# Country Report: Tanzania

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TANZANIA has an estimated population of 30 million of whom 80% live in villages. The country has approximately 3.7 million agricultural households of which 2.5 million keep rural poultry compared to 1 027 383 who keep cattle (Minga et al. 1996). The country is endowed with vast poultry resources estimated at 29 685 220 birds, according to the 1994 livestock census. This number comprises 20 163 811 local village chickens; commercial chickens include 368 933 broilers and 152 478 layers. Other birds include 743 472 ducks and geese, 63 447 turkeys and 37 942 guinea fowls. These numbers fluctuate seasonally depending on a number of factors that include disease outbreaks, sales, and availability of feeds. Rural chicken supplies 100% of all the chicken meat and egg requirements for rural people and about 12–13% of urban requirements (Melewas 1989).

The major constraint to rural chicken development is Newcastle disease (ND). The disease causes 90% mortality rates and sometimes decimates whole flocks during outbreaks. Control of ND in rural areas is almost non-existent due to lack of an appropriate vaccine. Effective control of ND in village chickens will enable poor flock owners to realise the economic potential of this industry. Economic analysis of rural poultry in Tanzania indicated that it is a viable enterprise and a promising alternative source of income for rural households. It was calculated that with minimum input, a family stands to gain between USD 563–1000 per year, which is more than the per capita income (USD 130), as long as ND is controlled. Other workers estimated a national turnover of 114.9 billion Shillings (USD 144 million) from sale of growers if constraints such as ND are eliminated.

Conventional thermolabile vaccines have not been appropriate for village poultry because of their strict requirement for a cold chain. The advent of thermostable vaccines from Australia has revived the possibility of controlling the disease in village chickens and current research efforts are focused towards the use of these vaccines. Initial studies on the thermostable vaccine strain NDV4-HR in the laboratory and the field produced very good results when the vaccine was administered intraocularly and via drinking water. Laboratory results using strain thermostable I-2 were similar to NDV4-HR. Since the last quarter of 1999, nation-wide field evaluation of thermostable I-2 vaccine has been going on. About 100 000 doses of the vaccine have been produced and are currently being distributed for evaluation to Veterinary Investigation Centres, located in the 7 agroecological zones of Tanzania. The trials are being coordinated by the Animal Diseases Research Institute (ADRI) in Dar-es-Salaam. The goal of the project is to bring the vaccine production closer to the villagers, and in packages (doses) equivalent to the number of chickens possessed by one or two flock owners.

## Village Poultry

Poultry play an important role in meeting economical and social obligations for the household, especially for poor families. In addition to slaughtering for home consumption, chickens are sold to raise money for the purchase of food, medicine, clothes and payment of school fees, bride price, farm implements, fertilisers, and levies. It is regarded as a special food during festivals, ceremonies, entertaining visitors and as a gift. Chickens are also kept for traditional healing and rituals.

Economic studies of rural poultry keeping have shown that the industry is a viable and promising alternative source of income for rural households. Salum et al (1999) calculated that a household with 10–15 chickens, at a reproduction rate of 3–4 generations per year and clutch size of 10–15 eggs, will generate an income of between 450 000 and 800 000 T. Shs. (US$563–1000) per year. This is more than the 1997 per capital income of Tanzanians

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(US$130). In a small study in the Morogoro region involving eight villages, it was observed that the ratio of chicks to growers to adults was 2:1:1 instead of the ideal 2:2:1, due to relatively minor constraints. With minimal inputs, these constraints can be eliminated resulting in a surplus of 76.6 million growers and an income of 114.9 billion shillings per year (Minga et al. 1996). Far more benefits can be reaped from this industry with improvement in management practices and genetic potential, which may result in increase in clutch size, generations per year and live weight.

## Village Chicken Production Systems

Village chicken management simply involves keeping birds under free-range and scavenging conditions around the homestead. The system is characterised by minimal inputs both in terms of time and resources.

Chicken management in the household is the responsibility of women and children. In most areas, men express little interest in chickens saying it is a lesser activity that is relatively unprofitable. However, in areas where chicken sales fetch higher prices due to demand by traders from big cities and towns, men become very much involved in keeping chickens.

### Housing

In many cases, chickens are provided with a night shelter within or outside the family's house. Usually a separate room is set aside for chickens within the house. Alternatively, chickens are sheltered in a kitchen that is separate from the family's living area, or a separate hut is constructed especially for chickens. The huts differ in shape and size from one region to another. In some areas, including the lake zone, poultry houses are raised up on poles to discourage predators. In others, a two-storey house is constructed where chickens and ducks are kept on the ground floor and pigeons on the upper floor. Locally available materials are used for construction, such as mud bricks, or wooden poles plastered with mud and elephant grass roofing. In a few cases, the chicken huts are contained within a wire fence. The size of huts is often not adequate for the flock size, overcrowding is common, and usually ventilation is poor. Very few chicken owners allow chickens to roost on trees at night.

### Nutrition

Rural chickens obtain their daily ration mainly by scavenging around the homestead. Any supplementation they receive can include maize grain, maize or sorghum or millet bran and human table leftovers. Addition of protein is rare except when children catch insects or worms and feed the chickens as a hobby. Water is also provided by a number of farmers. A few flock owners provide feeding and watering facilities. These are not specialised but are in the form of broken mugs, gourds or wooden troughs.

### Breeds/types

A number of chicken breeds are kept in the Tanzanian traditional chicken production system. These types vary in size, hatchability, number of eggs laid and mothering ability. There is normally no selection process practised. The characteristics of the different breeds are shown below. The names of different breeds and types differ from one area to the other; the breed names shown in Table 1 are adopted from Southern Tanzania.

## Constraints to the Production of Village Chickens

Very few studies have been undertaken to identify production constraints affecting the rural chicken industry. Diseases are the greatest problem affecting

**Table 1.** Characteristics and features of different breeds of chicken in Tanzania.

| Breed/Type | Characteristics/features |
|---|---|
| Kuchi or Kuza | Short beak with few feathers, heavy with good meat, lays few eggs (7–10) but usually hatches them all, 4-months laying interval, mature size big, much preferred due to its size and weight |
| Poni or Kishingo | Small in size, less weight, many feathers, lays up to 20 eggs and hatches them all, good mothering ability, 4-months laying interval |
| Mbuni | Moderately big in size, no tail, lays up to 15 eggs and hatches them all, laying interval between 3–4 months, more vulnerable to diseases |
| Tongwe or Msumbiji | Short and stout, small in size and weight, lays about 20 eggs and hatches them all, good mothering ability, preferred by producers but not buyers because of small size, laying interval between 3–4 months |

village chicken production (Melewas 1989; Minga et al. 1989). In a survey of rural poultry keepers by Yongolo (1996), respondents ranked constraints in the following order; diseases (95.5%), ectoparasites (88.8%), predators (82.2%), lack of affordable veterinary services (73.3%), stock theft (60%), lack of marketing services (55.5%), control of prices (51.1%), housing (40%), feeding/watering (22.2%). Of the diseases, ND was by far the major problem cited by villagers. Other diseases were fowl typhoid, pullorum and coccidiosis. There are probably many other diseases that were not mentioned by respondents, such as helminthoses as they do not usually cause massive deaths.

**Epidemiology of Newcastle disease**

Not many studies have been done in Tanzania to assess the epidemiology of the disease in village chickens. However, based on available information, the disease has been reported in all regions of Tanzania, affecting all age groups and causing high mortality rates, sometimes up to 100%. General information from various Veterinary Investigation Centres located in various parts of the country and from interviewing flock owners, indicate that disease outbreaks occur mainly in the dry season (July–November). However, due to poor disease reporting and documentation, these Centres do not have hard data to confirm this seasonality.

In 1998 the Ministry of Agriculture established a disease reporting system whereby Village Extension Workers are required to fill in field report forms for every disease outbreak encountered. The Epidemiology Unit at the Ministry headquarters places the information obtained onto a computer database, which is accessible on demand. According to this database, ND outbreaks in 1998 and 1999 were 24 and 84 respectively. No seasonal pattern was discernible. According to the Epidemiology Unit, so far only about 10% of cases are reported because the system is still new. In addition, the accuracy of these reports is questionable due to lack of qualified personnel and lack of diagnostic facilities at the village level. However, it is hoped that as the reporting system improves and Village Extension staff receive training on identification of diseases and diagnostic facilities get closer to villages, reliable information will start emerging from the database.

Yongolo (1996) did a detailed cross-sectional study on the epidemiology of ND disease in the Tabora and Morogoro regions. The overall seroprevalence was 37.2%. However, in both regions, highest seroprevalence rates were found in September–October (63.5%), followed by March (50%), July (25%), December–January (19.1%) and lowest in June (18.1%). The mean haemagglutination inhibition (HI) titres were highest in September–October ($Log_2$ 4.4) and lowest in June ($Log_2$ 1.21). Severe ND outbreaks were reported and confirmed in June–October while minor outbreaks occurred in December and February. These data confirm the seasonal occurrence of ND in the dry season between July–November. However, it seems this seasonality is determined on the basis of relative severity and frequency of outbreaks. Outbreaks can still occur at any time of the year depending on availability of susceptible populations and virulent virus. In addition to the season, the study by Yongolo (1996) identified other risk factors associated with ND. These include location (village, region), age, presence of other poultry species (ducks, pigeons) and proximity of homesteads.

**Diagnosis of Newcastle disease**

At village level, diagnosis of ND depends entirely on clinical signs. The main signs are high death rates and drooping of wings. Very few cases are submitted for laboratory diagnosis because of distance and other logistical problems. The recently introduced field report form, that reports and describes any disease outbreak, will supply the much-needed information. However, at present the flow of report forms from villages to the Veterinary Investigation Centres has been sluggish because the mechanism has not been streamlined.

**Methods of control of poultry diseases in village chickens**

*Traditional methods*

Various traditional medicines have been claimed to treat ND in village chickens, but their efficacy has not been confirmed in controlled laboratory studies. Some of these remedies are listed below:

- *Pilipili* fruit (pepper): Red pepper powder is mixed in drinking water or is given orally.
- *Osukuroi* leaves (*Aloe* spp.): Leaves weighing about 0.25 kg are sliced into fine pieces and mixed with three cups of water and mixed thoroughly and left to stand for few minutes. This is given orally. However, Osukuroi is said to be toxic so care should be taken not to exceed the recommended dose. Recovery is claimed to occur after 3 days
- *Capsicum* spp.: Fruits of capsicum and pieces of unripe pawpaw fruits are steeped in water and the mixture given as a drench to birds.
- *Lonzwe* (*Cupharia* spp.), *Swiswi magandaga* (*Cissus quadraguris*) and *Nkulwamhembe*: A mixture of water and stem material from Lonzwe and magandaga and root material of swiswi and

nkulwamhembe. It is given orally and is claimed to be 100% effective.

*Conventional methods*

The conventional method available for control of ND in rural poultry is the use of ND vaccines, but this method is not often used. Very few flock owners vaccinate their flock against ND or against any other disease. The few people who do vaccinations in some villages include village extension personnel and teachers. Most flock owners sell or slaughter their chickens when the disease outbreaks begin.

## Role of Extension Services in Village Chicken Production

The government, through the livestock extension field officers, is currently running a unified extension services, including livestock and crop production at village level. But with the advent of economic liberalisation, the private sector will take over some of the government functions. The role of the government will be limited to the control of epidemics, infectious diseases, sanitary control, regulation and eradication of scheduled diseases. In vaccination programs, the government will retain the role of controlling the quality of vaccines. It will support and promote the private sector to import and distribute veterinary inputs and establish an effective regulatory and marketing system for products. It will, however, take a long time for private sector services to reach the village level, as most private practitioners are concentrated in cities and towns. Meanwhile, mechanisms should be set up to facilitate the participation of NGOs and community-based groups to fill the gap.

**Institutional and human resource capacity**

The following shows the number of personnel in the animal health delivery sector:

| | |
|---|---|
| Registered veterinary surgeons | 414 |
| Government Officers: | |
| Veterinary surgeons | 173 |
| Livestock officers | 67 |
| Livestock field officers | 1437 |
| | (certificate and diploma) |

Other institutions involved include:

Parastatals

Sokoine University of Agriculture — Involved in research

NGOs (AUSTROPROJECT, VETAID, Religious): these assist in providing communities with sustainable animal health services, loans, training, water and marketing of livestock products.

**Marketing**

There is currently no established formal marketing system for rural poultry. However, there is an increasing demand for village poultry meat in towns and cities, which has created a group of traders who travel to villages to purchase the birds. Because of relatively high demand as compared to supply, all the available birds are taken up and therefore no marketing problems have been encountered

## Research and Development on Rural Poultry Production

Research into village chickens has not previously been the object of many studies. Since the advent of thermostable ND vaccine, a number of projects aimed at evaluating these vaccines under Tanzanian conditions have emerged. The main impetus on research on village poultry has focused on ND because it is the major production constraint.

Laboratory trials performed at Sokoine University of Agriculture revealed that the NDV4-HR vaccine administered via the intraocular route and drinking water provided high levels of protection against challenge with Newcastle virus up to 90 days post-vaccination, with no side effects observed. Following successful laboratory trials, field trials to assess the efficacy of NDV4-HR vaccine under village conditions were done. Results from studies in Central Tanzania (Foster et al. 1996) and Southern Tanzania (Salum and Kapaga 1997) confirmed laboratory findings that NDV4-HR conferred a high level of protection when administered intraocularly and via drinking water. The usefulness of the vaccine when administered through feeds such as sorghum is questionable.

Another thermostable vaccine the Australian strain I-2 was tested at ADRI laboratory and the results obtained were comparable to those of NDV4-HR (Wambura et al. 2000).

A nationwide project aimed at production and testing of the Australian strain I-2 vaccine started recently. The vaccine is produced at ADRI and is distributed to six Veterinary Investigation Centres located in different agroecological zones of Tanzania. An identical protocol is used for testing of the vaccine in selected villages.

It is obvious that research on village poultry should also focus on other diseases and husbandry such housing and nutrition. When the present genetic potential of village chickens is realised, a decision on whether or not to improve genetic composition can be made. Finally, there is need for the formation of a network on all activities related to poultry so as to coordinate research and extension activities.

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