains will help to develop appropriate disease control measures and improve biosecurity.

This review is part of a series of Country Reviews that are commissioned by the Animal Production Service (AGAP) of the Food and Agriculture Organization of the United Nations (FAO) for the Socio-Economics, Production & Biodiversity Unit of the Emergency Centre for Transboundary Animal Disease of FAO (ECTAD).

This review is intended as a resource document for those seeking information on the poultry sector at national level. It is not exhaustive. Some topics are only partially covered or not covered at all and the document will be supplemented and updated on an ongoing basis. Contributions and feedback are welcome by the author(s), FAO/AGAP and FAO/ECTAD Socio-Economics, Production & Biodiversity Unit¹.

The original report by Dr Halifa Msami was edited by Ms Jenny Schwarz in June 2008 and has been supplemented with data from the FAO statistical database (FAOSTAT), the World Bank and the United Nations Population Division.

¹ For more information visit the FAO website at: www.fao.org/avianflu/en/farmingsystems.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 Health and Production, Viale delle Terme di Caracalla, 00153 Rome, Italy

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Acronyms and abbreviations

ACIAR	Australian Centre for International Agricultural Research
ADRI	Animal Disease Research Institute, Dar es Salaam
AI	Avian Influenza
AIDS	Acquired Immuno-Deficiency Syndrome
ASDP	Agriculture Sector Development Programme
ASDS	Agriculture Sector Development Strategy
ASMP	Agriculture Sector Management Project
AusAID	Australian Agency for International Development
CAHWS	Community Animal Health Workers
CBOs	Community Based Organisations
CVL	Central Veterinary Laboratory, Temeke Dar es Salaam
DIIS	Disease Information and Intelligence Systems
DVO	District Veterinary Officer
EAC	East African Community
ERETO	Ngorongoro Pastoral Project (A Maasai word for cooperation)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GoT	Government of Tanzania
HIV	Human Immunodeficiency Virus
HPAI	Highly Pathogenic Avian Influenza
I-2	Thermostable, live, avirulent ND vaccine available for local production
LGA	Local Government Authorities
LITIs	Livestock Training Institutes
MAC	Ministry of Agriculture and Cooperatives
MKUKUTA	Mkakati wa Kupunguza Umaskini na kuongeza Kipato (see NSGRP for translation)
MOA	Ministry of Agriculture
NARCO	National Ranching Company
NBS	National Bureau of Statistics
NCA	Ngorongoro Conservation Authority
ND	Newcastle Disease
NDV	Newcastle Disease Virus
NEMC	National Environment Management Council
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organisation
NSGRP	National Strategy for Growth and Reduction of Poverty

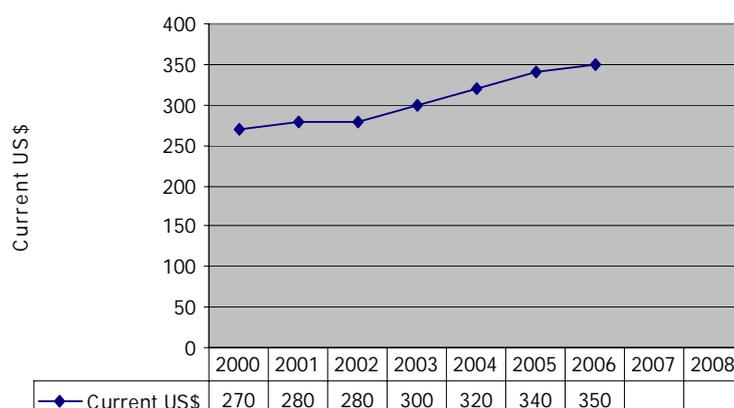
OIE	Office International Des Epizooties
PACE	Pan African Control of Epizootics
PMO-RALG	Prime Minister's Office - Regional Administration and Local Government
PRA	Participatory Rural Appraisal
SADC	Southern Africa Development Community
SANDCP	Southern Africa Newcastle Disease Control Project
SMS	Subject Matter Specialists
TAFMA	Tanzania Animal Feed Manufacturing Association
TAZARA	Tanzania Zambia Railway Authority
TCP	Technical Co-operation Project
TFDA	Tanzania Food and Drugs Authority
TOR	Terms of Reference
VCT	Veterinary Council of Tanzania
VIC	Veterinary Investigation Centres
WHO	World Health Organization of the United nations
WTO	World Trade Organization
WVI	World Vision International

Chapter 1

The country in brief

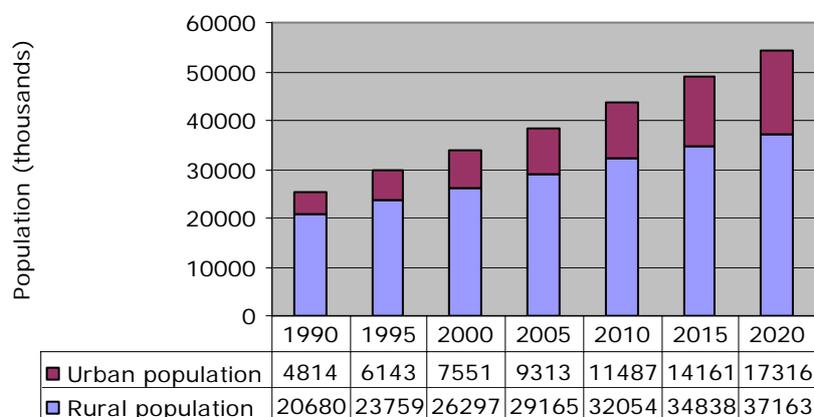
Country:	Tanzania	
Location:	Eastern Africa, bordering the Indian Ocean, between Kenya and Mozambique	
Population, total	39,458,709 (2006)	Source: World Bank, May 2008
Population, growth rate:	3% (2006)	Source: World Bank, May 2008
Economy group:	Low income	Source: World Bank, May 2008

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



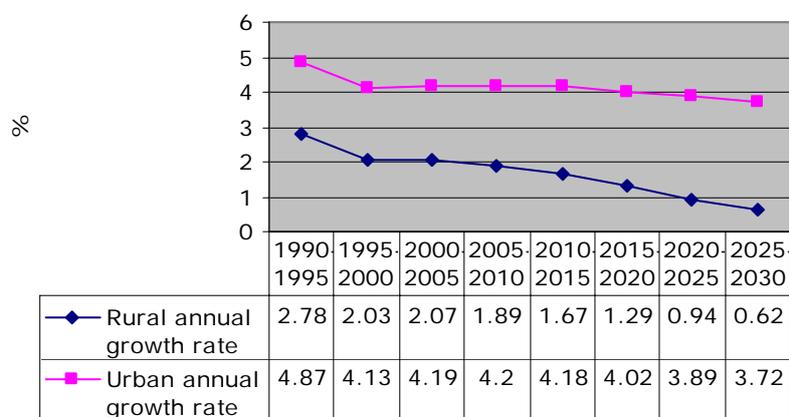
Source: The World Bank Group World Development Indicators, May 2008

FIGURE 2: Demographic profile



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision, <http://esa.un.org/unup>, May 2008

FIGURE 3: Annual population growth rates

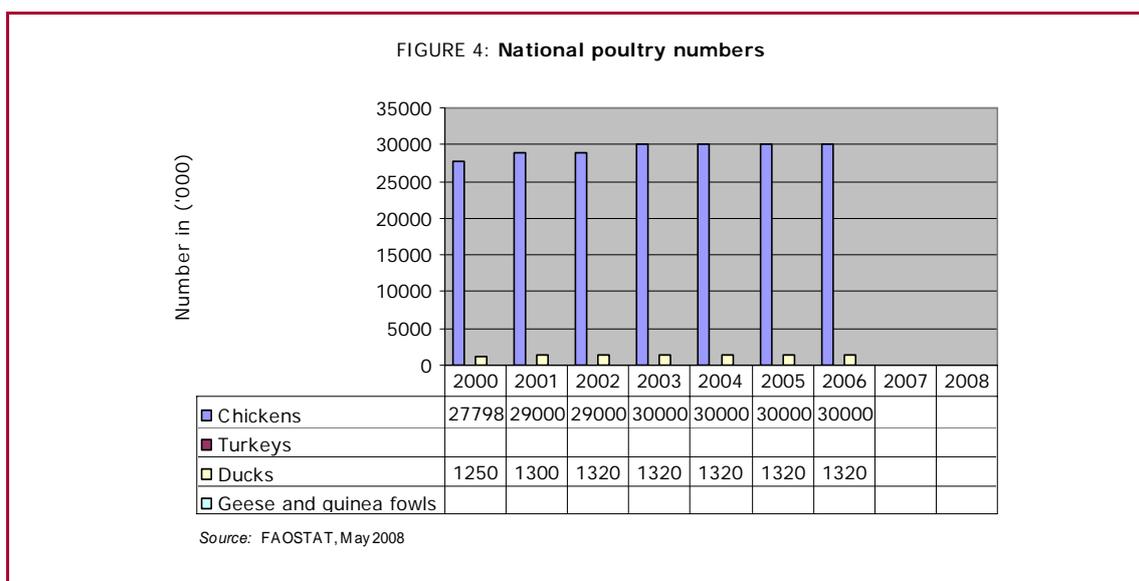


Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision, <http://esa.un.org/unup>, May 2008

Chapter 2

Profile of the poultry sector

2.1 NATIONAL POULTRY FLOCK



Accurate statistics on poultry population are not available and estimates are usually used. These vary. The MOA gave a slightly different estimate for 2002/2003 in the order of 34,827,675 chickens (MOA/NBS 2002/2003). Of this number, approximately 32,559,208 million were local village chickens kept predominantly in the rural areas. Commercial birds included 589,563 broiler and 1,222,267 layer chickens kept by smallholder farmers and 456,638 birds (both broilers and layers) on large-scale farms. There were 1,362,216 ducks and 213,545 turkeys. Other types of poultry kept include guinea fowls and pigeons.

Over the period 1995 to 2003 the total chicken population on the mainland increased at a rate of 2.6% per year; this principally a result of an increase in the indigenous chicken population. By extrapolation, if the same growth rate is assumed to have taken place in the period 2003 to the present, then the total number of chickens in 2007 would be 36,908,651.

Most chicken-keeping households (94%) kept less than 30 chickens per household and these households accounted for 79% of the chicken population as on October 1st 2003. Only 3% of households kept over 40 chickens per household. However, they represent 21% of the total chicken population indicating a small number of large production units.

2.2. GEOGRAPHICAL DISTRIBUTION OF POULTRY FLOCKS

TABLE 1.1:
Distribution of poultry flocks (October 2003)

Location	Chicken				Total	Ducks	Turkey	Pigeons
	Breeding stock		Broiler	Layers				
	Exotic (Commercial)	Exotic (Commercial)	Exotic (Commercial)	Local				
				Dual purpose	Total	Total	Total	Total
Dodoma		69,652	122,136	1,634,079	1,825,867	106,227	12,075	
Arusha		31,793	0	899,385	931,178	10,480	572	
Kilimanjaro		36,355	168,203	1,356,781	1,561,339	42,319	3,194	
Tanga		7,859	29,630	1,751,278	1,788,767	117,486	503	
Morogoro		466	82,168	2,018,227	2,100,861	76,948	89,728	
Pwani		40,358	125,649	1,254,145	1,420,152	53,420	13,100	
Dar es Salaam		32,002	310,601	182,449	525,052	13,462	983	
Lindi		152,855	33,314	1,075,122	1,261,291	35,334	6,207	
Mtwara		2,886	2,627	704,619	710,132	8,885	20,607	
Ruvuma		13,250	6,037	1,536,330	1,555,617	38,878	868	
Iringa		114,098	82,311	2,045,274	2,241,683	82,093	1,620	
Mbeya		402	65,714	2,493,796	2,559,912	91,591	7,538	
Singida		6,616	7,589	1,643,973	1,658,178	35,013	7,501	
Tabora		5,330	3,949	2,498,191	2,507,470	57,565	1,830	
Rukwa		615	7,261	1,114,556	1,122,432	88,647	2,686	
Kigoma		1,879	10,349	785,308	797,536	51,782	592	
Shinyanga		32,934	11,276	2,935,380	2,979,590	94,783	708	
Kagera		171	13,139	905,549	918,859	67,632	9,170	
Mwanza		10,481	29,446	2,580,891	2,620,818	152,904	9,786	
Mara		1,183	14,561	1,505,422	1,521,166	64,254	12,737	
Manyara		4,528	737	694,081	699,346	18,942	10,698	
Total for mainland		565,712	1,126,697	31,614,837	33,307,246	1,308,645	212,704	
Zanzibar		23,851	95,569	944,371	1,063,791	53,571	841	
Total		589,563	1,222,266	32,559,208	34,371,037	1,362,216	213,545	

TABLE 1.2:
Average number of poultry per household by region (October 2003)

Region	Chicken Type									
	Indigenous Chicken			Layers			Broilers			Total number of chickens
	Number of households	Number of indigenous chicken	Per household	Number of households	Number of layers	Per household	Number of household	Number of broilers	Per household	
Dodoma	139,219	1,634,079	11.7	672	122,136	181.8	565	69,652	123.3	1,825,867
Arusha	80,457	899,385	11.2	0	0	0!	320	31,793	99.4	931,178
Kilimanjaro	154,940	1,356,781	8.8	1,571	168,203	107.1	629	36,355	57.8	1,561,340
Tanga	176,512	1,751,278	9.9	432	29,630	68.6	628	7,859	12.5	1,788,767
Morogoro	154,723	2,018,227	13.0	570	82,168	144.2	78	466	6.0	2,100,861
Pwani	78,423	1,254,145	16.0	833	125,649	150.8	252	40,358	160.2	1,420,152
Dar es Salaam	10,294	182,449	17.7	1,160	310,601	267.8	291	32,002	110.0	525,052
Lindi	82,799	1,075,122	13.0	531	33,314	62.7	380	152,855	402.3	1,261,290
Mtwara	96,471	704,619	7.3	553	2,627	4.8	361	2,886	8.0	710,132
Ruvuma	139,018	1,536,330	11.1	540	6,037	11.2	588	13,250	22.5	1,555,617
Iringa	199,676	2,045,274	10.2	557	82,311	147.8	499	114,098	228.7	2,241,683
Mbeya	256,026	2,493,796	9.7	1,445	65,714	45.5	287	402	1.4	2,559,913
Singida	125,615	1,643,973	13.1	783	7,589	9.7	498	6,616	13.3	1,658,178
Tabora	167,037	2,498,191	15.0	655	3,949	6.0	646	5,330	8.3	2,507,469
Rukwa	109,522	1,114,556	10.2	561	7,261	12.9	187	615	3.3	1,122,432
Kigoma	80,981	785,308	9.7	658	10,349	15.7	313	1,879	6.0	797,537
Shinyanga	256,289	2,935,380	11.5	1,545	11,276	7.3	807	32,934	40.8	2,979,590
Kagera	147,251	905,549	6.1	1,278	13,139	10.3	171	171	1.0	918,858
Mwanza	239,014	2,580,891	10.8	950	29,446	31.0	315	10,481	33.3	2,620,818
Mara	141,752	1,505,422	10.6	832	14,561	17.5	207	1,183	5.7	1,521,166
Manyara	89,692	694,081	7.7	301	737	2.4	111	4,528	40.8	699,345
Mainland	2,925,711	31,614,837	10.8	16,427	1,126,697	68.6	8,133	565,712	69.6	33,307,246
Zanzibar	66,434	944,371	14.2	799	95,569	119.6	266	23,851	89.7	1,063,791
National	2,992,145	32,559,208	10.9	17,226	1,222,267	71.0	8,399	589,563	70.2	34,371,037

Source: National Sample Census of Agriculture 2002/2003

TABLE 1.3:
Chicken production: total number of households (hh) keeping chickens and average flock size as of 1st October 2003

Flock size	Indigenous chicken			Layers			Broilers		
	Number of hh	Number of Chicken	Average chicken by hh	Number of hh	Number of Chicken	Average chicken by household	Number of hh	Number of Chicken	Average chicken by hh
1-49	2,942,154	28,534,749	9.7	12,465	95,450	7.7	6,185	42,583	6.9
50-99	42,648	2,570,192	60.3	1,897	116,458	61.4	1,206	74,145	61.5
100-299	6,295	828,029	131.5	1,383	239,359	173.1	431	72,859	169.0
300-499	120	39,952	332.9	629	229,119	364.3	167	42,288	253.2
500-699	784	472,128	602.2	560	320,966	573.2	12	5,861	488.4
700+	143	114,159	798.3	293	220,913	754.0	396	328,242	828.9
Total	2,992,144	32,559,209	10.9	17,227	1,222,265	71.0	8,397	565,978	67.4

Source: National Sample Census of Agriculture 2002/2003

On the mainland, Shinyanga, Mwanza, Tabora, Mbeya, Iringa and Morogoro regions account for 45% of the total chicken population and the number of chickens per household ranges from 9 to 15. Dar es Salaam had the smallest indigenous chicken population (182,448) but the highest number of chickens per household due to large numbers of commercial farms. The highest density of chickens was in Zanzibar, Dar es Salaam, Mwanza and Kiliman

62% of smallholder households in Tanzania keep chickens with 3,017,004 smallholder households (2,950,268 on the Mainland and 66,736 in Zanzibar) keeping predominantly indigenous chickens (National Sample Census of Agriculture 2002/2003). For the period 1995 to 2003 the average growth rate of indigenous chickens was 2.2 % per year. The rate of growth was relatively higher for the period 1999 to 2003 (4.3%) than during 1995 to 1999 (0.13%). Of all the livestock kept in Tanzania, local chickens are the most widely and evenly distributed throughout the country.

The number of improved chickens kept by smallholders in Tanzania is very small. The improved chicken population as at 1st October 2003 was 1,811,829 of which 1,222,266 were layers and 589,563 broilers. They represent 3.6% and 1.7% percent of the total chicken population respectively (National Sample Census of Agriculture 2002/2003). Most improved chickens are kept by a small number of households (8% of smallholder households kept 64% of the layers, whilst 65% of the broilers were kept by 7% of the smallholder households).

The number of layers has increased sharply in the last nine years. It increased from 287,691 to 1,126,697 chickens with a growth rate of 18.6% per year for the period 1995 to 2003. However, the high growth rate of 26% experienced in the period 1995-1999 declined to 11.7% over the period 1999 to 2003. Assuming the growth rate of 18.6% to have prevailed in the period 1995 to 2007, the layers population as at 1st October 2007 is projected to be 2,418,268 as a standing population at any one time.

Layer production is concentrated in Dar es Salaam (28%), Kilimanjaro (15%), Pwani (11 %) and Dodoma (11 %). In Iringa, Morogoro and Mbeya, layer production is moderate, while the remaining regions have insignificant layer production.

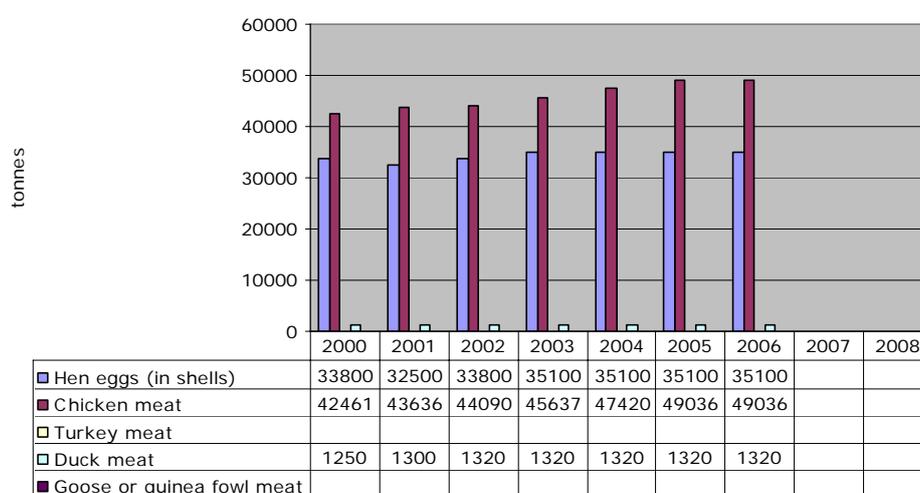
Similarly, the number of broilers has increased in the last nine years. However, the rate of increase is much less than that of layers and the growth practically stagnated over the period 1999 to 2003. It increased from 184,002 to 565,712 chickens with a growth rate of 15% per year for the period 1995 to 2003. However, the high growth rate of 30 percent per year experienced during the period 1995 to 1999 had declined sharply to a very low level of 2% during 1999 to 2003. By projection with the given growth rate, the number of broilers in 2007 is expected to be 626,881.

The total number of chickens kept by large-scale farmers in the country as at 1st October 2003 was 456,638, of which 22,423 were indigenous, 312,043 were layers and 241,592 were broilers. The chickens were kept on 393 farms. However, some of these farms kept chickens on a small scale and this did not represent the main enterprise of the farm. Only 50 farms kept sufficient chickens to be considered a large-scale enterprise (over 500). These

had a total of 446,714 chickens (5,800 indigenous, 209,066 layers and 215,225 broilers) as at 1st October 2003. In June 2006, one farm - Ruvu National Service or JKT Poultry Farm - maintained 3800 PS for broilers and also had indigenous chickens (Kuchi ecotype and Vishingo or the naked neck ecotype) totalling 5,400 (MoLD 2006). The majority of the farms were located in Dar es Salaam, Pwani, Arusha, Mwanza and Tanga regions. The pattern of layer growth rate exceeding broiler growth rate follows the same trend as for that of smallholders ie the growth rate for layers over the period 1995 to 2003 was much higher than that of broilers. In large-scale farms on the mainland, the population growth rate of layers was 12 % per year, whilst that of broilers was only 4.1% per year for the same period. The number of layers in large-scale farms in Tanzania increased from 87,124 in 1995 to 216,474 in 2003, whilst the number of broilers only increased from 158,125 to 217,741 over the same period.

2.3 PRODUCTION

FIGURE 5: National production of the poultry sector



Source: FAOSTAT, May 2008

Another source of information shows the following data:

TABLE 2:
Production of poultry products (from both commercial and indigenous) in the period 2001/2002 to 2006/2007

Product	Year and Quantity					
	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007
Chicken meat	55,000	61,500	63,000	68,896	69,420	72,197
Eggs ('000)	650,000	790,000	910,000	1,800,000	2,145,000	2,230,800
Production of animal feeds (tons)	490,000	491,000	492,000	550,000	559,000	574,690

Source: The Speech of the Minister for Livestock when presenting to Parliament, the Estimates of Expenditure of budget for fiscal year 2006/2007 (July 2006)

Egg production

The number of eggs produced by smallholders in Sector 4 in Tanzania during 2002/03 was 367,955,297; of this 351,941,008 eggs were produced on the mainland and 16,014,289 in Zanzibar. Most of the eggs produced in Tanzania were from Mbeya (16%), Arusha (9%), Mwanza (9%), Tabora (7%), Iringa (6%) and Dar es Salaam (6%). This represents 52 percent of the total egg production in Tanzania from smallholders (National Sample Census of Agriculture 2002/2003). According to data available from the Speech of the Minister for Livestock Development when presenting to Parliament, the Estimates of Expenditure of budget for fiscal year 2006/2007 (Dodoma, July 2006) eggs produced in the period 2002/03 was 910,000,000. The difference (542,044,703) could be accounted for as a

result of production from large-scale commercial farms (Sectors 2 and 3) having been considered.

In Tanzania, 68% of eggs from indigenous chickens were sold. On the mainland the average price per egg was Tsh 54 (US \$ 0.04). The percentage sold can reach more than 80 percent as in Dar es Salaam (97%), Lindi (84%), Kigoma (83%), Dodoma (82%) and Arusha (81 %). This percentage can be as low as 38 percent in Mwanza, the highest egg producing region in the country. Eggs not sold would be used for consumption by the family and some will be incubated for hatching.

2.4 CONSUMPTION

Figure 6.a and 6.b: Poultry meat (in average calories/capita/day) (in kg/capita/year)

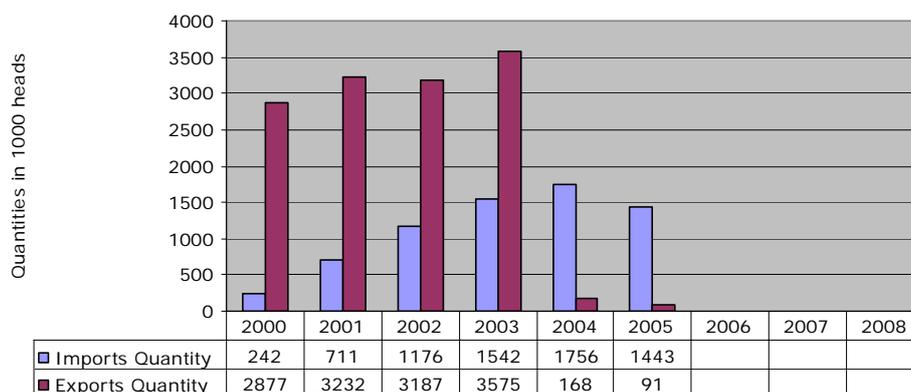
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Figure 6.c and 6.d: Eggs (in average calories/capita/day) (in eggs/capita/year)

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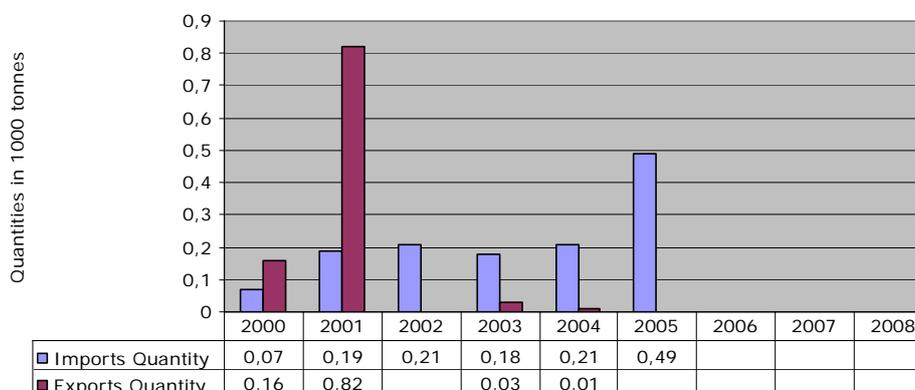
2.5 TRADE

FIGURE 7.a: Import/Export of live chickens



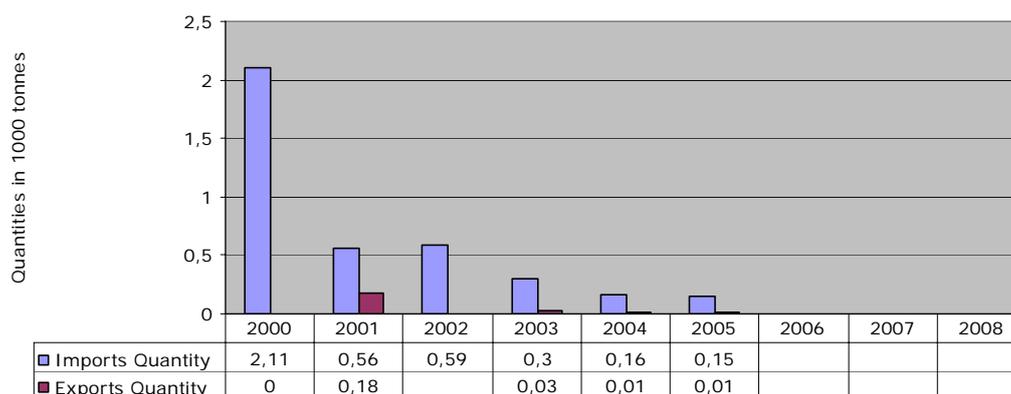
Source: FAOSTAT, May 2008

FIGURE 7.b: Import/Export of chicken meat



Source: FAOSTAT, May 2008

FIGURE 7.c: Import/Export of hen eggs with shells (including hatching eggs)



Source: FAOSTAT, May 2008

2.6 PRICES

Figure 8 Producer price (US\$/tonne)

This information has not yet been sourced

Figure 9 Consumer price (US\$/tonne)

This information has not yet been sourced

Chapter 3

Poultry production systems

TABLE 3:
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

The main economic activity in rural Tanzania is agriculture; it accounts for about 45% of the country's GDP and is the main occupation of 70% of the Tanzanian population. Livestock production is part and parcel of the rural economy and constitutes one of the major agricultural activities in Tanzania. The current poultry population is about 35 million chickens. Within this number are found about 33 million local village chicken kept predominantly in the rural areas and about 2 million commercial birds (broiler and layer chickens) kept by both smallholder farmers and large-scale farms. Other types of poultry kept include ducks, turkeys, guinea fowls and pigeons. According to the 2002/2003 National Sample Census of Agriculture, out of 4,901,837 smallholder households in Tanzania, 3,017,004 (62%) kept chickens and of these, 99% kept indigenous chickens and the remaining 1% kept commercial birds. There is no doubt that the poultry industry is very important as a business for income generation and for poverty alleviation. It is certain that all economic indicators show a low contribution from the livestock sector to the national economy of Tanzania. For example, at factor cost in the year 2001 in Tanzania, the livestock industry - which includes the chicken industry - contributed only 73,695 million Tanzanian shillings (77.49 million US\$); this was 5.7% of the total monetary national GDP of 1,294.768 millions (1361.48 million US\$) (Bank of Tanzania 2002). It is estimated that in Tanzania, the chicken industry is worth 40.5 billion Tanzanian shillings (US \$ 50.6 million) (Boki, 2000; Minga et al., 2000). However, it has been argued that if rural chickens - which dominate the poultry industry by over 90% - were properly managed and effectively utilised they could have a significant economic impact (Minga et al., 1996).

Poultry production in Tanzania is carried out under two major systems. These comprise of the small-scale village or backyard poultry system (local chicken production system) which is the dominant one. 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 and about 20% in urban areas. The other system is the semi-intensive and intensive poultry production system normally practised in peri-urban and urban areas in the country on a commercial basis. An analysis of poultry operations in Tanzania to categorise according to the FAO classification system of sectors 1 - 4 was carried out. It was concluded that Sector 1 is non-existent in the country, bearing in mind the fact that GPS operations are not conducted. Sector 2 represents high levels of commercial poultry production in Tanzania, mainly involving PS and hatcheries, but also raising commercial poultry (layers and/or broilers). 19 farms were identified in Tanzania which fall into this category, located in the administrative regions of Pwani (6), Dar es Salaam (6), Arusha (2), Mwanza (2), Mbeya (1), Ruvuma (2). The operations are medium-scale, embracing different levels of integration. Sector 3 represents farms involved in the intensive commercial egg and broiler production from hybrid chickens. 25,624 small-scale commercial production farmers raising commercial layers and broilers were classified in this category. The Tanzanian local chicken production system fits well into Sector 4 FAO classification. The three major components of bio-security (isolation, traffic control and sanitation) are highly adhered to in PS production and other Sector 2 commercial farms, but not in Sector 3 small-holder units. Bio-security is highly deficient in the Sector 4 extensive village chicken production system.

TABLE 4:
Poultry production systems (sectors 1 to 4) and their distribution (2007)

	Integrated	Commercial Semi integrated	Commercial eggs-meat	Backyard	Total
Dar es Salaam		4			
Pwani		8			
Arusha		2			
Mbeya		1			
Mwanza		2			
Kilimanjaro		2			
Total	0	19	25624*	2,992,145**	3120487

* Comprises small-scale improved chicken production for both broilers and layers for households keeping varying flock sizes.

** Comprises village chickens kept by the majority of almost all agricultural households in rural and peri-urban areas in their backyards.

3.2 SECTOR 1: INDUSTRIAL AND INTEGRATED PRODUCTION

There is apparently no farm in Tanzania with the typical features described in FAO Sector 1. Large-scale commercial systems of breeder farms with their own feed mills exist but none involve GPS. In addition, the size per enterprise does not approach 500,000. Although farm outputs from large commercial farms in Tanzania are processed and/or packed at the farm itself, none is meant for export but rather for domestic consumption only.

3.3 SECTORS 2 AND 3: OTHER COMMERCIAL PRODUCTION SYSTEMS

Commercial poultry production contributes less to the poultry industry (in terms of household food security) compared to the indigenous family poultry system. This system is normally practised in peri-urban and urban areas in the country on a commercial basis and employs intensive production techniques. Commercial poultry production is mainly based on the importation of parent stock (PS). Importation of broiler grand parent stock (GPS) for production of PS was also practised in the past but ceased in the early 1990s.

Medium and large-scale poultry farms are found near urban centres, producing for the urban market. The cost of production is high because of high feed costs; feeds account for more than 60% of the production costs of commercial birds. A vertical integration strategy for the development of the poultry industry in Tanzania is evident in Dar es Salaam; the large firms are involved in feed milling, DOC production, broiler and egg production, marketing and processing. However, these large integrated firms exist side by side with small-scale producers and their activities are complementary (Samberg, 1998).

Sector 2 represents large commercial poultry production in Tanzania; this mainly involves PS and hatchery, but also the raising of commercial layers and/or broilers. 19 farms were identified in Tanzania which fell under this category located in the political regions of Pwani (6), Dar es Salaam (6), Arusha (2), Mwanza (2), Mbeya (1), Ruvuma (2).

TABLE 5:
List of ps/hatchery poultry companies (commercial poultry foundation stock) (sector 2)

Company Name	Location	Products	Population Numbers/hatchery capacity
Mkuza Chicks Ltd	Kibaha (Pwani)	Broiler DOC Pullets DOC Chicken Meat Poultry feeds	Broiler PS 41,000; Layers PS 24,000; Broiler birds 35,000 per batch; HC 520,000 per month; Broiler processing plant 24,000 birds per day
Kibaha Education Centre	Kibaha (Pwani)	Broiler DOC Pullets DOC Poultry feeds Egg trays	Broiler PS 16,400; Layers PS 4,600; HC 240,000 per month
Ruvu JKT Poultry Farm	Bagamoyo (Pwani)	Broiler DOC Pullets DOC	Broiler PS 3800; HC 20,000 per month; Indigenous chicken (Kuchi and Vishingo) 5,400
Euro Poultry (T) Ltd	Mkuranga (Pwani), Temeke (Dar es Salaam)	Broiler DOC Pullets DOC Hatching eggs Table eggs Poultry feeds	Layers PS 65,000; Broiler PS 48,000; HC 460,000 per month. Hatching eggs supplied to Interchick 20,000 per week and Twiga 8,000 per week; Commercial Layers 40,000
Tomatho Holdings Ltd	Kibaha (Pwani)	Broiler DOC	N/A
Visiga	Kibaha (Pwani)	Hatching eggs, Table eggs	N/A
Ideal Chicks Ltd	Kinondoni (Dar es Salaam)	Broiler DOC Pullets DOC Poultry feeds	Layers PS 19,116; Broiler PS 28,109; HC 62,000 per batch
Mary White	Kinondoni (Dar es Salaam)	Hatchery only (buys hatching eggs and sells all chicks)	N/A
Twiga Feeds	Kinondoni (Dar es Salaam)	Broiler DOC Poultry Feeds	Broiler PS 32,000
Interchick Co. Ltd	Kinondoni (Dar es Salaam)	Hatching eggs Chicken meat	Hatching eggs 80,000 per month, Broiler processing plant

TABLE 5:
List of ps/hatchery poultry companies (commercial poultry foundation stock) (sector 2)

Company Name	Location	Products	Population Numbers/hatchery capacity
Tanzania Poultry Farms	Arumeru (Arusha)	Broiler DOC Pullets DOC	N/A
Kijenge Animal Products Ltd	Arusha municipality	Broiler DOC Poultry Feeds	N/A
Missenani Agri-Services	Ilemela (Mwanza)	Broiler DOC Pullets DOC	Broiler PS N/A; Layers PS 5,500; HC 82,000 per month
Songwe Poultry Farm	Mbeya	Broiler DOC Pullets DOC	N/A
Kiluvya Chick Company	Kinondoni Dar es Salaam	Broiler DOC Pullets DOC	Broiler PS 14,000; Layers PS 2500; HC 120,000; 54,000 chicks per week
Mateka Poultry Farm	Songea Ruvuma	Table eggs	Layers (commercials) 6,000; Egg production 135,000 eggs per month
Mama Vero Mushi Farm	Mwanza municipality	Table eggs	Layers (commercials) 5,800; Egg production 45,000 eggs per month
Peramiho Poultry Farm	Songea Ruvuma	Table eggs	Layers (commercials) 12,000; Egg production 225,000 eggs per month

HC = Hatchery Capacity
N/A = Not available

The operations are medium to large-scale embracing different levels of integration. From observation, it seems that a capacity baseline of 5,000 and upper scale of 80,000 can be applied for Sector 2 in Tanzania. There is however one farm (Euro Chicks Co.) in Temeke District, Dar es Salaam region that has a flock size of more than 100,000 birds. This farm is involved in the rearing of PS and Hatchery and institutes a higher level of management and other operational procedures than the other Sector 2 farms.

Sector 3 represents farms involved in the intensive commercial scale production of eggs and broilers from hybrid chickens. Improved chicken production in Tanzania operates on a small scale for both broilers and layers, as more than 70 percent of the total number of households keeping improved chickens keep less than 50 chickens per household (MoLD/NBS 2003). Accordingly, Tanzanian improved chicken production fits well in Sector 3. In October 2003, there were 25,624 small-scale commercial production farmers raising commercial layers (1,222,267) and broilers (589,563).

Housing in Sector 3 is highly variable depending on the type of operation of poultry production. The walls are half-raised with the upper parts remaining open. The floor may be mud or concrete. The size depends on the number of birds being kept and several are constructed using corrugated iron sheets which transmit a considerable amount of incoming solar radiation to the birds. Usually the personnel are not provided with protective gear and the house is not protected against animals or other birds which means that contact with other domestic and wild animals occurs. Management standards and bio-security levels in Sector 3 are low.

3.3.1 Breeding stocks and hatching eggs

Currently there are 15 hatcheries in Tanzania producing DOC. In 1996 there were seven hatcheries operating in Dar es Salaam and Pwani producing 170,000 DOC per week (Samberg, 1996). At the time of the current review, there were eight hatcheries in Dar es Salaam and Pwani producing approximately 434,000 DOC per week (314,000 broilers and 120,000 pullets). About 85% of the broiler DOC produced was from a single hatchery (Euro Chicks). For several years the hatcheries have been operating at varying capacities ranging from 30 to 100%. With the exception of two hatcheries that import embryonated eggs for hatching (Interchick and Mary White), all the other hatcheries maintain PS for egg production.

In Tanzania, there is no regulatory framework for hatcheries and breeding farms. The MoLD is in the process of introducing Regulations for Hatcheries under the Animal Diseases Act. The regulations will involve hatchery (buildings, incubators and any equipment or machinery used for rearing parent stock and for hatching eggs) and also the requirement for

any person wishing to own a hatchery or to have it under his control to make an application to the DVS. The hatcheries are currently not subjected to regular inspection and there are no defined specifications which owners conform to.

TABLE 6:
Broiler ps as per June 2006

Name	Growing Birds	Birds in production	Egg production per day	Requirement of PS DOC for July to October 2006
Euro Poultry T Ltd	48,000	-		
Visiga Poultry Farms Ltd		234	180	9,000
Kibaha Education Centre	9,000	6,000	4,200	2,000
SUMA JKT,Ruvu	2,000	1,900	1,330	4,000
Ideal Chicks Ltd	4,000	28,109	5,400	2,800
Tomatho Holding Ltd	-	1,900	1,482	5,000
Kiluvya Chick Company		16,500	7,700	-
Mkuza Chicks Ltd	62,000	13,000	9,100	
Total	125,000	51,143	29,392	22,800

Source: MoLD 2006

TABLE 7:
Layers ps as per June 2006

Name	Growing Birds	Birds in production	Egg production per day	Requirement of PS DOC for July to October 2006
Euro Poultry T Ltd	6,600	58,400	40,880	
Visiga Poultry Farms Ltd		702	540	
Kibaha Education Centre		3,000	2,100	5,000
SUMA JKT,Ruvu		-	-	2,000
Ideal Chicks Ltd	4,000	13,116	4,713	4,000
Total	10,600	75,218	48,233	11,000

Source: MoLD 2006

3.3.2 Broiler meat

See Section 3.3 for information.

3.3.3 Hen table eggs

See Section 3.3 for information.

3.3.4 Other species

This information has not yet been sourced

3.4 SECTOR 4: VILLAGE OR BACKYARD PRODUCTION

3.4.1 Chickens

It is generally believed that local chicken supplies close to 100% of all poultry meat and eggs consumed in rural areas and about 20% in urban areas.

Village chickens are the most important poultry species in Tanzania. They are generally owned and managed by women, children and the rural poor and are often essential elements of female-headed households (Msami 2005). They are usually run under a free-range,

low-input management system. The local chicken raised in the villages is characterized by a great variety of types and colours and low production, but it is well adapted to the environment and resistant to many common diseases. The output of village chickens is lower than that of intensively raised birds but it is obtained with a minimum input in terms of housing, disease control, management and supplementary feeding.

Data on traditional husbandry is very scanty and generally limited to small samples in localised ecological zones. There is a great need to initiate studies aimed at elucidating data about production levels of indigenous birds under village conditions covering all nine Agro-Ecological Zones (AEZ) of the country. Management practices in Tanzania are not atypical of the rest of black Africa (Kitalyi and Mayer; 1998 Minga et al.; 1989 Msami, 2000; Mwalusanya et al 2002).

In the village poultry sector, management is minimal and simply involves keeping the birds under free-range and scavenging conditions around the homesteads. The family of the individual households owns the birds and the day-to-day care is provided by women and children with little or no inputs for housing, feeding or veterinary care. The little care bestowed upon the birds includes provision of table food scraps and/or limited amounts of grain or bran each morning. Villagers perceive these scavenging chickens as a natural low-grade crop that offers very desirable meat on occasions. However production is too unreliable to warrant committing investment of their time, financial or other resources. There is no incentive to improve husbandry because frequent outbreaks of ND cause total or partial exterminations of the village flocks. The husbandry practised is unimproved and traditional and there is no deliberate effort to improve the chicken genetically.

Housing

The majority of households provide night shelter to their flocks, however for some households, birds are not provided with housing at all. Permanent housing of local chickens is under normal circumstances very rare in some villages. Complete confinement is similarly rare except for in some households in urban centres. There are occasions when villagers are forced to confine their birds to avoid destruction of young crops, particularly in densely populated areas. Chicken shelters are generally small and constructed from sun-dried clay and in some instances birds are housed in the owner's house/hut. Shelter constructed using chicken wire mesh exist in very few homesteads. Common poultry houses found around the lake zone and northern zone are raised huts placed on poles and the birds access the huts with a help of a ladder. The huts are fenced out by use of thorn shrubs to repel predators.

Msami (2000) established that out of 43 households interviewed, 24 (55.8%) kept their chickens in the chicken house, 13 (30.2%) within the family house, 3 (7%) in the kitchen/store and in woven baskets and only 3 (7%) kept their birds perched in trees. Mwalusanya et al (2002) established that simple housing was provided at night to 95.2% of the households studied. The birds were only housed at night and left to scavenge for their feed during the day, thereby getting exposed to various predators. The frequency of cleaning was daily in 21 (49%), weekly in 13 (30%), and monthly in 2 (5%) respondents from total of 43 interviewed farmers. Three farmers cleaned the house at longer intervals than monthly (Msami 2000). Lack of protection of young birds from predators (birds of prey, rodents and domestic dogs and cats), cold and heavy rains contribute to the losses which could be reduced considerably if proper housing was provided and husbandry practices improved.

Designing of appropriate housing using locally available materials was attempted in the study by Msami et al., (2004). The farmers were taught about the optimal shelter, which would prevent disease spread and predation to the chicks. Using these shelters entailed semi-confinement and provision of feeds and water, which proved very difficult to implement because of the high costs of commercial feeds.

Initiating and maintaining a bio-security program is almost impossible with the extensive management system and the type of housing involved. Pathogens cannot be prevented from getting in contact with village chickens when they are on free range. The flocks are usually in direct contact with the owners, the visitors to the household, other birds in the village, newly introduced birds, other free-living birds and mammals and night shelters are not bird-proof, insect-proof or rodent-proof.

Feeding

In the village poultry sector, households depend on scavenging around the homesteads as the method of feeding their birds. The supply of drinking water is sometimes neglected and water from a clean source which is free from potential contamination is not supplied. In general, the birds have low nutritional status as reflected by the low growth rates, chick and grower mortalities, low hatchability and low mature body weight. In Tanzania the average weight at slaughter (at 5 – 6 months) ranges between 0.6-1.2 kg (Boki, 2000) which is comparable to the situation in Mozambique of 1.3 Kg (Harun et al 2004)

Interviewed households reported insects, leftovers, greens, coconut cake, cereals, bran and fruits as the major ingredient of the scavenged feed, which is generally abundant in rainy season. There is provision of some supplementary feed by mostly women and children throughout the seven ecological zones, particularly so in the peri-urban system. The types of food vary depending on what is available from crop residues and by-products of grains and table scraps. Along the coastal region, the type of supplementary feed include coconut cakes, food leftovers such as stiff maize porridge (ugali), maize bran and cereals. Use of beetle larvae developing in decaying cattle manure is not uncommon in farmers practising the agro-pastoral system of farming. During scavenging, the birds come into contact with inanimate objects (fomites) that are contaminated with disease organisms, impure water, such as surface drainage water, rodents, wild animals and free-flying birds, insects and contaminated feed. These are among the methods by which infectious diseases can be transmitted and spread from one farm to another.

Introduction of new poultry into the households

Msami (2000) reported that 34 out of 43 households got their replacement and new stock from chicken traders. Only three of these farmers had knowledge of the immense danger of disease posed by introduction of new birds into their flocks. Buying and selling accounted for 54% of all the replacements and new stock, followed by gifts (23%) and as foods/feasts (23%).

Village chicken flock size and structure

There have been many studies of the traditional village poultry system in Tanzania and throughout Africa (Minga et al.; 1989; Msami, 2000; Sonaiya, 2001; Mwalusanya, 2002). A typical flock structure in villages would have 5 to 15 adult birds, of which one or two would be cocks and 4 to 12 would be hens. The flock would also have 8 to 20 chicks and 4 to 10 growers. Village chickens are kept under extensive low input - low output production systems. Other characteristics of these birds are in the table below.

TABLE 8:
Characteristics of rural chicken in Tanzania

Parameter Group	Parameter	Estimate
A. Flock Structure	Flock count	25.5 (10-30)
	Cocks	1 (1-3)
	Hens	5 (4-12)
	Growers	6 (4-10)
	Chicks	10 (6-20)
B. Hen Performance	Age at 1st egg (Wks)	24
	Body wt at 1st egg (g)	900
	Egg weight (g)	41
	Adult body weight for hens	1.5
	Adult body weight for cocks	1.8
	No. clutches/yr	3
	No. eggs/clutch	15
	Clutch formation	20 days
	Incubation period	21 days
	Brooding period/clutch	56 days
C. Flock Formation	Inter-clutch period	24 days
	Hatchability	80%
	Chicks per clutch	12
	Survivability	30-40%
E. Economics	Chicken off take flock per year	
	Flock owners on poverty line	100%
	% Family income derived	15-40

Source: (Boki, 2000) Sonaiya (2001), Minga (2003) Msami (2000)

Studies to determine local chicken productivity levels under traditional management, flock size and structure have been conducted in Tanzania (Minga et al.; 1996; Msami, 2000; Mwalusanya, 2002). Information on rural poultry production and productivity in Tanzania is presented below. The total number of egg production per hen per year ranged from 6-20. In general, egg productivity of scavenging poultry in Tanzania is low, chick mortality is high (30-80%) and hatchability is high (50-100). In addition to genetic effect, this low egg production could be improved and even doubled without any detrimental effect on hatchability through rational feeding. The improvement of egg production could also be achieved by early weaning of the chicks but its effect on chick survival and female reproductive life needs to be known (Minga, 1996).

TABLE 9: Production co-efficients of rural poultry in Tanzania

Source	Country	Clutches per year	Egg per clutch	Egg weight (g)	Hatchability (%)	Chick mortality (%)
Kitalyi & Mayer, 1998	Tanzania	2.4	15	--	78	32
Minga et al., 1989	Tanzania	-	6-20	41.0	50-100	80
Msami, 2000	Tanzania	2.9	12	-	84	30
Mwalusanya et al	Tanzania		11.8	44.1	83.6	40.3

Different age groups are observed with hens forming the majority of the flock followed by chicks and growers which were more or less same in number. Cocks are fewest comprising about 8.2% of the flock. Cocks were culled at an early age for either sale or slaughter. The ratio of chicks: growers: adults were 10:10:14 (Msami 2000). In Tanzania, a model was proposed which showed that if husbandry was improved and veterinary interventions applied, it would be possible to change the current chick: grower: adult ratio such that the ratio based on one hen would be 34:32:1 (Minga, 2001). The low number of growers and chicks is mainly due to high chick mortality resulting from diseases, predation and nutritional disorders. Scavenging poultry play a key socio-economic role and largely contribute to protein malnutrition alleviation in Tanzania and other African countries. However, there still exist serious constraints to its development in terms of low egg production, hatchability and survival of chicks. Rural poultry production as a means to alleviate poverty could be highly increased if those constraints are properly targeted in terms of improvement of the rate of reproduction and reduction in mortality (Minga 2005).

There is a range of simple improvements in flock husbandry and management which could make a big positive impact to the productivity of a small household village chicken flock. This includes improved housing, protection against predators, chick feed supplementation, more effective disease control and management of flock size in accordance with the size of the Scavenging Feed Resource Base (SFRB).

3.4.2 Ducks

Other poultry are of less importance to smallholders as shown in Table 10. Of the other poultry, ducks are the most prominent and are concentrated in Mwanza (12%), Tanga (9%) and Dodoma (8%) regions.

TABLE 10:
Number of poultry other than chickens

Type of livestock	Household number	Head number	Average number per household
Ducks	165,958	1,308,645	8
Turkeys	5,992	212,704	35
Others (pigeons, guinea fowls)	27,112	295,550	11

Source: National Sample Census of Agriculture 2002/2003 (Modified)

Large-scale farms make a minor contribution to the population of poultry other than chickens with only 5,000 ducks and 612 turkeys (MoLD/NBS).

3.5 POULTRY VALUE CHAIN ANALYSIS

3.5.1 Day-old chicks

Commercial DOC are sold primarily at a point close to TAZARA railway station. The majority of hatcheries sell DOC at TAZARA Railway station while a few hatcheries either sell directly to farms or utilise agents for the distribution of their produce. Several of these agents are the operators of poultry shops which market various types of poultry inputs. Euro Chicks for example have their selling point close to Dar es Salaam airport and that of Kiluvya hatchery is situated at the corner of Shekilango and Morogoro Road in Kinondoni District. Other selling points are located at Namanga area in Kinondoni and Chang'ombe (Temeke District).

It frequently happens that some DOC do not find buyers and the hatcheries are forced to take them back to their rearing farms. Several hatcheries have this safety-valve mechanism to handle excessive DOC. Otherwise the destruction of unsold DOC by some hatcheries is carried out due to lack of a market; the subsequent sale as pig feed was witnessed by the author in 2004. Imported DOCs are sold in the similar manner. Under normal circumstances, DOC are brought to these selling points as per orders as well as for free marketing. During times of scarcity, all sales are in accordance with previously confirmed and paid for orders. The hatcheries have specially made trucks (with protection against wind, dust and rain) for ferrying DOC from hatcheries to the selling point. However, the smallholder farmers who raise commercial chickens utilise ordinary vehicles to transport the DOC to their rearing farms. The TAZARA distribution area should invariably be regarded as a high-risk area for HPAI because domestic birds from different hatcheries are mixed, traded and distributed to

different locations. Marketing days are Monday and Thursday of every week, when a high poultry density is witnessed. The price of broiler DOC varies between Tsh 1,200 (US\$ 0.96) - 1,300 (US\$ 1.04) and the pullet DOC costs Tsh 1,300.00. Due to the current shortage (mid June 2007) of DOC the prices have been hiked to Tsh 2,000 (US\$ 1.6) by some unscrupulous traders.

The DOC for parent stocks are imported and consignments are received either at Dar es Salaam or Kilimanjaro International Airports. Also, some farms import their commercial DOC in a similar way. Up-country sales are usually facilitated through air transportation of DOC particularly to Arusha, Mwanza, Kilimanjaro, Mtwara, Bukoba and Musoma etc. Otherwise road transportation to several destinations is the only alternative.

3.5.2 Chicken meat

The large-scale poultry farmers have their own transportation facilities and some in Dar es Salaam have a cold chain system which ensures the maintenance of good quality eggs and dressed broiler meat. The small-scale farmers usually depend on itinerant middlemen to sell their produce and often end up being denied fair prices. The major means of transportation of eggs in Dar es Salaam is by means of bicycles whereby several egg trays are packed on the back seat of the rider; a convoy of such bicycles from the site of production (from the outskirts of Dar es Salaam, mainly Kitunda and Kipunguni) is daily routine. It is suggested that farmers should form a group or association that will assist with marketing of eggs and meat. A good marketing channel among the poultry producers, retailers, sellers regulated by an association may help small farmers from being exploited by the traders.

The small-scale farmers (Sector 3) sell live broilers directly to consumers or through middlemen. The live broiler chickens are caught and transported to the market by different means (pickups, weaver baskets on bicycles). At the market they are placed in chicken stall for display. From here the birds will be sold as live birds or slaughtered and sold as meat.

Dressed chicken and table eggs are sold to the consumers through a number of channels. These are:

- Farm gate e.g at Interchick Company
- Sales outlets (a series of which have recently been set up throughout Dar es Salaam)
- Distributors
- Hotels, restaurants and street food vendors
- Supermarkets
- Open markets

The current price of a broiler bird (about 1kg dressed carcass weight) is Tsh 4,000.00 (US \$ 3.20) and a tray of eggs (30 eggs) costs Tsh 4,000.00 (US \$ 3.20)

In Tanzania, village chicken is more popular because of the perceived taste, even in the main towns and cities. Farmers are generally confident that there will always be a market for their output, even if production rises. However, farmers do express concerns that they are being ripped off by middlemen along the marketing chain. Several poultry stakeholders talk about much needed improvements to marketing systems, and some go further to suggest the formation of marketing co-operatives as a possible solution.

There is no evidence to suggest that markets in Tanzania are uncompetitive. Tanzania has a more highly developed market system than a number of countries in Africa like Mozambique (Woolcock, 2003). For example in the Dodoma area of Tanzania, farmers have multiple choices in selling their chickens:

- They can take their chickens to Dodoma town themselves and sell direct to a retailer at the market.
- They can sell to a trader who does the same thing, except in larger lots of around 100 birds. The trader would have bought the chickens from number of farmers. These traders reside in the same village or come to the village to purchase chickens and use public transport to get to market

- Farmers can take their chickens to the cattle markets in their own village, which are held by rotation once every fortnight in every village. These markets attract a larger numbers of traders including those who purchase chickens.

Larger-scale traders may purchase birds in large numbers (1,000 - 2,000) from the retailers in Dodoma for transport to Dar es Salaam by the lorry load. They are happy to pay retail prices even for large lots because of the saving in time required to purchase from farmers or smaller traders, and the higher prices which chickens fetch in Dar es Salaam. There are highly organised supply chains from most regions to supply Dar es Salaam involving coordinated rail and road transport. For example, chickens from the Singida Region used to be transported to Dodoma by rail in large numbers, and were transferred to large lorries to complete the journey to Dar es Salaam. They used rail to Dodoma because roads were poor and trucks for a speedier completion of the journey. However, currently the traders are using trucks all the way from Singida following repairs and construction of Dodoma-Singida road. Such highly organised marketing chains all add to the competitive nature of the outlets at the farm level.

In Handeni district it is common to find some traders selling village chickens to passing traffic along the Chalinze Arusha Road. Such traders will shake tied up local chickens as well as eggs to travellers in attempts to convince them to buy the chickens.

All aforementioned information withstanding, the marketing system is still very informal and lacks good organization and infrastructure including facilities specifically for marketing of poultry. Improving markets will boost sales and consequently give an incentive to farmers to produce and increase production. A workshop conducted in 2005 in Singida drawing participants from Dodoma and Singida by SANDCP proved to be an effective two-way exchange of information. It was revealed that there are two existing associations representing traders. The first is the Association of Chicken Traders for Dodoma Majengo Market, which covers the trade in village chickens. The association has 72 members; it is not yet formally registered but is recognized by the Regional Cooperatives Department. The second is the Association of Chicken Dealers of Mungumaji Market in Singida. This association has 40 members and is a formally registered body. In order to address traders' needs, they ought to be assisted to analyse problems and identify strengths, weaknesses and opportunities in marketing. It is important to facilitate the establishment of primary and secondary poultry markets in order to create an incentive for poultry keepers to trade and increase their income by boosting sales. Education to farmers and traders on the importance of poultry keeping and sale of surplus chickens through a formal market is of importance. Local Government Authorities LGAs, private sector and NGOs can be used to create an enabling marketing environment (SANDCP 2005).

Marketing studies on village chicken

Mlozi et al, (2001) carried out a one-year longitudinal marketing study of free range local chicken (FRLC) in Morogoro municipality. The study involved five groups of people: bar kitchen owners, women street food vendors (Mamalishe in Swahili), supermarkets, vendors, middlemen and farmers; the former earned more profit and the farmer got the least. These findings show that there was a significant variation of the selling prices. Number of chicken sold per day and profit margins generated both per chicken and per day between the five different groups of people are shown in Table 11.

TABLE 11:
Profit margins earned by different local chicken sellers

Business type	Buying price (TShs)	Selling price (dressed carcass) (TShs)	Birds sold/day	Profit/bird/day (TShs)	Total profit/day (TShs)	Profit/month (TShs)
Bar kitchen	1, 432	3, 331	19	1, 899	36, 081	1, 082, 430
Food vendor	1, 633	3, 967	2	2, 334	4, 668	140, 040
Supermarket	1, 500	3000	5	1, 499	7,459	223,770
Vendors	1, 308	3, 160	12	1, 852	22,224	666, 720
Middleman	1, 259	3, 411	6	2, 152	12, 912	387, 360
Farmer	-	1, 259	3	1, 259	3, 777	113, 310

Source: Mlozi et al (2001)

Further, a cross-sectional survey of 117 farmers raising FRLC was done in seven villages in Dodoma and Singida regions (Mlozi et al., 2002). The farmers were involved in crop production, ruminant and poultry keeping. The study found that most farmers had income below the poverty line. Sixty out of 117 (51.3%) interviewees showed that their annual income was below Tshs 100,000 (US\$ 100, when exchange rate was Shs. 1,000.00 per USD 1.00). Further, this survey showed that farmers' earnings from selling FRLC were least among the six income sources: cattle businesses, field crops, remittances from relatives and other livestock. Of the six income sources, most smallholder farmers earned 60 percent of their annual total income from selling cattle. Smallholder farmers earned only 2.5 % of the total annual earning from selling FRLC as compared to the other five income sources.

Interview with a trader: Example of marketing system, costs of marketing, margins

The trader lives in a village approximately 50 km from the city of Dodoma. He aims to purchase 100 birds for each trip to Dodoma, but can sometimes only secure 50 or so. He has a number of buying methods; he knocks on farmers' doors in his own and surrounding villages and buys a few birds from each farmer; he purchases birds from smaller-scale village-based traders who may have assembled 10 to 20 birds for on-sale to larger traders such as himself and sometimes farmers contact him to sell their birds. He travels from village to village by bicycle. He travels from the villages to Dodoma town by public transport. He most often sells the birds to a retailer in the town market, but sometimes he goes directly to a restaurant or hotel to fulfil pending orders. Parliament holds its sessions in Dodoma and if Parliament is in session, then demand for chickens is high and hotels pay a premium. The trader sometimes encounters losses from mortalities and from missing birds which disappear while scavenging. The mortalities vary a lot but on average would be 4 to 6%, plus 1 to 2% missing ones while scavenging. A round trip takes two days, and he makes 2 to 3 trips per week.

The buying price of birds varies according to the source, the size of the birds and the number being purchased. He pays farmers TShs. 1,800 (US\$ 1.43) for a cock, TShs. 1,400 (US\$ 1.11 – 1.12) to 1,500 for a hen, and smaller birds for 1,000(US \$ 0.8) to 1,200(US \$ 0.95). An average buying price is around shillings 1,500 (US \$ 1.12). He sells the birds to the retailer for shillings 1700(US \$ 1.35) to 1800 (US \$ 1.4). The margin is therefore 250(US \$ 0.2) per bird before allowing for his expenses.

Expenses are as follows (USD conversion):

	Tsh	USD
Bus fare (return trip)	3,000	2.4
Transport of chickens (100 birds)	2,000	1.6
Wheelbarrow to the market	500	0.4
Market taxes	500	0.4
Travelling expenses (meals)	1,000	0.8
Traders labour 2 days at 1000	2,000	1.6
Losses say 7% - 7 birds at 1750	12250	9.7
TOTAL	19500	15.4
Cost per bird (100 birds)	195	0.15
Profit margin per bird	38	0.03

This means that for 1,000 birds the trader would make a profit of USD 30.00, which is substantial by village standards.

As can be seen from the above figures, losses are the key variable in determining profit margins for traders and their business is a very risky one. The control of ND will no doubt be of great benefit to them, and some of this benefit would be expected to be passed onto farmers in due course in the form of higher prices. The above figures also demonstrate the disadvantage of farmers taking their own birds directly to market, as the costs per bird would be considerably higher for just a few birds.

Bio-security is obviously an issue in the above story. The infectious diseases can be spread from farm to farm by such a trader through introduction of diseased birds, introduction of healthy birds which have recovered from disease but are now carriers, shoes and clothing of the traders who move from flock to flock, contact with inanimate objects (fomites) that are contaminated with disease organisms, dead birds that have not been disposed of properly, bicycles and premises contaminated by soil or old litter.

3.5.3 Table eggs

See Section 3.5.2 for information

3.5.4 Other species

This information has not yet been sourced

Chapter 4

Trade, marketing and markets

4.1 DOMESTIC MARKET

Table 10: Distribution of markets

This information has not yet been sourced

4.2 IMPORT

DOC produced locally do not meet demand which is estimated at 32 million per year and therefore both hatching eggs and live chicks are imported to fill the gap (see Table 12). The number of hatching eggs imported has been declining from over nine million in 2002/2003 to just over a million in 2005/2006. Conversely the number of live DOC imported has increased from 0.92 million to 3.3 million during the same period. The combined local production of DOC and importation of DOC has managed to meet Tanzanian demand (32 million) and in several instances surpassed the demand. It was not uncommon before the HPAI scare for several hatcheries to face stiff competition in selling their DOC and they quite often ended up rearing the DOC themselves because of failure to market them.

TABLE 12:
Importation of doc and hatching eggs into tanzania during the period 2000–2006

Year	Client	Source	Product	Quantity	
2000	Inter-chick	Netherlands	Eggs	108,000	
		South Africa	Eggs	133,000	
	Ruvu JKT	Israel	Layers - doc	3,450	
	Belisle T Ltd	South Africa	Eggs	345,600	
		Uganda	Broiler - doc	6,000	
		Zimbabwe	Eggs	777,600	
	Twile traders	Kenya	Eggs	100,000	
	Mtunda	Kenya	Layers - doc	300	
	Mkuza	South Africa	Eggs	259,200	
	Seni & Co	Kenya	Eggs	48,000	
	Burton Investments	Zimbabwe	Layers –doc	45,000	
	Burton Investments	Zimbabwe	Broilers - doc	18,000	
	Jaribu women group	Israel	Eggs	54,000	
	2002	Jaribu women group	Israel	Eggs	30,000
		Jaribu women group	Uganda	Eggs	60,000
		Alex mwai	South Africa	Layers – doc	2,000
Dudley –graham		Uganda	Eggs	6,000	
Dudley –graham		Zimbabwe	Broiler – doc	2,160	
Dudley –graham		Malawi	Eggs	30,000	
Nicholous Marwa		Israel	Eggs	36,000	
Kijenge animal products		Israel	Layers – doc	11,209	

TABLE 12:
Importation of doc and hatching eggs into tanzania during the period 2000–2006

Year	Client	Source	Product	Quantity
2003	Inter-chick	Uganda	Eggs	12,000
		Israel	Layers – doc	16,000
			Broilers - doc	12,000
	Belisle T ltd	Malawi	Layers – doc	16,000
			Broilers – doc	1,000
		South Africa	Eggs	464,400
2004	Jamada chicks	South Africa	Eggs	72,000
		Zimbabwe	Eggs	12,000
		Uganda	Layers- doc	861
		Zimbabwe	Eggs	10,000
		Malawi	Broilers – doc	25,600
		The Netherlands	Eggs	2,070
		South Africa	Eggs	1,440
		South Africa	Layers – doc	500
		Zimbabwe	Eggs	3,135
		South Africa	Layers – doc	1,000
		South Africa	Broiler – doc	74,000
		The Netherlands	Layers – doc	8,000
		Dudley –graham	Broiler – doc	1,740,000
		Dudley –graham		
		2005	Inter-chick	Kenya
Kenya	Layers – doc			12,000
Kenya	Layers – doc			14,000
Kenya	Layers – doc			6,000
Kenya	Layers – doc			8,000
Kenya	Layers – doc			4,600
Kenya	Layers – doc			1,500
Kenya	Layers – doc			2,000
Kenya	Layers – doc			2,000
Kenya	Layers – doc			2,000
Kenya	Layers – doc			1,500
Kenya	Layers – doc			4,000
Kenya	Eggs			1,780,000
Kenya	Broiler			660,000
Kenya	Broiler			35,000
Kenya	Broiler			328,000
Kenya	Broiler			4,000
Kenya	Broiler			78,000
Kenya	Broiler			519,000
Kenya	Broiler			45,000
Kenya	Broiler			250,000
Kenya	Broiler	16,000		
2006	Elizabeth Mwakatobe	Kenya	Parent stock	16,000
		Malawi	Layers	2,000
		Malawi	Layers	40,000

TABLE 12:
Importation of doc and hatching eggs into tanzania during the period 2000–2006

Year	Client	Source	Product	Quantity
	Luhizo Hassan	Uganda	Eggs	6,210
		Malawi	Eggs	96,000
		Zimbabwe	Layers	7,000
		Malawi	Eggs	12,000
		The Netherlands	Broiler-doc	112,000
	23233	Egypt	Eggs	6,000
		Uganda	Eggs	10,000
		Uganda	Layers – doc	357
		Malawi	Eggs	2,000
		Uganda	Layers – doc	147,000
			Broiler – doc	5,000
		Egypt	Broiler – doc	2,000

Source: MoLD courtesy of MR Temu

Records retrieved from Tanzania Revenue Authority indicated that for the period July 11, 2005 up to May 26, 2006, parent stock chicks imported amounted to 143,578 from 8 countries (Table 13).

TABLE 13:
Number of chicks for ps imported and their origin from july, 2005 to may, 2006.

Date	Company name	No. of chicks	Source
11.07.05	Christ Disciples Mission	5,000	Germany
25.07.05	Kibaha Education Centre	3,450	U.K
12.08.05	Joe Mbuna (Kiluvya Poultry Co)	5,950	Netherlands
23.08.05	Euro Poultry Ltd	1,000	Kenya
13.09.05	Fammy Poultry Product Ltd	1,190	Netherlands
04.09.05	Ideal Chicks Ltd	3,000	UAE
28.09.05	Kiwara L.D	357	Netherlands
08.09.05	Kilacha Production &Train. Centre	3,335	France
08.09.05	Kibo Poultry Products Ltd	6,210	France
18.10.05	Mkuza Chicks	4,000	Mauritius
17.10.05	Tanzania Poultry Farms	10,710	Netherlands
21.10.05	Joe Mbuna	4,760	Netherlands
31.10.05	Tanzania Poultry Farms	2,572	Netherlands
08.11.05	Misenani Agric.Services Ltd	1,000	Mauritius
08.11.05	Kibo Poultry Products Ltd	1,170	France
08.11.05	Kibo Poultry Products Ltd	7,794	France
09.11.05	Mkuza Chicks	2,000	Mauritius
09.11.05	Mkuza Chicks	2,000	Mauritius
21.11.05	CEFA Njombe	407	Netherlands
27.12.05	Kilacha Production &Train. Centre	2,970	France
27.12.05	Kilacha Production &Train. Centre	579	France
23.12.05	Magereza	500	Mauritius
19.12.05	Mkuza Chicks	2,000	Mauritius
19.12.05	Mkuza Chicks	2,000	Mauritius
07.02.06	Mkuza Chicks	2,000	Mauritius

TABLE 13:
Number of chicks for ps imported and their origin from July, 2005 to May, 2006.

Date	Company name	No. of chicks	Source
07.02.06	Mkuza Chicks	2,000	Mauritius
22.02.06	Ideal Chicks Ltd	1,150	Zambia
24.02.06	Tanzania Poultry Farms	1,350	France
21.03.06	Ideal chicks Ltd	5,800	Netherlands
12.03.06	Suma JKT Ruvu Unit V Ruvu	2,495	Netherlands
10.04.06	Tanzania Poultry Farms	10,710	Netherlands
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Interchick Co Ltd	5,000	Kenya
02.05.06	Kibo Poultry Products Ltd	6,210	Netherlands
24.04.06	Kile Farms	357	Netherlands
16.05.06	Mkuza Chicks	4,000	Netherlands
24.05.06	Kibaha Education Centre	1,000	Mauritius
26.05.06	Tanzania Poultry Farms	2,552	Netherlands
	Total	143,578	

Source: TRA Dar es Salaam

As of now (2001–2006/07) the hybrids that are imported and their sources (wherever it was possible to establish) are: Ideal Chicks Co. Shavers I, II, III, Bovan (Brown and Bovan Gold (Layers PS), Kasila and Ross 208 (Broiler PS) Euro Chicks (Bovan brown and black for layers Ex Henrick Genetics Netherlands) and broiler PS (Arbo acres Ex Kenchick Kenya), Mkuza Chicks (Hybro Shavers for broiler PS, Missenani Agri services Mwanza Nera layers PS from Mauritius and Hybro Broiler PS from Netherlands). The breeding farms usually import PS DOC and not eggs.

4.3 EXPORT

This information has not yet been sourced

4.4 SLAUGHTERING FACILITIES

This information has not yet been sourced

4.5 POULTRY FEEDS

In the recent past in Dar es Salaam, some large-scale poultry farms have started processing their table birds into frozen chicken and chicken parts with production of 125 tons of meat per month. Two such companies are Mkuza Poultry Farms (with their processing plant at Kwala, Kibaha, about 50km west of Dar es Salaam) and Interchick Company, producing 30 and 60 tons per month respectively. In the year 2006/2007, a total of 72,197 tons of meat was produced in the country. Chicken produced in these enterprises and their associates are slaughtered, processed and sold as fresh carcasses or frozen chicken. Some birds are also sold live to the open market and slaughtered in various homes and business places.

Public designated abattoirs specifically for poultry (similar to slaughter houses/slabs for domestic ruminants) do not exist in Tanzania. Slaughtering facilities attached to markets are not well designed or constructed - the killing of the poultry, removing the feathers from the poultry and dressing of the carcass is all carried out in the same area. Personnel handling birds are not well protected (with appropriate clothing) from potentially infected birds, and inedible by-products are disposed of in the same system as domestic solid wastes. This is a

clear bio-security risk area as infectious diseases could spread from diseased slaughtered bird to other farms or humans by:

- Contaminated shoes and clothing of workers, visitors or caretakers who come into contact with diseased birds
- Contact with inanimate objects (fomites) that are contaminated with disease organisms
- Carcasses or their parts
- Impure water, such as surface drainage water contaminated with water from the slaughter facility
- Rodents and free-flying birds
- Insects
- Contaminated feed and feed bags
- Contaminated delivery trucks bringing birds and merchandise to the market
- Contaminated premises through inedible by-products
- Air-borne fomites

Chicken produced from scavenger production systems are sold live to the open market and slaughtered in various homes and business places. The slaughtering can also be carried out directly at the selling points. At one market (Kisutu) in Dar es Salaam, large consignments of birds are off-loaded from trucks that have arrived from Central Tanzania. The slaughtering is usually done in an unhygienic manner and proper disposal of inedible parts and offal is difficult. Such parts are consumed by birds of prey particularly Indian crows and dogs. Human beings come in contact with birds and their fluids during the slaughter process.

4.5 POULTRY FEEDS

There has been an increase in animal feed production in the last five years in Tanzania, particularly in Dar es Salaam and surrounding areas. This has followed increased demand for animal feed which has attracted a good number of feed manufacturers into the business.

Feeds account for more than 60% of the production costs of poultry. In 2001, the total animal feed produced was 490,000 tonnes and this figure has increased progressively to the current production of 574,690 tonnes. Most of the feed is sold through agents located throughout the urban and peri-urban areas. The retail price of poultry feeds varies depending on the type of feed and the mill, with broiler mash normally being the most expensive while the grower and layer mash are relatively cheaper. In the last five years, the prices have been increasing at a rather alarming rate (Table 14). Most unregistered feed producers do not usually send feed samples for chemical or nutritional analyses (Shayo et al., 2005). Even amongst the registered feed companies, only a few very occasionally send their samples for nutritional analyses, mostly to Tanzania Industrial Research Development Organization (TIRDO), Sokoine University of Agriculture (SUA), Tanzania Bureau of Standards (TBS), to Kenya (Unga Feeds, KBS) and to The Netherlands. However, most producers complain that the charges for feed analysis in Tanzania - especially those of TBS and TIRDO - are too high and results take a long time to be processed.

TABLE 14:
TREND OF PRICES (TSHS) OF POULTRY FEEDS (50KG PACK) FROM FIVE FEED MILLERS IN DAR ES SALAAM

Producer	Year	Feed type					
		Broiler starter	Broiler all mash	Broiler finisher	Chick starter/mash	Growers mash	Layers mash
FALCON	2001	-	-	-	-	-	-
	2002	-	-	-	-	-	-
	2003	11,500	11,500	11,500	-	-	-
	2004	12,000	12,000	12,000	-	-	-
	2005	13,500	13,500	13,500	-	-	-
	2006	14,000	14,000	14,000	-	-	-
	2007	14,500	14,500	14,500	-	-	-
HILL ANIMAL FEED	2001	-	-	-	-	-	-
	2002	-	-	-	-	-	-
	2003	-	-	-	-	-	-
	2004	-	-	-	-	-	-
	2005	12,000	12,000	12,000	12,000	11,000	11,000
	2006	13,000	13,000	13,000	12,500	11,500	12,000
	2007	13,500	13,500	13,500	13,500	13,500	13,500
TAUSI ANIMAL FEED	2001	9,000	9,000	10,000	8,000	8,000	8,000
	2002	11,000	11,000	11,000	9,000	9,000	8,000
	2003	11,000	11,000	11,500	9,000	9,000	8,000
	2004	11,500	11,500	11,500	11,000	11,000	8,500
	2005	12,500	12,500	12,500	11,000	11,000	10,000
	2006	13,000	13,000	13,000	12,500	11,500	12,000
	2007	13,500	13,500	13,500	13,500	13,500	13,500
EAGLE FEED	2001	11,500	11,500	11,500	11,500	-	-
	2002	12,000	12,000	12,000	12,000	-	-
	2003	12,500	12,500	12,500	12,500	-	-
	2004	13,000	13,000	13,000	13,000	-	-
	2005	13,500	13,500	13,500	13,500	-	-
	2006	14,000	14,000	14,000	14,000	-	-
	2007	14,500	14,500	14,500	14,500	-	-
KIBOKO	2001	-	-	-	-	-	-
	2002	-	-	-	-	-	-
	2003	-	-	-	-	-	-
	2004	-	-	-	-	-	-
	2005	13,000	13,000	13,000	13,000	-	-
	2006	13,000	13,000	13,000	13,000	-	-
	2007	13,500	13,500	13,500	14,000	-	-

Source: Feed sellers' interviews

Poor quality feed is an issue for commercial farming in Tanzania. Based on the chemical composition of the feeds, Shayo et al (2005) revealed that the quality of almost all the feeds manufactured in Eastern and north-eastern Tanzania were lower than the requirements of the chickens. Crude protein and metabolisable energy contents of the feeds were below the recommended levels and this contributed to the low performance of the chickens. Since feed cost is the prime input in commercial poultry production, efforts must be directed to minimising the costs without comprising the quality.

Chapter 5

Breeds

5.1 EXOTIC BREEDS

The common commercial breeds and their crosses are the White Leghorns, Rhode Island Red, Light Sussex and Plymouth Rock and hybrids such as Hi sex, Hybro, Shavers (I, II, III), Bovan (Brown), Bovan Gold Line, Arbo Acres, Kasila, Ross 208 and Nera.

5.2 LOCAL BREEDS

Five ecotypes are identified and named; *Mbeya*, *Morogoro-medium*, *Ching'wekwe*, *Kuchi* and *Singamagazi* (Msofe, et al., 2001). *Singamagazi* and *Kuchi* are significantly heavier, with longer shanks and heavier eggs than the other ecotypes. The different ecotypes differ in both productivity and disease resistance potential (Msoffe, 2002).

Chapter 6

Veterinary health, public health, biosecurity measures

6.1 HIGHLY PATHOGENIC AVIAN INFLUENZA

The threat of HPAI incursion into Tanzania is a real one as there are several factors which favour transmission of the disease. Even though Tanzania has taken appropriate measures to curb the entrance of the disease, the danger is still present. The country is very large with several ports of entry for poultry and poultry products and large water bodies. There are several districts along the flyways where migratory birds mix and places such as live markets where domestic birds are assembled, traded and distributed to different locations. Thus the live marketing system allows areas where domestic birds coming from different places mix before they are taken to different areas of the country. Subsequent slaughtering is also carried out in a manner that can be conducive to rapid spread of infectious viruses. Moreover, the extensive free range system of production has poor bio-security and there is mingling with wild birds and domestic birds as well as human beings.

The recent experience of the RVF outbreak has shown that Tanzania has limited capacity to handle animal disease emergencies.

An HPAI awareness questionnaire would indicate the level of awareness among Tanzanians on the threat of HPAI. This has not yet been carried out. It is appreciated that while Tanzania is still free from HPAI, it is important that all key stakeholders have a good understanding of HPAI preparedness and prevention. It is important that this is done even on a limited scale such in the densely populated areas such as Dar es Salaam city, Coast and other areas.

As poultry mortality due to ND and other diseases has been a relatively common occurrence, village poultry owners have developed a range of ways of salvaging some benefit from sick or dead birds. Consequently, the consumption and sale of sick birds is a common practice among resource-poor farmers. This inevitably results in contracting the disease or dissemination of the same if an outbreak occurs. This means that should an HPAI outbreak occur, infection of humans would be anticipated. It is essential that rural people are made aware of the threat posed by the consumption of sick birds and how to contain disease. Adaptation of these recommendations will be easier in communities where ND control is working well and frequent high mortality of birds has become a rare event.

Tanzania has HPAI preparedness and response plans in place. Preparedness involves a number of factors including raising the level of public awareness of the disease issue (which has been done with success) and making sure that all aspects of the laboratory system and surveillance are robust (an aspect that is still being developed). The HPAI emergency preparedness plans need to be drilled by conducting simulation exercises to perfect the reaction in the event of an outbreak. Systems for early detection, rapid response and eventual containment of the disease are critical.

Areas at high risk of contracting highly pathogenic avian influenza

High-risk areas were defined, which included all ports of entry for travellers from outside and all ports of entry for poultry and poultry products. Tanzania has 42 official ports of entry which include airports, seaports, lake ports and dry land entry ports. Migratory birds have a tendency to congregate around large water bodies. The high risk areas therefore include Lake Victoria basin, an area that forms an axis of Lakes Natron, Manyara, Eyasi and Nyumba ya Mungu dam, the area that contains Lake Rukwa, Mtera dam Usangu plains, the Indian Ocean coast and three areas where domestic birds coming from different places mix before they are taken to different places. The period between November and March is critical for Avian Influenza Surveillance in Tanzania due to migratory birds from Europe which come to

winter in Tanzania. The disease is already in Africa and birds from Europe may carry it from Egypt and Sudan on their way to Tanzania.

Official regulation for the control of avian influenza

The government regulations and interventions to prevent the entry of AI into Tanzania, as well as its reaction to the spread of the disease in parts of Asia, Europe and Africa are well documented (MoLD documents, 2007). The GoT Reaction to the Global Spread has been to focus on fighting the disease effectively with steps taken aimed at the disease prevention which included:

- ban importation of poultry and poultry products from affected countries
- institute an effective surveillance system, both passive and active
- strengthen national laboratory systems
- coordinate targeted community training
- develop appropriate training programmes for various levels

Because of the threat of HPAI, GoT initially banned the importation of all poultry and poultry products but was forced later to lift the ban because of the acute shortage of DOC (both broiler and layers). A team of officers made a study of the hatchery companies and made an assessment of the situation (including their requirements), following which permits for importation were issued.

Formation of the National Avian Influenza Multisectoral Task Force (NAMUTAF)

The Avian Influenza NAMUTAF works under the Tanzania National Disaster Reduction Committee (TANDREC) with a mandate from the government to make decisions. The group is multi-sectoral and coordinated by the Prime Minister's Office, Disaster Management Unit or the Lead Agency the Ministry of Livestock Development on delegation from the PMO.

Formation of Technical expert group on "Highly Pathogenic Avian Influenza"

The group deals mainly with:

Risk assessment

This includes assessing the risk of introduction of a disease into respective areas and rating it as e.g. Moderate, High or Negligible. It also involves assessing the risk of spread and sustenance of infection.

Compilation of a comprehensive Emergency Preparedness Plan

The Tanzania Emergency Preparedness and Response Plan for HPAI was formulated by this group. The plan recognizes the need for conducting active disease search using rigorous scientific methods as well as that of outbreak investigation using staff in the medical, veterinary or wildlife fields, after they have acquired the capacity to recognize and report suspicious cases of avian influenza. A total of 6,000 samples from chicken, ducks and guinea fowls and wild birds were collected and tested at Central Veterinary Laboratory and at the University of Minnesota in the United States. Results were negative for Avian Influenza.

The Ministry has been assisted by FAO and USAID and has received and distributed 500 sets and 2,000 sets of protective gear (masks, disposable gloves, T goggles, disposable boots and overalls). Capacity building of CVL to do virus identification is continuing. Various items (for molecular biology) and benches for the laboratory will be supplied. These activities are part of the larger project which will have components covering the MLD, MOH, MNRT and SUA. The Japanese University has agreed to send Primers to SUA and it is understood that other laboratories may share these.

The Ministry of Livestock Development personnel have undergone training on sampling and bio-safety at Mpwapwa Veterinary Investigation Centre (VIC). The participants included two veterinarians and two lab technicians from each of the six VICs, and 3 supporting staff from MLD. The Faculty of Veterinary Medicine of Sokoine University of Agriculture with assistance from UC Davis School of veterinary medicine has trained 30 trainers on avian influenza surveillance, public health, prevention and response.

The Avian Influenza Information, Education and Awareness sub committee

There are 4 sub committees which are now functional; the awareness sub group has been the most active and has been able to get a grant from UNICEF for carrying out awareness campaigns to the tune of Tsh 110,569,000.00 (USD 88,455.20). A total of 1,000,000 leaflets and 400,000 posters have been produced and distributed. More technical awareness materials are in the process of development.

Training workshops in the Lake zone were carried out and drew participants from District Veterinary officers, District Wildlife officers and District Medical officers. The aim was to create awareness and build capacity for District staff to carry out training in the wards and villages on emergency preparedness.

Capacity for Early Detection

Capacity will continue to be built in the VICs so that they are able to collect quality samples and submit them to CVL. The CVL was due to be upgraded to a bio-security laboratory level 3 to be able to diagnose the disease before the end of 2007. In the meantime the CVL will process and submit samples for further diagnosis to the reference laboratories outside the country. Capacity is also being built in MOHSW and in the meantime if an AI patient is suspected at any health facility that is not the District hospital, he shall be referred to the District Hospital for further investigation and management. Provisions shall therefore be made by MOHSW to protect medical staff from being exposed to AI from sick patients and to procure necessary diagnostic kits as well as medical supplies for patient management

National Integrated Avian Influenza (AI) Emergency Preparedness and Response Plan

The National Integrated Avian Influenza (AI) Emergency Preparedness and Response Plan is intended to articulate measures for the prevention of introduction or spread of Highly Pathogenic Avian Influenza (HPAI) in Tanzania.

The overall objective of the Plan is to safeguard human health and protect the socio-economic welfare of those involved in poultry farming by preventing the introduction and spread of HPAI in Tanzania. The specific objective is to prevent the introduction and - if it occurs - to mitigate its spread in Tanzania, and the consequent economic and ecological disaster.

The plan concentrates on six key objectives:

- Capacity for early warning and reporting improved
- Capacity for early detection and reporting improved
- Capacity to contain AI problem at source established
- Opportunities for human infection reduced
- Tanzanian Public awareness of HPAI improved
- Research and understanding of Avian Influenza epidemiology
- Coordination and management

The total cost of the National Avian Influenza Emergency Preparedness and Response Strategic Plan is estimated at USD 25,294,188 with surveillance activities being allocated USD 4,625,520; laboratory diagnostic capacity building being given USD 2,447,900; reducing opportunities for human infection being allocated 6,189,000 and public & technical awareness creation being allocated USD 3,232,600.

The plan will be under the overall management of the Prime Minister's office, but the Ministry of Livestock Development will coordinate day-to-day implementation. Senior staff from the Ministry of Livestock Development, Ministry of Health and Social Welfare and the Ministry of Natural Resources and Tourism will directly implement day-to-day activities. At Regional and District Level, the plan will be executed using the existing Government structures. The Regional and District Disaster Management Committees will be the Local Command Centres. Government funding had begun to emerge but ceased abruptly in January 2007 following the RVF outbreak.

6.2 OTHER MAJOR POULTRY DISEASES

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/aq/againfo/programmes/en/empres/home.asp

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

The diseases most prevalent in commercial poultry farms are ND, infectious bursal disease (IBD/Gumboro disease), Fowl pox, Marek's disease, Salmonellosis, colibacillosis and mycoplasmosis. A vaccination schedule to prevent common diseases is normally followed. When purchasing the DOC, small scale farmers usually receive proper guidelines on vaccination and medication from PS farms and their agents. In Sector 3 layer and broiler production operations, the vaccination is usually against MD (for pullets only), ND and IBD. Each breeding farm seems to maintain a different vaccination schedule, but in general protection is practised against ND, IBD, Avian Encephalomyelitis/epidermic tremor (AE), Infectious bronchitis (IB) and Fowl pox. Vaccination against ND in commercial poultry has been successfully sustained, meaning that outbreaks of ND are very rare here; ND has now become mainly a disease of village chickens. Vaccines are imported from Israel, Spain and Italy and sold at retail price of ND LaSota strain Tsh 2,500.00 (US \$ 2) and IBD Tsh 3800.00 (US \$ 3) per a 1000 doses vial.

There have been reports of vaccination failures particularly against IBD and MD. In egg production farms - particularly in Kitunda and Kipunguni farms (the major egg producing area) in Dar es Salaam - MD is rampant mainly due to the maintenance of multi-age flocks. The occurrence of clinical syndromes of IBD in chickens in Tanzania was first observed in 1989. The disease was encountered in layer chicks purchased from one commercial hatchery in Dar es Salaam (Kapaga et al., 1989). Since this outbreak, IBD in Tanzania has been occurring almost annually with the disease now being the main killer of intensively managed commercial layers (Sector 3) in the major cities especially Dar Es Salaam and Arusha. The disease syndrome has also been observed in scavenging chickens in some parts of rural Tanzania (Yongolo et al 1995). It has been suggested that levels of maternal antibodies should be monitored to ascertain appropriate time of vaccine administration.

Several diseases and in particular Newcastle disease (called Mdondo in Swahili) is usually mentioned by farmers as the major constraint inhibiting rural chicken development. When outbreaks occur they are usually accompanied by high mortality rates and this discourages farmers from investing much time or money in their flocks. The disease shows a seasonal occurrence pattern with a peak in the dry season (August - November) and all age groups being equally affected. The disease is endemic in the country and three types of Newcastle Disease virus (NDV) have been isolated. In economic terms, the direct cost of ND is considerable. It is estimated that in Tanzania 30 - 80% of the 32,559,208 village chickens die annually from ND. Village chickens sell for around USD 2.00 to 3.00 per bird. At a 30% mortality rate the minimum direct annual cost of uncontrolled ND is USD 19,535,525. At 80% mortality, the maximum loss is in the order of USD 78,142,100. Other diseases mentioned to limit local poultry development in order of importance were coughing/sneezing (Infectious coryza), fowl pox, mites, ticks, and fleas (Msami, 2000). Experience in Tanzania has shown that other diseases become more important in the longer term after ND is controlled. Infectious coryza is also believed to have become more prevalent in Tanzania where ND has been controlled, although the evidence is only anecdotal at this stage. This is a bacterial disease which causes respiratory problems. Control is easy with antibiotics, which are available to farmers. Farmers also have their own local remedies for bacterial diseases based on an extract of a plant such those in the Aloe genus. Laboratory tests have confirmed that there is some positive effect from this substance.

6.3 BIOSECURITY MEASURES

Sector 2

The three major components of bio-security (isolation, traffic control and sanitation) are adhered to in PS production to a high standard. All-in/all-out management styles are practised and single age; species flocks are maintained. Simultaneous depopulation of facilities between flocks and time for periodic clean-up and disinfection to break the cycle of

disease is practised. In the PS farms, poultry have no access to the outside environment and are confined in separate buildings that limit interaction with potential reservoirs. In this system, production and flock data records are normally available from the farm management team.

Bio-security measures include:

- Attempts to keep the germs away from the poultry (i.e. free of disease), by:
 - Limiting visitors to the farm and restricting their direct contact with the flock
 - Obtaining birds from a disease-free source. Knowing the history of the flock by inquiring about past diseases in the parent flock and also the vaccine history of both the parents and newly hatched birds.
 - When adding new birds to the flock, quarantining them in a separate area from the main flock for at least two weeks
 - Keeping free-living birds and mammals away from the flock
 - Obtaining feed from a clean dependable source. Storing feed so that it is bird-proof, insect-proof, and rodent-proof.
 - Obtaining water from a clean source so it is free from potential contamination.
- Measures to keep the poultry away from the germs:
 - Prior to the arrival of new birds, cleaning and disinfecting their housing to ensure that there is no build-up of potential disease pathogens from previous flocks.
 - Cleaning and disinfecting all equipment and supplies on a regular basis and definitely between flocks.
 - After disinfection of the housing, keeping the house empty of birds for at least two weeks.
 - Avoiding mixing of different ages or species of birds.

The breeder farms that have been categorised in Sector 2 of the FAO classification have houses constructed with modern materials and with consideration of local conditions so as to achieve maximum performance. The breeder farms in Sector 2 and commercial farms have open-sided houses with gable type roofs. During hot weather, ambient temperatures rise up to 35°C with high humidity especially along the coastal belt. This weather has a negative effect on chicken productivity and some big farms use large fans for ventilation of their buildings.

Despite the integration of different activities in PS farms, each operation is located in different farms or locations. Euro Chicks for example maintains four farms located more than 30km apart. The biggest farm is 5,000 hectares in size and is located at Buyuni Temeke District, Dar es Salaam close to the Indian Ocean. Within this farm are five production centres which are over three kilometres apart. All buildings are constructed to offer protection against rain, high humidity and high ambient temperature. Within a production centre, the buildings are separated from one another by a distance of 15m in order to reduce possibilities of disease and parasite transference from house to house. The brooder house is completely separated from buildings which house growing and adult birds. Chicks are reared on deep litter. Heating is usually provided from an overhead hover such as infrared lamps and paraffin heaters. Use of a charcoal stove to provide artificial heating is also not uncommon. Plywood is used to confine chicks to the area of artificial heat for one week so that they do not stray and become cold and chilled. The floor is made from concrete and the walls are open. Expanded metal grills have been used to screen buildings and this provides for adequate ventilation. Roofs are made of corrugated iron sheets inclined at high-pitch that sheds heavy rains. In some houses grass thatch is used as an insulator to reduce the radiation down to the birds and hence lessen heat stress. It must however be borne in mind that although thatch is a good insulator it has the potential of harbouring vermin and parasites, a fact that was well known by Sector 2 management staff.

Only birds of the same age group are housed in one farm (the all-in/all-out principle) and farm workers attend only to their own birds thereby avoiding carrying diseases from one group of birds to another. The poultry houses are always locked and resident flock attendants have protective gear (including shoes and boots) when caring for flocks separate from those worn off the farm. Visitors are not allowed in or near the poultry houses with exception of essential visitors such as owners, feed delivery drivers, and service personnel who must put on protective outer clothing including boots and headwear prior to being allowed near the flocks. These measures are practiced to varying levels by all PS/Hatcheries. With regards to the HPAI threat, one could argue that the commercial setting is ideal for the propagation of the virus because there is a very large number of birds in a confined environment.

Sector 3

In the small scale commercial system of management, intermediate levels of bio-security measures are enforced. There is limited access to the outside environment, and confinement in separate buildings limits to some extent interaction with other potential reservoirs. However, control of pathogens is not fully practised and whilst single age; species are kept with all-in/all-out practised in broiler operations, this is not the case in egg producing farms. In this system, production and flock data records are generally available.

Sector 4

In the traditional system, poultry co-habit with humans, have free contact with other potential reservoirs of HPAI viruses and have a high possibility for the existence of multiple pathogens, which can be sustained by the presence of different age groups of poultry in the same flock or shared environment. The presence of these factors compromises bio-security, stamping out activities and vaccination exercises. In this system, production and flock data records are commonly not available.

Chapter 7

Current policies, legal framework

Government Policy

Structural adjustment programmes have resulted in some changes in agricultural/livestock, trade and exchange rate policies and the re-definition of the role of Public and Private Sectors. These changes could improve the profitability of small-holder farmers, especially those that are moving towards intensification. The Government of Tanzania (GoT) has committed itself to carrying out major reforms in the agricultural industry, with clearly defined MoLD core functions, private functions and joint public and private functions. The goal/mission of the MoLD will involve (a) creating an enabling environment for the participation of the private sector in livestock production, marketing, processing input supply and distribution and credit; (b) development of appropriate agricultural infrastructure; and (c) provision of adequate extension services, research (including diagnostic services) and training. Following the liberalisation process, MoLD has been left with a core of key functions including monitoring, planning, regulating and promoting the livestock industry.

The Agricultural and Livestock Policy of 1997 was in line with the ongoing reforms and redefined the roles of public and private sectors. The key elements of this policy are:

- To encourage livestock sector growth through private sector-based initiatives in the industry.
- To encourage increased exportation of livestock products, to increase foreign exchange earnings.
- Market information and market monitoring, quality control, promotion of institutional structures

However, during implementation of this policy other reforms emerged thus necessitating a review and formulation of a new policy - the National Livestock Policy 2006. Both policies seek to promote livestock production and productivity in order to ensure basic food security, increase export earnings, raise nutritional status and increase standard of living.

Further relevant policies include:

- The Presidential Circular No. 1 of 2002 (focuses on regulated animal movements for controlling animal diseases)
- The Empowerment Policy
- The Investment Policy. Investments in the public sector aim at creating an enabling environment to facilitate investments by the private sector. Broadly, investments in the public sector include inter alia infrastructure, agricultural extension, research, policy formulation and regulatory functions. In order to facilitate foreign and domestic investors, the government has set up the Tanzania Investment Centre.
- The Land Policy 1995 (regulates the land tenure system whereby livestock owners should be allocated land so as to restrict uncontrolled animal movements)
- The Environment Management Policy (aims to control environmental degradation)

There are also a number of other global policies that poultry development is seeking to elaborate and implement. They include the National Trade Policy of 2003 and the Livestock Stakeholders Resolutions of 2001. The vision of the livestock industry as stated by the livestock stakeholders in April 2001 is that "By year 2025, there should be a livestock sector which to a large extent shall be commercially run, modern and sustainable, using improved and highly productive livestock to ensure food security, improved income for the household and the nation while conserving the environment".

Government Strategies

The cornerstone of Tanzania's policy, since its independence, has been to pursue egalitarianism and self-reliance. Over the last two decades, this policy has gone through various alterations, with increased attention being given to poverty eradication, which led to the preparation of the PRSP and Tanzania Development Vision (TDV) 2025. Based on these long-term visions, the government is now implementing the Agricultural Development Strategy (ASDS) and the Rural Development Strategy (RDS) and the recently launched National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA - the Kiswahili acronym) as major vehicles for the implementation of poverty reduction plans and programs to realize the MDGs.

Since poverty is entrenched in rural areas, the primary objectives of these two strategies are to stimulate growth of the rural economy by building on gains achieved at the macro level, and to empower the rural poor to overcome poverty by enabling them to gain greater access to land, water, financial resources and markets. Poultry-keeping is an integral part of the country's rural economy and improvements in farm incomes through increased chicken production is considered as a prerequisite to the reduction of rural poverty and food insecurity.

ASDS is addressing area No. 1 of NSGRP and spells out strategies for improving agricultural production. ASDP was formulated as the Implementation Programme of ASDS. The current set up of agriculture development in Tanzania has centred on ASDP, which applies the Basket Fund Modality. The ASDP has two main components, namely the Local Government component and the National Level Component. The National Level has four sub-components namely: Agricultural Services, Irrigation Development, Marketing and Private Sector Development, Food Security, Coordination, Monitoring and Evaluation.

International and Regional integration initiatives

The main challenge in the livestock industry is to meet the sanitary conditions for regional and international livestock trade. Thus, the industry is to be intensively engaged in international trade, accelerating exports and competing effectively with imports, where the only protection for the local industry will be provided by justifiable tariffs and necessary sanitary. Policy adjustments to align the livestock industry with the new world trading order have been completed and Tanzania will be active in pursuing further international trade reforms. Some relevant initiatives include:

- World Trade Organization's Agreement on SPS
- WHO/FAO's Codex Alimentarius
- NEPAD's Comprehensive Agricultural Development Programme
- SADC's Regional Indicative Strategic Development Plan (RISDP)
- East African Community (EAC) Agricultural and Rural Development Policy. Within the East African and Southern African regions, progress is being made towards implementing the East African Community (EAC) and Southern African Development Community (SADC) free trade protocols in the hope that greater trade and integration in livestock products will contribute to growth and development.

Chapter 8

Analysis

8.1 CURRENT STRENGTHS AND WEAKNESSES OF THE POULTRY SECTOR

The main economic activity in rural Tanzania is agriculture; it accounts for about 45% of the country's GDP and occupies 70% of the Tanzanian population. Poultry-keeping in villages is an integral part of Tanzania's rural economy and plays an essential role in improving household income and nutrition; chickens are currently considered as a cash crop. Local poultry production is now beginning to receive attention from scholars, policy makers, researchers and development workers. Village chickens require low capital investments, feed themselves through scavenging and are easy to maintain. Increasing urban demand for local chickens is stimulating trade from rural areas to town and creates opportunities for farmers to sell more chickens at a better price. In turn, this creates opportunities for improving backyard poultry production.

However, both commercial and traditional systems are constrained by diseases, poor quality feeds, inadequate technical support services, low genetic potential of the local breed and weak farmer organizations. In addition, there is inadequate regulatory framework in hatcheries and breeding farms.

Regardless of the increase in production trends, the performance of the livestock industry is still low. This is mainly due to low growth rates, high mortality rates, low reproductive rates and poor quality of the product. Modest improvement of these production coefficients coupled with adding value through processing could significantly increase output and income from the livestock industry.

Recommendations

Establishment of a National Poultry Development Coordinating Body

From the review it became apparent that the country lacks a sound poultry policy, long-term poultry research plans, coordination among the relevant Government organizations, scientists and poultry producers and organized poultry marketing systems. There is therefore a need to establish a National Poultry Development Coordinating Body in Tanzania. In the meantime, an NGO World Poultry Science Association, Tanzania Branch was recently registered in the country. This NGO could monitor the constraints to poultry production, formulate research needs, develop plans and execute them in an organized way to ensure the overall development of poultry farming in Tanzania. A medium-term plan on poultry research and development activities could be considered under this NGO to accelerate current poultry development in the country. The research will inevitably involve HPAI.

Improvement of present poultry marketing system

The review showed that a disorganized marketing system prevails in Tanzania which affects poultry production and its profitability, particularly for small-holder farmers. As poultry production in Tanzania is increasing, the improvement of the present marketing systems for poultry meat and eggs is a pre-requisite for both producers and consumers. A good marketing channel among poultry producers, retailers and sellers which is regulated by the relevant authority may help prevent undue exploitation of small farmers. Since poultry meat and eggs are perishable products, it is important that special attention is paid to the collection, storage and transportation of these products.

The lack of marketing studies for commercial poultry is a big shortcoming and efforts should be made to carry this out.

With regards to the HPAI threat there is a need to effectively communicate the risks to the people involved in the movement of poultry and poultry products. In the event of an HPAI outbreak there will be an imposition of trade barriers to try to prevent the spread of infection but the subsequent inevitable illegal trade will be very difficult to monitor and control.

Improvement of facilities for the diagnosis of poultry diseases

The facilities for the diagnosis of poultry diseases have not been expanded to match the growing commercial poultry sector and overall increased poultry production. More diagnostic centres ought to be established in areas where poultry farms are located in high concentrations. For prevention of HPAI, there is a need to collect samples with the cooperation of farmers, to make a diagnosis and to sensitise local authorities to take necessary precautions. The priorities ought to be the monitoring of wild and local birds so that we know exactly if and when HPAI, H5N1 enters Tanzania. It is believed that surveillance of wild migratory birds is a good early warning strategy.

Strengthening quarantine and stamping out control measures

In an event of an HPAI outbreak, one control strategy will be quarantine and stamping out. There is a need to reduce objections to stamping out through use of effective communication methods and adequate compensation. Messages should be well informed, explain the policy that is being implemented and should be tailored to rural populations. These messages should be directed to women as women are more concerned about children and the life of the community. Efforts should be made to compensate women, because they own the local chickens.

Improvement of feed quality

The quality of almost all the commercial feeds being sold to farmers is lower than the requirements of the poultry leading to the low performance of the chickens. There should be regular testing of the quality of the feeds and raw materials to eliminate this problem.

Coordinating the activities of NGOs to improve their work in the poultry sector

Almost all the operating NGOs formulate project plans on the development of the poultry sector for poverty alleviation and implement these at the grassroots level. There is a need for the activities of NGOs to be better coordinated by the Central Government rather than leaving this process to the Prime Ministers Office Regional Administration and Local Government (PMO-RALG).

Improved flock management/husbandry of village chickens

There is a range of simple improvements in flock husbandry and management which could make a huge positive impact to the productivity of a small household village chicken flock. Measures such as improved housing, protection against predators, chick feed supplementation, more effective disease control, and management of flock size in accordance with the size of the Scavenging Feed Resource Base (SFRB) have been discussed. The focus here is on the flock itself, particularly on improving the productivity of individual hens through better management of brooding, culling of less productive or non-laying hens, the harvesting of eggs in excess of flock requirements and turnoff of birds at the most appropriate time.

Formulation of National Poultry Policy

It is important to develop a national poultry policy to strengthen poultry production; poultry is only briefly referred to in the livestock policy of 2006.

8.2 PROSPECTS OF THE POULTRY SECTOR OVER THE NEXT FIVE YEARS

This information has not yet been sourced.

Annex I

Who is who (contact list)

Non-Governmental Organizations (NGOs)

NGOs are self-funding and are generally very responsive to farmers concerns and effective in service delivery. Some community based organizations are funded by NGOs. They work closely with and easily form partnerships with District Councils and the private sector and can therefore be used in ND control. These NGOs include ERETO, FARM Africa, VETAID, Southern Highlands Dairy Development Project (SSDDP), CARE and Heifer Project Tanzania (HPT), Plan International and World Vision. These are already involved with ND control as most of them work closely with the LGAs (SANDCP Local Consultants Report, 2005).

Farmers/Producers Organizations

The current policy is to encourage farmers' organizations through co-operatives, associations and informal groups with the aim of having independent co-operatives controlled by stakeholders themselves. In the villages there are some livestock keepers' associations' e.g the pastoral council within NCCA and the Chalinze rural poultry group.

Annex II

List of major projects – poultry sector

Newcastle Disease Control

ND is a major problem in the development of village chickens in Tanzania. The mortality rate due to ND can reach as high as 90% and sometimes devastates whole flocks during outbreaks. Control of ND in village chickens in the past had very limited success. Most of the vaccines used were heat sensitive and supplied in vials with large number of doses (usually 1,000 doses), which were not affordable for most rural farmers. Moreover, the effective cold chain system required for the distribution of these vaccines is lacking or deficient in most rural areas. However this obstacle has recently been overcome through the development of a thermo-tolerant ND vaccine I-2 that was developed in Australia and is extensively used in Tanzania. Administered by eye droppers, the I-2 vaccination techniques are easy, effective and sustainable. I-2 vaccine can be without refrigeration for up to two weeks and is in small vials so that large losses are eliminated. For three years (2002–2005), the Southern Africa Newcastle Disease Control Project (SANDCP) implemented a community-based ND control program, with the aim of improving the livelihoods of poor villagers in Tanzania through increased numbers of birds and eggs. The SANDCP has produced and tested both the vaccine and extension materials. The project focused on an integrated program encompassing institutional strengthening of the Government Livestock sector and NGOs, and promoting rural community participation and ownership in the ND control. The pilot efforts have had a resounding success.

SANDCP made significant achievements in capacity building, community development and poverty alleviation through developing and implementing a model for ND control that is sustainable. As a result Tanzania is now doing well in the control of ND in village chickens and continuing to produce and use increasing amounts of I-2 ND wet vaccine. Factors that contributed to the success of the SANDCP project included: a proven technology in the thermotolerant I-2 vaccine and the delivery mechanism; quality control of vaccine production and distribution; an organised campaign approach to vaccination of chicken populations; significant and demonstrable benefits to users that were realised under operational conditions; community consultation and participation and careful training and extension to maintain quality control in the field.

There has been significant Government support to the vaccine production activities at CVL which has led to improved vaccine production. During the fiscal year 06/07 (starting July 1, 2006 up to April 2007), CVL produced 14,496,000 doses of I-2 ND vaccine as a 'wet' vaccine. Production of I-2 vaccine was in accordance to the improved standards to ensure good vaccine potency and efficacy under difficult field conditions. CVL endeavours to ensure that the successes of the activities will be sustained and the laboratory is capable of producing in sufficient quantity vaccine of an appropriate standard for use throughout the country. CVL has managed to achieve provisional registration of the I-2 vaccine with TFDA to better guarantee its quality and effectiveness to users and potentially expand sales networks within country and new markets in neighbouring countries.

Poultry breeding

In order to attain high productivity in village chickens, genetic improvement and the rearing of crosses between the local chicken and the pure breeds such as the Rhode Island Red (RIR) has been attempted on several occasions in Tanzania by the Ministry responsible for livestock. The success and impact has not been felt so far, possibly because it was a top-down approach with limited sensitization of farmers.

Animal Health

The GoT has been involved in the control of notifiable diseases like Fowl typhoid and Newcastle disease both in commercial and traditional poultry rearing systems. The PACE project greatly strengthened the national epidemio-surveillance and disease reporting

network and the control of notifiable diseases utilises the facility for disease surveillance and monitoring. The MoLD has defined ND as a priority disease and formulated a national ND control policy including cost effective strategies. A similar strategy is envisaged for fowl typhoid. The implementation of strategies for ND control in local chickens and the monitoring and evaluation of progress has been carried out with great success (National ND Control Strategy 2007, under formulation).

Meat and food inspection of locally processed or imported products to safeguard public health is implemented both by the GoT and TFDA. The definition of legally enforceable standards for products and services has been achieved through the EAC framework. Licensing and control of importers, wholesalers, retailers and private veterinary practitioners is carried out by TFDA, VCT. TFDA is involved with an enabling role by licensing appropriate vaccines/pharmaceuticals and facilitating imports. Zoo Sanitary Inspectorate Services are active in regulating the import of day old chicks, breeding stock and hatching eggs

Human Resources development and capacity building

Sokoine University of Agriculture (SUA) has the responsibility to train high-level manpower in the country both at undergraduate and postgraduate levels. The annual intake of veterinary students has remained constant for the last 25 years and there has been a total of 378 graduates since the inception of the degree with 340 (89.9) being males and only 38 (10.1%) being females (Mgassa, 2005). Tertiary training in livestock is done at LITIs

Training on ND control has been conducted in seven districts of five regions in Tanzania. The training was in the form of basic sensitization and awareness courses on important aspects of ND coupled with a more specialized training in the control of the disease using the wet (liquid) form of 1-2 vaccine currently being produced at CVL. The first workshop was sponsored by The Regional Land Management Unit (RELMA) and was organized for districts of Arumeru (Arusha), Mafia (Coast), Singida (Singida), Dodoma rural and Dodoma urban (Dodoma region). The second series of ND seminars were in response to request by 3 district councils (Kilosa, Kilombero and Ulanga) of Morogoro region under Eastern Zone Client Oriented Research (EZCORE) projects.

In a bid to improve local chicken production in rural areas, the EZCORE has been educating smallholder farmers about improving local chicken production. In the period 1999 to 2007 EZCORE Project conducted a series of Farmers Fora with participants drawn from the eastern zone districts of Muheza, Kilosa, Kilombero and Ulanga.

Ongoing poultry projects at Sokoine University of Agriculture

Currently there are two ongoing projects on rural chickens at Sokoine University of Agriculture. (*Msoffe, P.L personal communication*)

(a) A Wellcome Trust funded project on the improvement of livelihoods of the poor through education on the health and productivity of local poultry. The main activity for the project is training selected district veterinarians, extension staff and farmers.

(b) A collaborative research project with the University of California Davis (UCD) on village level bio-security as a measure to control (to prepare for) Avian influenza. The main activity is the training of grassroot policy makers, extension staff and farmers on ND vaccination and disease identification.

The author is implementing a project entitled *Enhancing rural livelihoods through the control of Newcastle Disease and the prevention of Avian Influenza in Tanzania*. The development goal of the project is to improve the livelihoods of resource poor women, children and HIV/AIDS affected households, by making available an affordable, reliable vaccine for the control of ND in village chickens and increased awareness of the prevention of zoonotic diseases such as HPAI. The activity will be for one year from February 2007 – January 2008, and will be based at CVL, Tanzania. Radio interviews will be recorded in Dodoma and Mtwara Regions.

CVL has received development aid from the Government of USA towards preparedness for an Avian influenza outbreak. The aid is in the form of laboratory equipment, reagents and human capacity building. During the period 18 to 29 June 2007 the personnel from University of Minnesota in collaboration with National Veterinary Services Laboratories, Ames Iowa (the OIE reference Lab on HPAI) will be engaged in the installation of laboratory equipment that have arrived recently at CVL from the US and thereafter conduct training on their use. The training will involve all laboratory personnel of CVL virology, and also lab personnel from Muhimbili National Hospital and National Institute of Medical Research (NIMR).

Annex III

Studies on poultry in Tanzania

Poultry research in Tanzania has for some time now been the object of extensive studies and factors limiting productivity are well established (Minga et al, 1996, Minga et al, 2000 and Minga, 2001). Through the sponsorship of a Danida funded project IHEPRUCA several studies on local chicken have been undertaken leading to the award of M.Sc. degrees jointly run by SUA and KVL Denmark. These include those of Mwalusanya (1998) who looked at the productivity and nutrition of local chickens under village management conditions, while Lawrence (1998) studied the ecotypes and natural disease resistance among scavenging local chickens of Tanzania. Mdegela (1998) investigated the molecular epidemiology of *Salmonella enterica* sub-specie *enterica* serova *Gallinarum* biovar *gallinarum* infection in chickens in Tanzania.

IHEPRUCA has also sponsored PhD. degree programmes in local chickens and these include those of Msoffe (2002), who looked at the diversity among local chickens ecotypes in Tanzania. Waihenya (2002) investigated the bioactivities of *Aloe secundiflora* (aloeaceae) on Newcastle disease and Fowl typhoid in local chickens (*Gallus domestica*). Additionally, Yongolo (2004) looked at the molecular epidemiology of Newcastle disease virus (NVD) isolates of Tanzania. Kampeni is studying on the nutritional characteristics of the characteristics of the scavenged feed and supplementary feeding of indigenous rural chickens in Tanzania.

A research project on family poultry was conducted from 1999 to 2001, under the auspices of International Atomic Energy Agency (I.A.E.A) and Animal Diseases Research Institute, to identify the major disease conditions and factors limiting family chicken production in Coast and Dar es Salaam regions (Msami, 2000, et al 2004). Farmers in both the zones mentioned Newcastle disease as the major constraint inhibiting rural chicken development. It was found that the women play a major role in family poultry development. Women provided most labour for family poultry activities but men made several decisions on their use. The nutritional status of the birds has proved to be low and strategic improvement in feeding will result in concomitant increase in productivity. The feeding system to be designed should consider the available feed resources that include coconut cake, maize bran and selected grains. When farmers were asked to rank the functions of chickens in their village, source of food was ranked highest (67%), followed by source of income (31%), and social functions (ceremonies, gift, ritual) (2%).

For three years (2002 – 2005), the Southern Africa Newcastle Disease Control Project (SANDCP) implemented a community-based Newcastle disease control program, with the aim of improving the livelihoods of poor villagers in Tanzania through increased number of birds and eggs. The SANDCP produced and tested both the vaccine and extension materials.

I-2 Newcastle disease vaccine is widely used in Tanzania and it has been extensively tested both in the laboratory and in the field (Wambura et al 2000, [Wambura et al](#) 2006) Production and testing of the Australian thermo stable Newcastle disease vaccine (I-2 strain) for protecting village chickens against virulent strains of Newcastle disease in rural areas of Tanzania was funded by the World Bank under the umbrella of Tanzanian Agricultural Research Project Phase 2 (TARP II) (Kapaga et al 2004).

Other studies include those on diseases particularly ND, Fowl typhoid, fowl cholera and helminthiasis (Mdegela et al Muhairwa et al Magwisha et al).

Upgrading and crossbreeding with exotic germplasm has been the main attempts of improving the productivity of local chickens. The few studies which have been done on crossbreeding of indigenous breeds to various exotic blood levels have indicated that crossbred chickens are superior to local chickens in terms of egg number, egg weight and growth rate (Katule, 1990; Ali, 1995).

Annex IV

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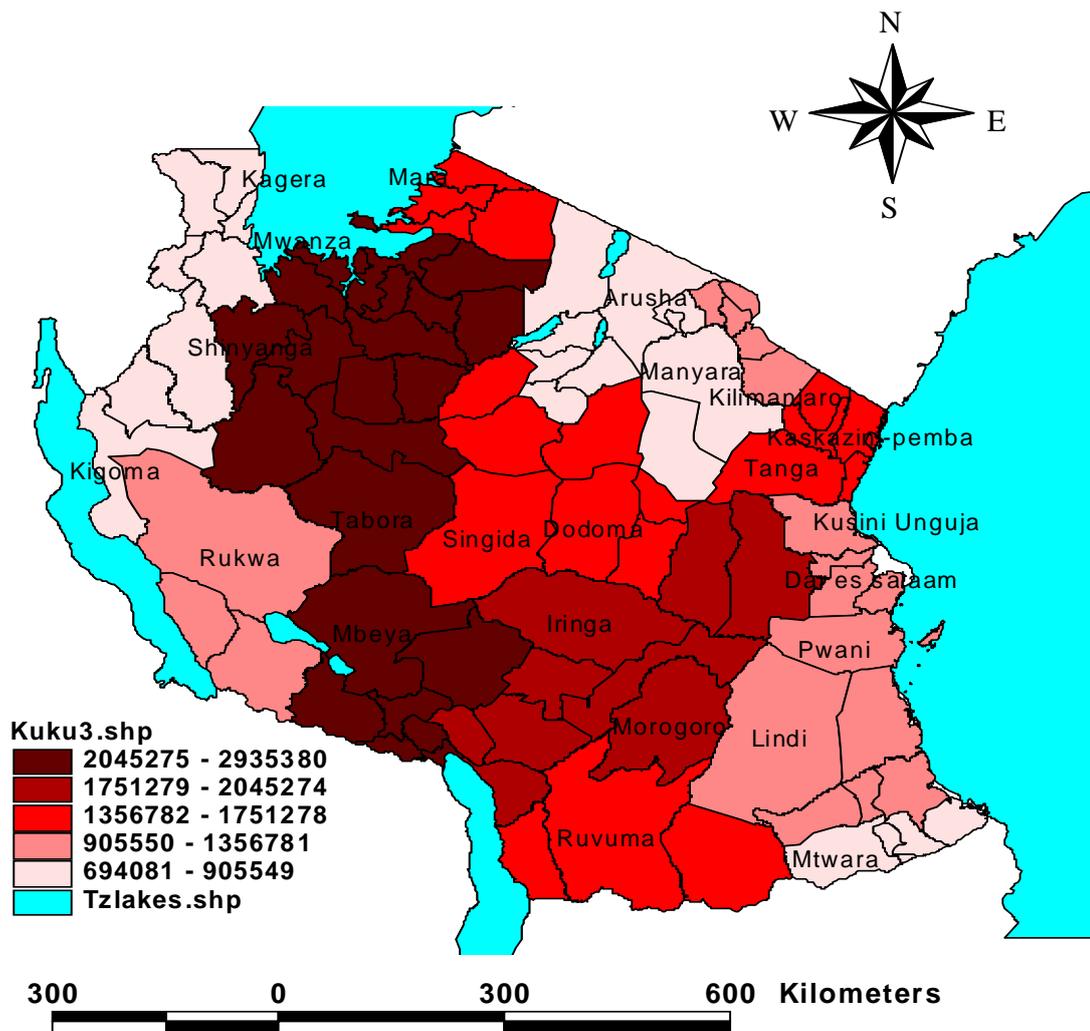
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Annex V

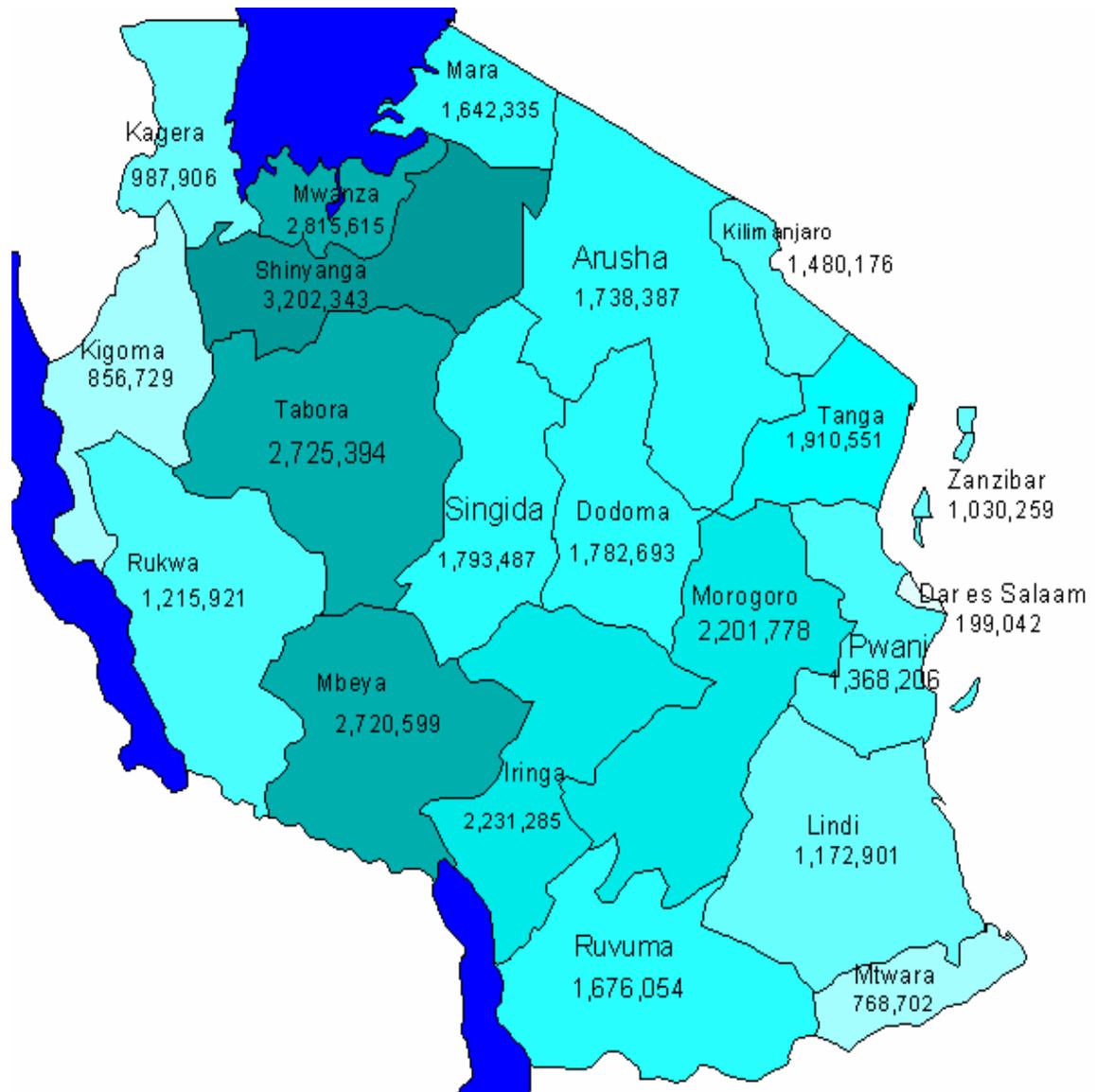
Maps

MAP 1: Distribution of total number of chickens by region (2007 estimates)



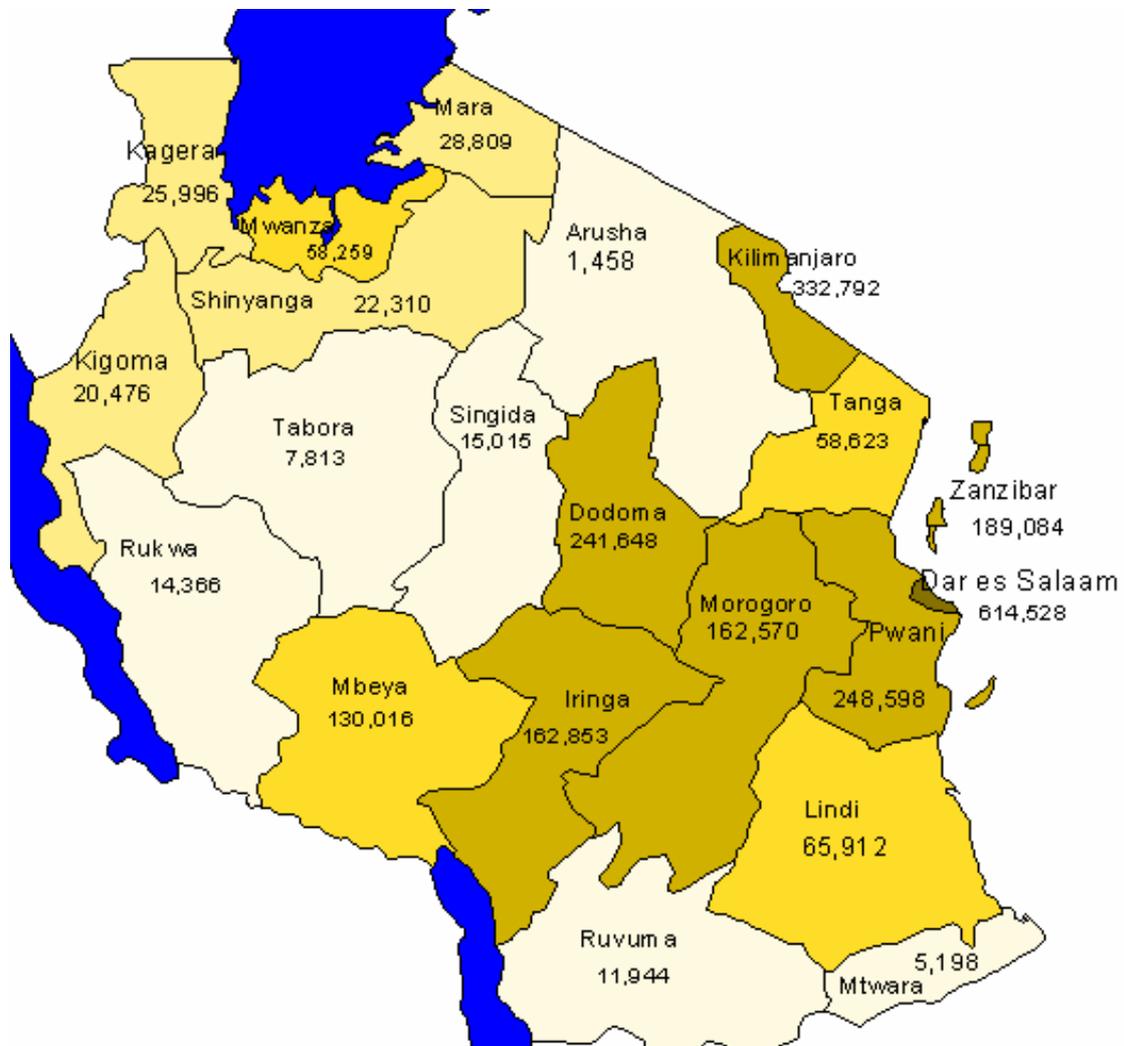
Source: Data for 2007 was extrapolated from the National Sample Census of Agriculture 2002/2003

MAP 2: Distribution of indigenous chickens by region (2007 estimates)



Source: Data for 2007 was extrapolated from the National Sample Census of Agriculture 2002/2003

MAP 3: Distribution of layer chickens by region (2007 estimates)



Source: Data for 2007 was extrapolated from the National Sample Census of Agriculture 2002/2003