

# Country Report: Botswana

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POULTRY-RAISING is the livestock enterprise available to all farming families, even the poorest (Bell 1992). Village chickens comprise the major part of the poultry industry in many developing countries (Spradbrow 1997). Village flocks are small, of mixed age and mostly unhoused or poorly housed. Most village chicken production systems are based mainly on native, domestic species which require very low levels of inputs (Sayila 1999) leading to low output, hence the term 'low input/low output system'.

Village stocks comprise the local unimproved poultry breeds commonly found in developing countries (Crawford 1992), or may include mixed (unspecified) breeds resulting from uncontrolled breeding (Kulube 1990). The terms indigenous, native or traditional chickens are often used as synonyms for village chickens, even where there is a high proportion of non-indigenous blood in the flocks. They are also termed scavenging chickens, where they are allowed to run free in the village surrounds, and backyard chickens where they are kept in a house yard (confined or free).

Backyard poultry production has been a traditional component of small farms throughout the developing world (Branckaert 1995). In Africa, it is estimated that 80% of the poultry population is found in these production systems, that contribute up to 90% of poultry products in some countries (Branckaert 1995; Sonaiya 1995). The population of village chickens in Botswana is estimated to be approximately 3.5 million (Moreki 1997).

The rearing of chickens is popular in rural villages of most resource-poor countries, as a means of providing supplementary food, extra income and employment for family members (Andrews 1990; Jalaludin 1992) and also to capitalise on harvest wastes and inferior grains produced on farms (Sonaiya 1995). Indigenous chickens survive under

unfavourable weather conditions, sheltered or not sheltered, in cages or in tree branches (Nalugwa 1996; Nel 1996). However, if not confined chickens can cause quarrels between neighbours by destroying gardens (Aini 1990; Oh 1987). They are self-reliant, disease-resistant and parasite-tolerant. The management is largely the responsibility of women and children (Losada et al. 1997; Martins 1995).

As a valued enterprise of every household, village chickens play an important role in the developing world, and the absence of a backyard chicken in a rural household is a sure sign of poverty (Nalugwa 1996; Nel 1996). In Zambia, Zulu (1999) reported that indigenous chickens provide the mainstay of the rural economy and contribute to food security and agricultural development.

Attempts are being made to raise the productivity of indigenous chickens in many countries, by improving housing, nutrition and health programs. In their study of indigenous chickens in Indonesia, Sinurat et al. (1992) reported improvements in performance resulting from improved management (nutrition, housing and disease control) and marketing strategies. Future prospects for rearing village chickens are believed to be good, because of traditionally high demand for their meat, which is tasty compared to that of commercial chickens (Crawford 1992).

In order to assess village poultry production in Botswana, a study that covered 10 administrative districts was undertaken.

## Methodology

A total of 1000 rearers were interviewed using a questionnaire in 15 villages of Botswana (Etsha, Gantsi, Hukuntsi, Kanye, Malolwane, Marapong, Masunga, Maun, Mochudi, Mokgomane, Motokwe, New Xade, Parakarungu, Tlokweng and Tsabong). Field surveys started with a pretest of a questionnaire in Bobonong and Molalatau villages in the Central District. The questionnaire was then modified and finalised. The villages chosen were categorised into

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'more urban, rural and remote rural'. Data were collected using a formal questionnaire and through informal interviews (ie. key informants, group interviews, direct observation, village walks). A questionnaire was administered to groups of students from primary and secondary schools.

## **Results and Discussion**

### **Composition of village chickens in Botswana**

There are seven species of poultry kept including chickens, ducks, pigeons, turkeys, peafowls, geese and guinea fowls. Chickens predominate (94%) in all the villages, followed by pigeons (3%) and ducks (2.5%) respectively. Pigeons are mainly kept by boys and are at times sold to generate income. Other poultry species of minor importance include guinea fowls, peafowls and geese.

### **Gender analysis and ownership of village chickens**

Eighty two per cent of the rearers are women while men constitute the remainder. It appears that village chickens have more bearing on the lives of women than of men. However, during the survey the majority of men could not be found at home as they were either working outside the villages or caring for large stock such as sheep, goats and cattle.

### **Reasons for keeping village chickens**

The rearers gave many reasons for keeping village chickens. However, the majority of the rearers keep chickens mainly for meat, as a source of income, meat and eggs, greeting visitors, providing a sanitation service and to a lesser extent for healing rituals. Most of the rearers in Etsha said they use village chickens (not naked neck birds) in healing rituals.

A few rearers use chicken manure to improve the fertility of the soil. The use of manure in fertilising soils is consistent with the findings of Østergaard (1995) and Aini (1990) in South Korea and Malaysia respectively. Other reasons for rearing chickens in order of importance include: for ornamental purposes, heralding the break of the day, tradition or hobby, pest control, bartering, easy to keep, paying debts, for recycling waste and for exhibition at shows and trade fairs. Feathers are used in making pillows. The multiple uses of village poultry reported in this study are in agreement with earlier reports by many workers in Asia and Africa (Aini et al. 1990; Sonaiya 1995).

### **Housing and shelter**

Sixty-five per cent of the rearers in all the villages in this study do not provide housing for chickens. Consequently, birds sleep on tree branches, piles of bricks/blocks, old vehicles, bush fences, walls, under roof overhangs or on top of huts, thus exposing them to risks of predation, unfavourable climatic hazards and theft. Shelter is constructed using locally available material such as old tins, iron sheets, plastic bags, thatch grass, mud bricks or blocks. Gantsi township has the highest number of rearers (87%) that provide housing to village chickens, followed by Etsha (72%), Parakarungu (60%) and Maun (58%). The five villages that have the highest number of rearers that do not provide shelter to village chickens are Mokgomane (92%), Motokwe (90%), New Xade (88%) and Malolwane (78%).

The risk of predation always exists as most rearers confine birds at night but allow them to scavenge during the day. The mother hen and chicks are highly vulnerable to predators if they are not confined at night. Eggs that are laid in the bush are often stolen or eaten by dogs and snakes. Risks of predation and theft are more common with birds that are not confined at night than with those that are confined at night.

### **Management of village chickens**

All members of the household are involved in feeding and watering village chickens, but women and girls are the major contributors. For instance, 82% of the women said they are responsible for feeding and watering village chickens while 6.6% of the men and boys are involved. The contribution of children, family and relatives in feeding and watering of birds is 3.4%, 7% and 1%, respectively. Mainly men and boys construct shelters. The contribution of men, relatives, family and children in the construction of shelters was 2%, 0.2% and 0.2%, respectively.

### **Feeds and feeding**

Birds scavenge during the day and are also given a supplementary diet of cereals (especially maize and sorghum), bran and kitchen wastes. Other feed stuffs include maize products (maize meal and samp), melon seeds, sunflower, brewers grain, millet, mixed fowl feed and beans. Twelve per cent of the rearers said they feed birds mixed fowl feed (mixture of sorghum, maize and sunflower), which is purchased from the stores. Bran is widely used and is obtained from primary schools and milling plants found in the villages. Bran is fed mainly to chicks and usually given wet or dry in various containers or on bare

ground. On the other hand, less than 1% of the rearers feed compounded feed (e.g. growers and layers mash). One per cent of the rearers do not provide feed to birds and the birds depend entirely on scavenging.

Chickens are fed once or twice a day. They are fed mainly in the morning before they roam the village surrounds in search of feed and late in the afternoon as they return home to sleep. The common feeding method is by broadcasting grain on the bare ground. Less than 1% of the rearers provide feed ad libitum, which shows that nutrition is one area that needs to be improved for these chickens to be productive.

### **Breeding and Productivity of Village Chickens**

Breeding in village chickens is uncontrolled and indiscriminate. The male and females run together, resulting in the hen producing chicks all year round. Some rearers cross breed commercial broiler or layer chickens with Tswana birds and they claim that the offspring exhibit superior traits such as improved growth rates. Chick mortality is higher in summer than in all other seasons because predation and disease incidence increases during this period. Confining chicks and giving them creep feeding during high-risk periods (spring and summer) could alleviate the risks of predation. Additionally, hatchability is lower in summer than in other seasons because of high ambient temperatures, level of nutrition and high relative humidity. High temperature and high relative humidity result in most eggs deteriorating in quality. Consumption or sale of eggs should increase during this period.

Tswana hens produce 3–4 clutches in a year and the average clutch size is  $14 \pm 1.69$  eggs. Average hatchability is estimated to be 80%. About  $7 \pm 1.25$  chicks manage to reach sexual maturity, thereby signifying a chick mortality rate of approximately 50%. This high chick mortality could be ascribed to high predation rates and high incidences of diseases, especially Newcastle disease (ND), which occur in spring and summer. Other causes of mortality are bur-bristle grass (bogoma), natural disasters (hail and storm) and accidents caused by vehicles or drowning. Some birds are lost through theft while others that stray into the neighbours' gardens or homes are likely to be killed. Sexual maturity is said to be reached at around 6 months.

### **Genetic composition of village chickens**

The five common genotypes of chickens found in villages include: naked neck (*Na*), dwarf (*Dw*), frizzle (*F*), rumpless and feet feathering. The heat

tolerant genes (*Na*, *Dw* and *F*) are considered important in hot climates and can therefore be incorporated in breeding programs. The frizzle gene appears to be in serious danger of extinction as it was found in one village (Marapong) while other genes were found in all the villages surveyed. *Na* and *Dw* genes also appear to be endangered in Etsha and Parakarungu. Egg production for *Na* and rumpless birds is said to be higher than that of other genotypes. But hatchability for *Na* birds is said to be higher than that of rumpless birds. Consequently, rumpless birds appear to be selected against.

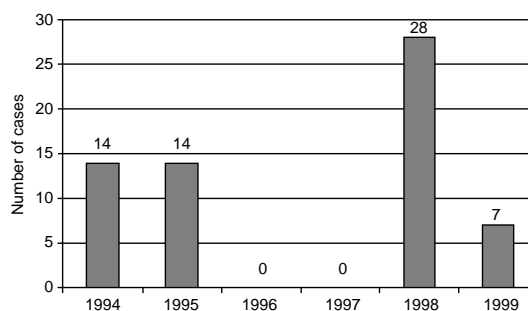
### **Diseases and health control**

The common diseases of village chickens are ND, fowlpox, coccidiosis, a disease called *saakhubama* (swelling of the bursa of Fabricius, infectious bursal disease). In the latter stage removal of bursa of Fabricius by rearers and treating with salt or chilli is claimed to allow the birds to recover from this sickness. Of these, ND was found to occur frequently and caused major losses. The majority of the rearers said that they did not know the time that ND occurred while 20% said it occurred between summer and autumn (January to April). However, it appeared that ND occurs mainly between September and January. ND has different names in different locations such as *dihamba* in Etsha, *muchachapansi* in Parakarungu and *mokorobalo* or *korobela* and/or *leroborobo* in all the villages. The common local name for ND is *mokorobalo*.

### **Newcastle disease**

According to the European Union, ND is an infection of poultry caused by any strain of the paramyxovirus 1 with an Intercerebral Pathogenicity Index (ICPI) in one-day old chicks greater than 0.7. The Office International des Epizooties (OIE) defines ND as a disease of birds caused by strains of avian paramyxovirus type 1, significantly more virulent (ICPI more than 1.2) than lentogenic strains, such as the vaccine strains Hitchner B1 and La Sota. Some species of birds may be infected with virulent strains of ND virus without showing any clinical signs.

In Botswana, ND is a notifiable disease, in compliance with the Disease of Animals Act (CAP 37:01) and in fulfilment of International Animal Health Code Article 1.2.02 to 3. The disease is characterised by sporadic outbreaks with major epidemics over time (Figure 1). The disease tends to be self-limiting as it kills almost all chickens. Chicken owners are expected to purchase their own vaccine. Vaccination programs are therefore not well coordinated and backyard chickens suffer the most because they not regularly vaccinated.



**Figure 1.** Newcastle disease cases (1994–1999).

Most districts recorded at least one case of ND in the last six years. Department figures reflect only the cases that were reported in the last six years and therefore are an underestimation of the disease situation. The cases ranged from 0 to 3 a month with a monthly mean of 1 case. Most cases occurred during the months of May to November with August predominating.

#### Control of diseases

The use of traditional remedies in controlling diseases predominates in all the villages, especially in the remote areas where drugs and vaccines are not

easily accessible. Two per cent of the rearers said that they used vaccines to control diseases while 13% used drugs. The common veterinary drugs are Terramycin, oxyphen, oxytetracycline and sulphazine. Both human and veterinary medications are used in treatment of diseases. For instance, blue stones that are used by humans to treat wounds and tinea are also used against fowlpox scabs. Other human medications used by the rearers are Vicks, Eno, Disprin and Compral. Extracts of onions and garlic are also administered.

Potassium permanganate (PP) is the common remedy used and is used before and during disease outbreaks. However, there are divergent views on its efficacy in controlling and treating diseases. For instance, while some rearers said it was effective others said it was ineffective suggesting that its efficacy has to be evaluated. Various remedies of plant origin are used against various ailments (Table 1). It appears that they are used mainly against ND.

The low use of vaccines by the rearers could be attributable to the fact that most vaccine packs come in 1000 doses. In addition, lack of housing makes catching birds for vaccination difficult, thus contributing to high incidences of ND. It would therefore be necessary for the rearers to group together to share the cost of vaccines. The advantage of this would be that the vaccine would not be wasted and the majority of chickens would be vaccinated against ND.

**Table 1.** Remedies of plant origin used to control diseases.

Local name	Common name	Scientific name	Part used
Pelobothoko	Wild karmedik	<i>Dicoma</i> sp.	roots, leaves
Motsaodi	African mangosteen	<i>Garcinia livingstonei</i>	leaves
Sebete	*	<i>Senna italica</i>	roots
Kgophane	*	<i>Aloe sebriana</i>	leaves
Mokgopha	*	<i>Aloe</i>	leaves
Sengaparile	Grapple plant	<i>Harphagophytum procumbens</i>	roots
Motlopi	Shepherd's tree	<i>Boscia albitrunca</i>	leaves
Moologa	Lavender fever-berry	<i>Croton gratissimus</i>	leaves
Morula	Marula	<i>Sclerocya birrea</i>	bark
Mopane	Butterfly tree	<i>Colophosepermum mopane</i>	leaves
Mogonono	Silver terminalia	<i>Terminalia sericea</i>	roots
Lengana	African wormwood	<i>Artemesia afra</i>	leaves
Sekaname	*	<i>Urginea sanguinea</i>	bulbs
Monepenepe	Long tail cassia	<i>Cassia abbreviata</i>	roots, bark
Mosimama	Ragwort	<i>Senecio strictifolius</i>	leaves
Mositane	Sumach bean	<i>Elephantorrhiza burkei</i>	roots
Letswai la khudu	*	<i>Oxygonum alatum</i>	roots
Lebolara	Tobacco	<i>Nicotiana tabacum</i>	leaves
Kwii	Onion	<i>Allium cepa</i>	bulbs
*	Garlic	<i>Allium sativum</i>	bulbs

\*Common names not available

### Parasites and control measures

The common parasites of poultry reported by the rearers were tampan ticks, mites, fowl lice, hard ticks and mosquitoes. As in diseases, traditional remedies also predominate in parasite control. The common remedies and/or methods used against parasites include ashes (cold and hot), paraffin, automobile oil, Jeyes fluid, Cape aloes, Doom Spray, potassium permanganate (PP) and boiling water. Boiling water and ash are poured in the shelter or where birds usually sleep. Karbadust (Carbaryl 5%) is the common chemical dust used by the rearers. Rubbing or smearing paraffin and automobile oils on the birds is said to be effective against parasites. PP is administered orally or birds are bathed in its solution. According to the rearers oral administration of PP renders blood of birds bitter or unpalatable thus helping to control parasites. Bathing birds in a solution of washing detergent such as OMO and SURF is also said to be effective against parasites.

### Marketing of village chickens and eggs

There is no organised marketing for either village chickens or eggs. Chickens are sold live to meet family needs and most of the sales occur from home. Only 65% of the rearers said they sold birds. Young males are the first to be sold, while most of the females are used for breeding. The average prices for adult male and female birds were P 17.97 ± 2.92 and P 17.17 ± 3.83 respectively (USD 1 equals 5 P). The average price for a dozen eggs was P 5.28 ± 0.16 compared to the average retail price of P 6.31 for eggs from commercial layers. Eggs were expensive in Mochudi (P 8.16 per dozen) and cheaper in Malolwane (P 2.52 per dozen) while chickens were expensive in New Xade (P 23.13 per bird) and cheaper in Marapong (P 12.24 per bird). Eggs are seldom sold and/or given to children to eat as they are used mainly for hatching. Sale and consumption of eggs is likely to increase in hot months when hatchability is low, during festive periods such as Christmas and when the schools open.

After selling chickens and eggs, 44% of the rearers use the money to buy food for their families. The money from sale of village chickens is also used to pay school fees, buy school requisites (pens, pencils, uniforms and books), buy additional birds, pay contributions at burial societies and at the church. Money is also used to buy large stock (goats and sheep), kitchen utensils and to pay traditional doctors.

### Constraints in Village Poultry Rearing

The five major constraints identified by the rearers in order of importance were diseases (20%), lack of

funds to build shelters and purchase feeds (19%), lack of technical support (13%), lack of shelter (9%) and predation (8.5%). The destruction of gardens by village chickens, which often results in quarrels with neighbours reported by six per cent of the rearers in this study, is in agreement with findings by Oh (1987) in Malaysia. Other constraints mentioned were inadequate supply of veterinary requisites, inadequate feed supplies, parasites and poor growth rates.

The predominance of traditional remedies in the control of diseases and parasites could be ascribed to the long distances that the rearers have to travel to purchase medication and vaccines. This therefore suggests that the use of thermostable vaccines such as Australian NDV4-HR, and I-2 that are suitable for the village environment should be promoted. Inadequate technical support from the extension and veterinary services also contributes to high mortalities. It is apparent that the extension service concentrates on commercial poultry while ignoring village chickens probably because of the low status given to these. The rearers indicated that they would like to be trained in poultry husbandry through seminars, workshops or field courses.

### Recommendations

The following recommendations are made:

1. Village poultry rearers should be trained in general poultry husbandry through seminars and field days.
2. A rural poultry financial scheme should be developed similar to the Bangladesh model. Alternatively, the Financial Assistance Policy (FAP) scheme should be extended to rural poultry production in the future.
3. Investigations should be carried out in such aspects as nutrition, housing, immunology, diseases and parasites. Also, the efficacy of traditional remedies in health control should be evaluated at research stations and on farms.
4. Trials involving the Australian NDV4-HR and/or I-2 vaccines should be carried out to test the efficacy of these vaccines locally. Also, suitable carriers of these two vaccines should be established among the local cereals such as sorghum, millet or maize.
5. Surveys should be conducted to determine the frequencies of available genotypes (eg. *Na* and *F*) among Tswana chickens and the extent to which these are endangered.
6. Preservation of genes facing extinction should be undertaken.

## Conclusion

Village poultry production in Botswana could play a major role in providing supplementary food, extra income and employment for rural dwellers. There is a need to improve health delivery to rearers and to evaluate traditional remedies widely used by the rearers to control diseases and parasites. Village chickens form an extensive genetic plasm, which breeders can exploit through selection, perhaps by improving the environment. Because of indiscriminate breeding, it has become apparent that some genes of economic importance that are found in village chickens are in danger of extinction. Training of rearers in poultry husbandry as well as extension agents is necessary if productivity of village chickens is to be raised. It can therefore be concluded that village poultry play a major role in poverty alleviation and that the benefits are likely to be realised with increased support from government and non-governmental organisations (NGOs).

## References

- Aini, I. 1990. Indigenous chicken production in South-east Asia. *World's Poultry Science*, 46, 51–56.
- Aini, I, Ibrahim, A.L. and Spradbrow, P.B. 1990. Field trials of a food-based vaccine to protect village chickens against Newcastle disease. *Research in Veterinary Science*, 49(2): 216–219.
- Andrews, P. 1990. Rural poultry production development in The Gambia. In: CTA-Seminar Proceedings Small-holder Rural Poultry Production, 9–13 October, Thessaloniki, Greece, 81–85.
- Bell, J.G. 1992. The village chicken and disease control. *Tanzania Veterinary Journal*, 12(1): 44–46.
- Branckaert, R. 1995. FAO and rural poultry development. In: Sonaiya, E.B. ed. *Sustainable Rural Poultry Production in Africa*. Proceedings of an international workshop held on June 13–16, 1995 at the International Livestock Research Institute, Addis Ababa, Ethiopia, 24–29.
- Crawford, R.D. 1992. A global review of the genetic resources of poultry. In: Hodges (1992) ed. *The management of global animal genetic resources*. Proceedings of an FAO Expert Consultation. Rome, Italy, April 1992, 205–211.
- Jalaludin, S. 1992. The development of poultry industry in Malaysia. In: *The Sixth Annual Animal Science Congress of the Asian-Australian Association of Animal Production Societies (AAAP) Proceedings*, volume 4. International Symposium. Sukhothai Thammathirat Open University, 27–28 November, 1992, Bangkok, Thailand, 14–21.
- Kulube, K. 1990. Smallholder rural poultry production in Zimbabwe. In: CTA-Seminar Proceedings Small-holder Rural Poultry Production, 9–13 October Thessaloniki, Greece, 263–270.
- Losada, H., Pealing, R., Cortes, J. and Vieyra, J. 1997. The keeping of poultry and pigs in the backyards of the urbanised areas of Itzapalpa (east of Mexico City) as a proposal for sustainable production. *Livestock Research for Rural Development*, 9(3): 2.
- Martins, C. 1995. Women-in-development activities in rural areas in the context of animal production. *Agriculture + Rural Development*, 2(1): 25–26.
- Moreki, J.C. 1997. Small-scale poultry production systems in Serowe-Palapye Sub-district (Botswana). Master of Applied Science (Agriculture) thesis, University of Melbourne, Melbourne, Australia.
- Nalugwa, L. 1996. *African Farming*, 11.
- Nel, C. 1996. Return of the farmyard chicken: The traditional African farmyard or village chicken has a long lineage and a bright future. *Farmers Weekly*, December 27, 1996, 6–11.
- Oh, B.T. 1987. Malaysia: Economic Importance. In: Copland J.W. ed. *Newcastle Disease in Poultry: A New Food Pellet Vaccine*. Australian Centre for International Agricultural Research (ACIAR) Monograph No. 5. Canberra, 83–85.
- Østergaard, V. 1995. Evolution of livestock production systems in developing countries. In: *Proceedings of the Joint FAO/KSAS Symposium on Supply of Livestock Products to Rapidly Expanding Urban Populations*, Hoam Faculty Club Seoul National University in Seoul, Korea, 16–20 May 1995.
- Sayila, A. 1999. Africa to benefit from poultry scheme. *World Poultry*, Elsevier, 15(7): 10–11.
- Sinurat, A.P., Hamid, H., Basuno, E. and Gilchrist, P. 1992. Improving the productivity of Indonesian village chickens. In: Wilson, M. ed. *Livestock Services for Smallholders: A Critical Evaluation*. Proceedings of a Seminar held in Yogyakarta, Indonesia, 10–15 November, 1992, 258–260.
- Sonaiya, E.B. 1995. African Network on Rural Poultry (ANRPD): Progress report, November 1989–June 1995. In: Sonaiya E.B. ed. *Sustainable Rural Poultry Production in Africa*. Proceedings of an International Workshop, June 13–16, 1995 at the International Livestock Research Institute, Addis Ababa, Ethiopia, 134.
- Spradbrow, P.R. 1997. Special requirements for village chickens. In: Mowat, N. and Rweyemamu, M. ed. *Vaccine Manual: The production and quality control of veterinary vaccines for use in developing countries*. Food and Agriculture Organisation, Rome, 123–126.
- Zulu, F.A. 1999. Current state of management of farm animal genetic resources in Zambia. A paper presented at the National Co-ordinators meeting of SADC/FAO on management of farm animal genetic resources (FanGRs), 5–8 July, 1999. Pretoria, South Africa.