



## Impact of Family Chickens on the Livelihoods of People Living with HIV and AIDS in Four Villages of Botswana

Kenaleone Gabanakgosi\*, John Cassius Moreki, Christopher Mareledi Tsopito and Shalaulani James Nsoso

*Department of Animal Science and Production, Botswana College of Agriculture,  
Private Bag 0027, Gaborone, Botswana*

\*Corresponding author's email: kenaleone@yahoo.com

### ABSTRACT

The impact of family chickens on the livelihoods of people living with HIV and AIDS (PLWHA) was investigated in Khudumelapye, Mogobane, Mokubilo and Serowe villages of Botswana. The objectives of this study were to determine the consumption and marketing of family chickens and to evaluate the contribution of family chickens towards household income and nutrition of PLWHA in four villages of Botswana. Data were collected from 100 respondents (25 from each village) using a structured questionnaire and through direct observation. The results showed that 79% of the respondents slaughtered chickens for family consumption and 21% to honour guests. Sixty-one percent of respondents consumed eggs while the remainder used eggs for breeding purposes. Seventy-four percent of the respondents sold some chickens to meet immediate family needs. Eighty-two percent of chickens were sold for cash followed by barter (10%). A total of 874 chickens were sold from the surveyed villages earning the sum of P18, 030.00 (2253.75USD). The average price of a chicken was P57.50 (7.19USD). These results suggest that family chickens were mainly used for consumption and were also sold to meet family needs, thus contributing to improved household income and nutrition of PLWHA. In order to increase the benefits of rearing family chickens, the rearers should be trained in general poultry management. In addition, the rearers should be encouraged to form associations which will assist in marketing chickens.

**Key words:** Family chickens, food security, HIV/AIDS, income, nutrition, PLWHA.

### INTRODUCTION

Family poultry is defined as small-scale poultry keeping by households using family labour and locally available feed resources (Sonaiya and Swan, 2004). In Botswana, family chickens comprise mainly local chickens which are referred to as *Tswana* chickens. Rearing family chickens can be of utmost importance in poverty alleviation as the poorest households and families affected by long-term diseases such as HIV and AIDS find chicken raising an easy activity that can contribute to household food security and income. Alders and Pym (2009) mentioned that family chickens made a significant contribution to poverty alleviation and household food security in Mozambique. Family chickens provide a source of high quality nutrition and income without requiring much in the way of labour or financial inputs (Alders *et al.*, 2007). In Botswana, family poultry play an important role in economic empowerment and improvement of food security, nutrition and household incomes of people living with HIV and AIDS (PLWHA) Moreki *et al.* (2010a, 2011).

Botswana Network of People Living with HIV and AIDS (BONEPWA+) provides indigenous *Tswana* chickens to selected support group members. Each member is given four hens and one cock that are raised

at members' homesteads (BONEPWA+, 2011). After chickens have increased in numbers, beneficiaries donate five chickens each to other vulnerable members of the society including people with disability, orphans, elderly people and other support groups. Additionally, the project assists beneficiaries with feeds, vaccines and vaccinations against Newcastle disease (NCD). The major beneficiaries of this project are people infected and affected by HIV and AIDS who have formed themselves into support groups and are affiliated to BONEPWA+ (2011). The objectives of this study are to determine the consumption and marketing of family chickens and to evaluate the contribution of family chickens towards household income and nutrition of PLWHA in Khudumelapye, Mogobane, Mokubilo and Serowe villages of Botswana.

### MATERIALS AND METHODS

#### Study area

The study was conducted at Khudumelapye (Kweneng), Mogobane (South East), Mokubilo and Serowe (Central) from June to July 2012. The study areas are shown in Figure 1.

### Selection of the study villages and sampling technique

A random sampling procedure was applied to this study and the cluster random sampling technique was used to choose 25 respondents (BONEPWA+ beneficiaries) from each village.

### Data collection

Data were collected by administering a structured questionnaire and through direct observation. Secondary sources of data were also reviewed. Only one member of the household was interviewed by reading and interpreting the questions in local language and responses recorded in English. Errors in data collection were minimized by using only one interviewer throughout the course of the data collection.

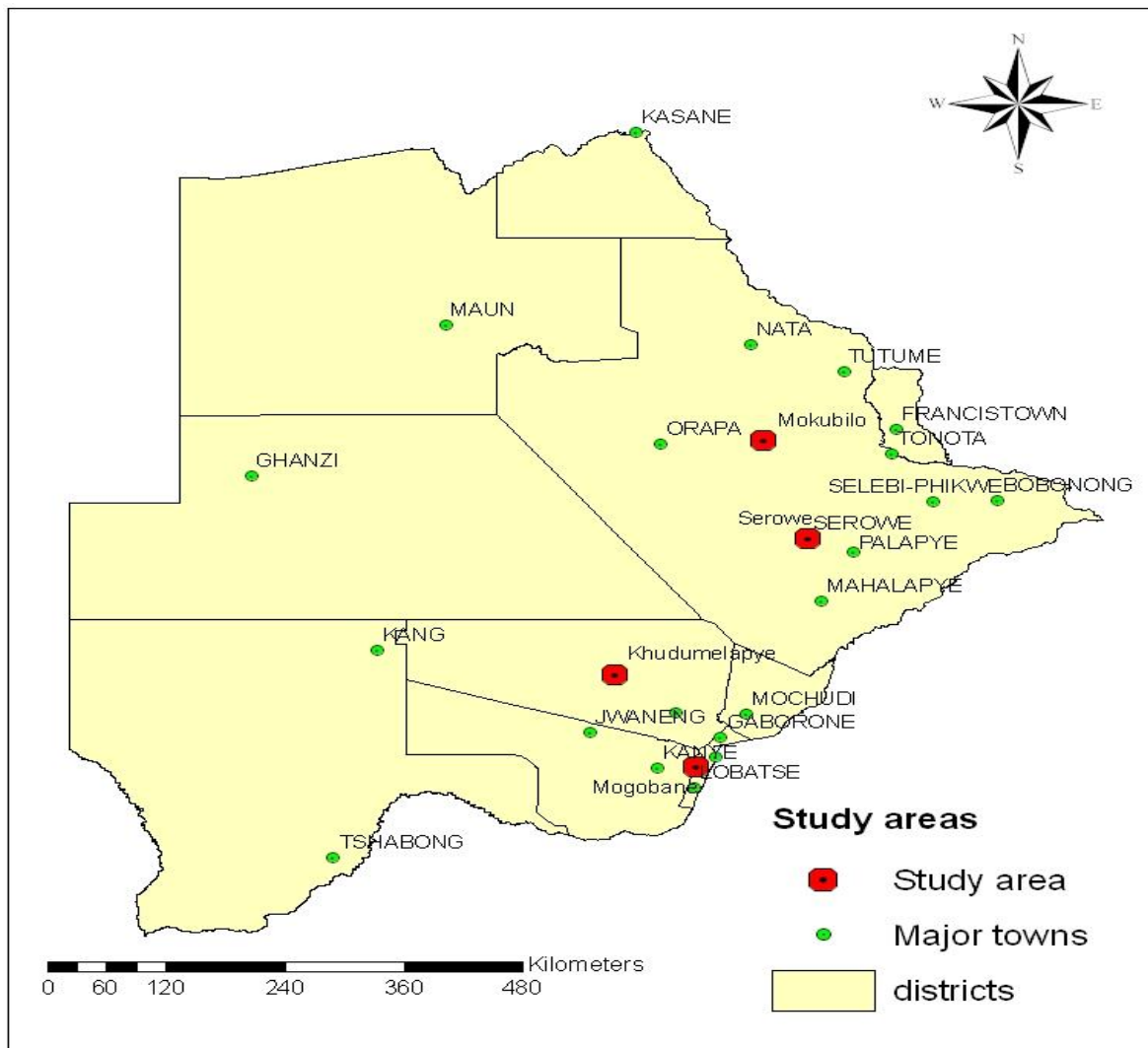


Figure 1. Map of the Republic of Botswana showing four study areas

### Data management and statistical analysis

Qualitative and quantitative data were analysed using Microsoft excel. Tables and figures are used to present summary statistics.

## RESULTS and DISCUSSIONS

### Demographic characteristics

Across the villages females were the main owners and carers of family chickens constituting 86% (Table 1). Forty-eight percent of the respondents were mature (middle aged) followed by youth (31%) and adults (21%). The present results are consistent with those of Moreki *et al.* (2010a). Sloan (2011) also stated that poultry was often owned and managed by women and children for whom they represent an important

source of cash income in times of need through the sale of adult birds, chicks or eggs. Eighty-two percent of the respondents had formal education, 10% non-formal education while the remainder never attended school (Table 1). The respondents who completed non-formal education and those that never attended school were aged  $\geq 60$  years. These results are in agreement with Setlalekgomo (2012) who reported that the respondents' level of education was dominated by junior secondary school certificate holders (37.2%) followed by primary school certificate holders (32.6%), Botswana General certificate of secondary education holders (20.9%), illiterate (6.98%) and tertiary (2.22%). Sixty percent of heads of households were mothers and 61% of the heads of households were single and unemployed (Table 1).

**Table 1.** Demographic parameters of respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

Variable n=100	Category	Number of respondents				
		Mokubilo	Mogobane	Serowe	Khudumelapye	Overall
Gender	Male	6	4	2	2	14
	Female	19	21	23	23	86
Age (years)	Youth	6	2	11	12	31
	Mature	14	13	12	10	48
	Adults	5	10	3	3	21
Educational level	Illiterate	3	1	3	1	8
	Primary	10	18	9	11	48
	Secondary	9	1	10	10	30
	Tertiary	1	1	2	0	4
	Non-formal	2	4	1	3	10
Marital status	Married	6	9	6	7	28
	Single	15	14	17	15	61
	Widowed	4	2	2	3	11
Head of house hold	Husband	7	7	6	7	27
	Father	3	1	7	2	13
	Mother	15	17	12	16	60
Position in household	Father	6	1	1	3	11
	Mother	18	15	12	20	65
	Son	0	3	1	0	4
	Daughter	1	6	11	2	20
Household size by sex	Male	11	10	14	12	47
	Female	13	11	14	15	53
Occupation	Formal	3	0	3	5	11
	Informal	1	1	4	4	10
	Unemployed	21	25	18	15	79

Seventy-nine percent of respondents were unemployed and depended on livestock (cattle, chickens, goats and sheep) for their living (Table 1). This finding is in agreement with Moreki (2006) who reported that the rearing of family chickens is most prevalent in the rural areas where the cash incomes of the people are generally lower than in urban areas. In the rural areas, unemployment is often high and female labour is relatively underutilised, so chicken rearing can help to supplement incomes and nutritional status of families.

Twenty-one percent of the respondents in the current study depended on temporary jobs for their living which included Poverty Eradication Programme (known locally as *Ipelegeng*), providing laundry services, stamping sorghum at schools, babysitting, weeding yards, herding livestock, hair dressing, working as house maids, brewing traditional beer, shoe repair, backyard vegetable gardens, tuck shop and builders. Only 10% of the respondents served as volunteers at home-based care, peer mother counselors, support group coordinator volunteers and peer educators at Prevention of Mother to Child Transmission.

Furthermore, 20% of the respondents sought work as nannies while 10% said they did nothing as they were advanced in age, ill, had disability and/or were blind. All the respondents said they obtained income from livestock sales (such as cattle, goats, sheep

and chickens) (Table 2). The study by Setlalekgomo (2012) in Lentsweletau (Botswana) showed that 2.33% of respondents were self-employed, whereas 2.33% worked as shop assistants, 2.33% primary school teachers, 2.33% domestic workers and 90.7% were unemployed.

#### Ownership of livestock

Livestock species reared across the villages are summarised in Table 3. Fifty-four percent of respondents said they owned livestock before they received BONEPWA+ assistance while the remainder said they did not own any livestock. Furthermore, 50% of the respondents said they had been keeping family chickens for more than four years (Table 3). The main livestock species reared included family chickens (42%), followed by goats (32%), cattle (16%) while others (donkeys, sheep, pigs and guinea fowl) constituted 10% (Table 3). In Zambia, the main livestock reared are chickens (50.7%) followed by cattle (35.4%), pigs (7.76%) and goats (6.08%) (Simainga *et al.*, 2011).

After receiving assistance from BONEPWA+, 50% of respondents said they purchased a goat each with chicken proceeds. This finding is in agreement with Moreki *et al.* (2010a) who stated that family chickens can be a stepping stone to rearing smallstock (sheep and goats) and cattle in developing countries including Botswana.

**Table 2.** Other sources of income for the respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

Source of income	Mokubilo	Mogobane	Serowe	Khudumelapye	Overall
Livestock sales	25	25	25	25	100
Children working	6	5	6	3	20
Relative working	3	5	7	2	17
Pension	2	11	4	4	21
Vegetable sales and crops	6	0	5	2	13
Tuck-shop	5	0	2	4	11
Traditional beer	0	2	4	2	8
Renting house at Gaborone	0	2	0	0	2

\*Numbers the same as percentages

**Table 3.** Ownership of livestock by respondents that benefited from BONEPWA+ food security project in the four selected villages of Botswana

Variable	Category	Number of respondents				Overall
		Mokubilo	Mogobane	Serowe	Khudumelapye	
Ownership of livestock before assistance	Cattle	8	1	4	3	16
	Goats	13	5	5	8	31
	Chickens	17	10	6	9	42
	Others	7	0	1	1	9
Duration of chicken rearing after assistance (years)	≤1	0	0	2	0	2
	2	0	1	0	0	1
	3	0	0	6	11	17
	4	0	7	7	7	21
Other livestock owned after receiving BONEPWA+ assistance	>4	25	17	10	7	59
	Goats	21	9	11	9	50

#### Uses of family chickens and eggs

All the respondents (100%) said they used family chickens as relish and source of income followed by gifts (33%). Thirty-nine percent of the respondents said they used manure to fertilize their gardens while 25% and 23% of the respondents used feathers for craft making and stuffing pillows, respectively. In addition, 20% of respondents said family chickens controlled weeds and insects in their fields. The use of chickens to control weeds and insects is in agreement with the findings of Moreki (2006).

Ninety-one percent of the respondents said they regularly slaughtered chickens while the remainder said they did not slaughter chickens. Majority of the respondents (79%) mentioned that they slaughtered chickens for family consumption while 21% for honouring guest. This finding agrees with Moreki (2006) who reported that family chickens were usually slaughtered to honour guests. Family chicken meat represented an important source of high-quality protein and essential micro-nutrients including the most readily saleable asset (Sloan, 2011). Furthermore, Magothe *et al.* (2012) stated that family chickens played a significant contribution in supplying a cheap source of animal protein and cash income. In Kenya, it is estimated that family chickens contribute 47% and 55% to the national egg and meat production, respectively (Kingori *et al.*, 2010).

On the other hand, 60% of eggs were mainly used for hatching and consumption followed by 35% which were used for hatching only. Simainga *et al.* (2011) in Zambia reported that eggs were used for hatching (82.3%), consumption (56.92%), sale (32.1%) and barter (2.47%). In the surveyed villages 61% of the respondents said they consumed eggs, while the remainder said they did not eat eggs as they believed that by eating eggs they would have eaten lots of chickens (Table 4).

This result is in contrast with Moreki *et al.* (2010a) who reported that 52.27% of the rearers did not consume or sell eggs but instead used them for breeding (hatching) purposes. In the present study, egg consumption occurred when egg production was high, during rainy season and hot weather, when two hens laid eggs in the same nest and after a hen had abandoned its eggs. Forty-three percent of the respondents said they consumed eggs during wet and hot weather conditions to avoid egg spoilage, as during this period hatchability is usually low compared to the cool season.

This result is in agreement with Moreki *et al.* (2010a) who reported that respondents consume eggs in summer when hatchability is low due to high temperature, high relative humidity and heavy parasite populations.

**Table 4.** Chicken meat and egg consumption by respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

Variable (n=100)	Category	Mokubilo	Mogobane	Serowe	Khudumelapye	Overall
Chicken consumption	Yes	23	23	21	24	91
	No	2	2	4	1	9
Chicken slaughter	Relish	20	20	18	21	79
	Visitors	7	4	4	6	21
Egg consumption	Yes	15	13	14	19	61
	No	10	12	11	6	39

\*Numbers same as percentage

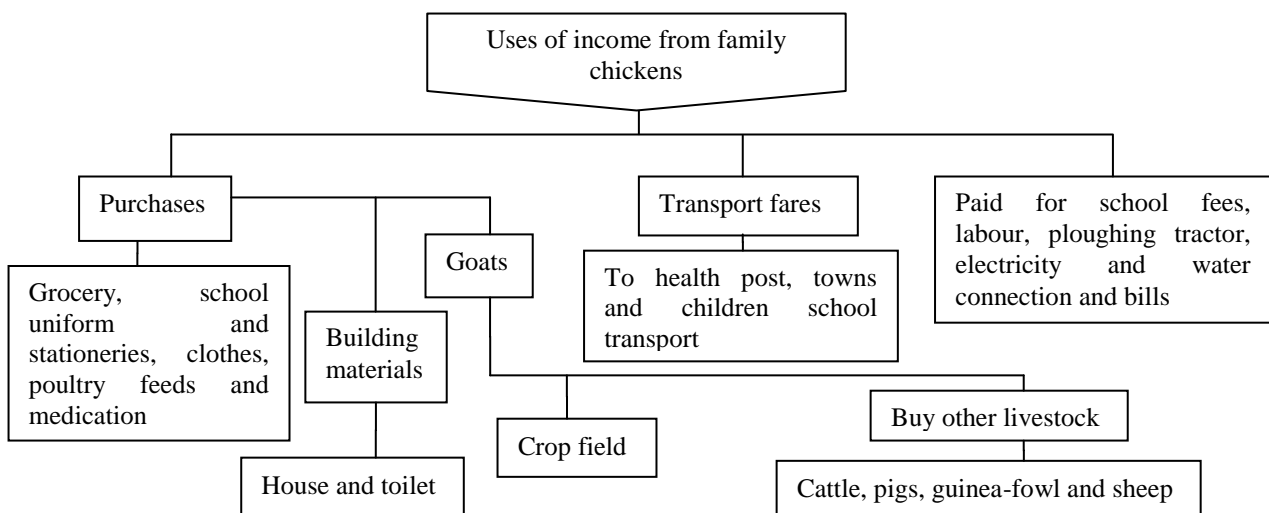
### Marketing

Seventy-four percent of respondents said they sold chickens to meet immediate family needs while the remainder said they did not sell chickens. Eighty-two percent of chickens were sold for cash followed by barter (10%). In this study, a 15 kg container of maize was bartered for a chicken at Mokubilo; a pair of shoes for a chicken at Mogobane and school uniform for two chickens at Mokubilo and Serowe. A total of 874 chickens were sold from the surveyed villages earning the sum of P18, 030.00 (2253.755USD). Family chickens were sold at varying prices. The average price for growers was P45.00 (P40.00 to P50.00), P55.00 (P50.00 to P60.00) for female adults and P70.00 (P60.00 to P80.00) for male adults. The average price of a chicken in the current study was P57.50 (P45.00 to P70.00). Moreki *et al.* (2011) reported average price of a chicken to be P49.43±6.92. Sixty-three percent of respondents mentioned that the market for chickens was satisfactory while the remainder said it was unsatisfactory. Chicken sales were observed to be high in Mokubilo (P6400), followed by Khudumelapye (P6280), Mogobane (3920) and Serowe (P1420).

The respondents said the market was satisfactory because chickens could be sold anytime of the year. The main buyers were individuals (97%) followed by retailers (2%) and government (1%). Simainga *et al.* (2011) reported that the main buyers of chickens and eggs were traders/middlemen (87%) and local people

(9%). According to Badhaso (2012) and Meseret *et al.* (2011), in Ethiopia chickens and eggs are sold in local and urban markets to traders or directly to consumers depending on the location of the farm dwelling. A total of 180 eggs were sold across the villages fetching the sum of P193.00. The average price of an egg was P1.25 (P1.00 and P1.50). Serowe sold more eggs (90 eggs) followed by Khudumelapye (50 eggs), Mokubilo (40 eggs) and Mogobane (25 eggs). Eggs were sold cooked or uncooked depending on the consumers' demands. Egg sales were high in summer and during rainy season.

Proceeds from chickens and egg sales were mainly used to purchase and pay for household needs (Figure 2). Income accrued from selling chickens was used to purchase school requisites such as note books, pens, pencils and shoe polish. In addition, money was used to hire labour to fence crop fields, pay builders, hire vehicles to deliver water for goats, purchase petrol for a car and to repair cars. The money was also used to purchase building materials including bricks/blocks, cement, sand, toilet accessories (toilet seat, door frame), window frames, door frames and corrugated iron sheets. In addition, money was used to buy house curtains, chairs, blankets, household utensils and water containers, pay for society fees, pay for funeral expenses while some money was saved at the bank for future use. These results are in agreement with Moreki *et al.* (2011).



**Figure 2.** Chicken and egg sales money usage by respondents that benefited from BONEPWA+ food security project in the surveyed areas

**Table 5.** Donation of family chickens by respondents that benefited from BONEPWA+ food security project in four selected of Botswana

Variables n=100	Category	Mokubilo	Mogobane	Serowe	Khudumelapye	Overall
Support group members	Yes	24	19	16	12	71
	No	1	6	9	13	29
Other support groups	Yes	24	19	16	12	71
	No	1	6	9	13	29
Community members	Yes	8	10	9	9	36
	No	17	15	16	16	64

\*Numbers same as percentages

### Donation of family chickens

Seventy-one percent of the respondents said they donated chickens to support group members and other support groups while 36% donated chickens to community members (Table 5). Community members who received chicken donations included community leaders, people with disabilities, destitutes, patients, Head of State (President), relatives, herd boys and friends. The respondents who did not donate chickens mentioned that their chickens died and/or flock production was low while others said that they were still multiplying their chickens before they could consider donating. All the respondents (100%) said that they were happy to donate chickens. The respondents expressed donation in different words including care, love, support, team work, sharing, socialization, pass-on-gift, togetherness, appreciation, encouragement and self-reliance. These results agree with Moreki (2012a) who reported that people that benefited from the food security project practiced pass-on-gift model to share the project benefits by donating some chickens to other vulnerable members of the communities within and outside their villages.

### Housing

Only 45% of the respondents across the villages said they provided housing to their chickens. Twenty-nine percent of respondents each from Khudumelapye and Mokubilo provided housing to their chickens

followed by Serowe (27%) and Mogobane (15%). These results indicate that the majority of the respondents did not provide housing to their chickens. Housing for family chickens was of a traditional type usually made from local materials (40%). Only a few (5%) concrete poultry houses were seen during the survey. Adult chickens were housed at night and allowed to scavenge for food during the day. Moreki (2006) reported that generally, family chickens find their own food and are housed at night. In this study, only chicks were confined throughout the day.

Fifty-five percent of respondents said they left their chickens overnight to roost in trees or bushes or a pile of bricks. In agreement with current results, Moreki (2006) reported that family chickens sleep on trees, piles of bricks/blocks, old vehicles, bush fences, walls, under roof overhangs or on top of the huts, thus being exposed to the risks of predation, climatic hazards and theft. Fifty-one percent of the respondents in the present study said they cleaned chickens weekly (Table 6).

The floor of chicken shelter was swept by family members using a local broom made of grass and no disinfectants were used. Eight-seven percent of the respondents said they used chicken droppings (manure) to fertilize garden soils to improve its fertility status while the remainder said they disposed of it by burial. Dikinya and Mufwanzala (2010) reported that chicken manure is a potential source of plant nutrients and chemical conditioner.

**Table 6.** Frequency of cleaning chicken shelters by respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

Variables n=45	Mokubilo	Mogobane	Serowe	Khudumelapye	Overall (%)
Weekly	5 (11.11)	6(13.33)	6(13.33)	6(13.33)	23 (51.11)
Twice a week	3(6.67)	0	1(2.22)	0	4 (8.89)
Three times a week	2 (4.44)	0	0	2 (4.44)	4 (8.89)
Monthly	3(6.67)	0	1(2.22)	2 (4.44)	6 (13.33)
Twice a month	0	0	2 (4.44)	0	2 (4.44)
When droppings accumulate	0	1(2.22)	2 (4.44)	3(6.67)	6 (13.33)

\*Values in brackets are percentages

### Feeds, feeding and watering

The respondents mentioned that field crops were the major feed resources available to chickens particularly during winter time after crop harvesting. In addition, chickens roamed in the village surrounds to dig up waste and undigested grains in the litter and heaps of manure. Insects, seeds, snails, frogs, grass, shoots and fallen fruits were also available as chicken feeds. This finding is in agreement with Khusro *et al.*

(2012) who stated that a number of insect taxa including silkworms, locusts, fly larvae, crickets and grasshoppers could be safely fed to chickens without compromising the quality and palatability of the meat.

All respondents (100%) fed kitchen leftovers to chickens followed by maize (80%), sorghum (21%), maize and sorghum bran (16%) and sunflower (10%). Only 10% of the respondents fed millet, samp, rice, maize meal and commercial feeds. The respondents

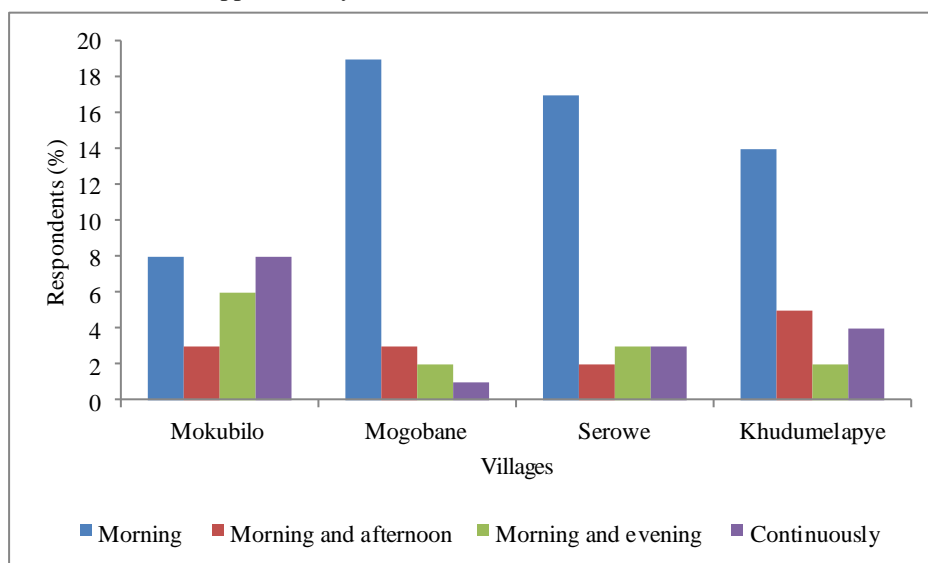
who kept their chickens at the fields said they fed melon seeds, melons, beans and bran. These supplementary feeds were given to chickens during feed shortage. In agreement with this result Kugonza *et al.* (2008) in Uganda reported that maize, sorghum, millet and other grains are provided as supplements to chickens. Scavenging chickens obtained some minerals through pecking of top soils. Aganga *et al.* (2009) found crude protein content of some family chicken feeds such as maize, millet and sorghum to be 9.8%, 6.5% and 1.1%, respectively indicating that through scavenging chickens obtain nutrients required for growth though not enough.

Sixty-five percent of the respondents said that they harvested maize, millet, sunflower and sorghum and used them to feed chickens while 45% of the respondents purchased grains from other farmers and/or retailers. Additionally, sorghum bran was purchased from primary schools and maize bran from millers was also used to feed chickens. In general, the feed resources in all the villages were limited. Mapiye and Sibanda (2005) reported that 95% of farmers in Zimbabwe produced their own supplementary feeds

while only 4.5% used purchased feed which reduces production cost.

Drinking water was provided to the chickens mainly by family members. During scavenging chickens looked for water to drink. In all the villages, chickens were given water used for human consumption while chickens kept at the fields were provided water from the streams and wells. This result agrees with Moreki (2006) who reported that chickens are given water used for human consumption. Old implements such as pots and very commonly automobile tyres cut medially into two halves were used as drinking vessels, and were placed in the vicinity of the house. Placing water near the chicken shelter ensured that water was easily reached by both chicks and adult chickens. In all the villages water was given mostly in the morning (Figure 3).

These results are in line with Moreki (2006) who reported that in Botswana several types of vessels are used as drinkers, including old metal (broken pots and lids of various containers) and plastic containers, troughs (metal and concrete) and old automobile tyres.



**Figure 3.** Frequency of water provision to family chickens by respondents that benefited from BONEPWA+ food security project in the surveyed areas

### Causes of losses in family chickens

Thirty-five percent of the respondents said they experienced bird losses which were mainly attributed to predation, diseases, parasites and theft (Figure 4). Predation accounted for 35.29% of losses followed by diseases (29.75%), parasites (20.09%) and theft (14.87%). Previous study by Moreki *et al.* (2010b) showed that the major causes of losses in family chickens were diseases caused more losses (36.7%) followed by diseases and parasites (11.1%), predation (8.89%) and a combination of diseases, parasites and predation (8.89%). Similarly, Ranwedzi (2002) identified the major constraints in family chickens to be diseases (36.7%), parasites (11.1%), predators (8.89%) and a combination of diseases, parasites and predation (8.89%). For Mcainsh *et al.* (2004), the most visible constraints to local chicken production in Sanyati

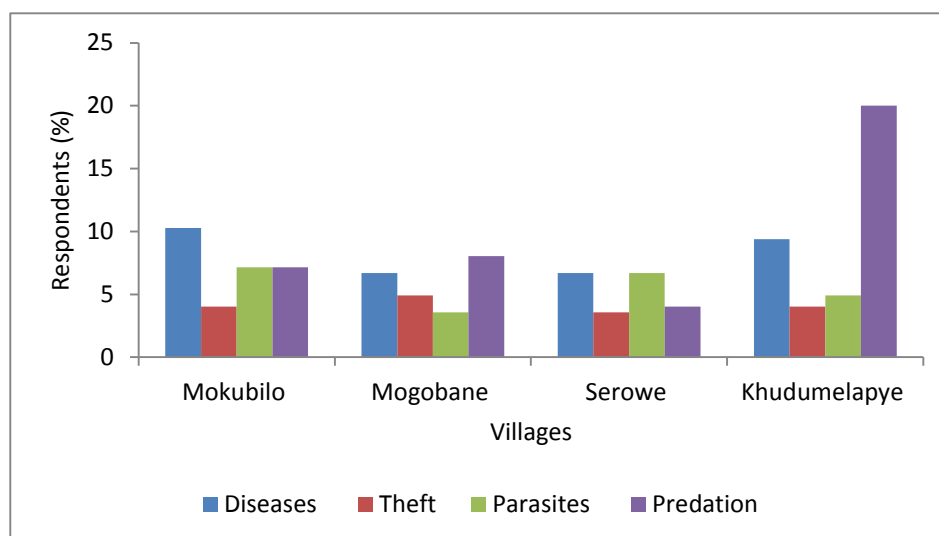
(Zimbabwe) were diseases (28%), predators (27%) and external parasites (21%). Mapiye and Sibanda (2005) found that chicken losses recorded were due to predation (40.5%), diseases (30.2%), accidents (8.8%), parasites (8.6%) and unknown causes (12.9%). Recently, Worku *et al.* (2012) reported that 96.9% of the respondents identified predators to be the primary production constraints in West Amhara Region of Ethiopia.

As shown in Figure 3 predation was highest in Khudumelapye followed by Mogobane because birds scavenged most of time due to lack of feeds. Also, rearing was at the ploughing sites where predators are commonly found. Lack of housing also contributed to chicken losses. Fifty-five percent of the respondents in the present study said they did not provide housing to their chickens resulting in increased predation. Other



causes of mortalities were poisoning (7%), inclement weather (5%) and vehicular accidents (2%). Kaudia and Kitalyi (2013) found lack of feed, lack of proper

housing and poor management to be the causes of losses in family chickens.



**Figure 4:** Major causes of family chicken losses experienced by respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

#### Food security and HIV/AIDS

**Food security outcomes:** The improvements in food security project included food quality (91%), nutrition (91%), income generation (74%), food quantity (64%) and food affordability (64%) (Table 7). Across the villages there were improvements in both food nutrition and income generation. Moreki and Chiripasi (2011) reported that family chickens contribute significantly to food security and poverty alleviation. The BONEPWA+ food security project significantly contributed to improved household food security, income generation and nutrition

(BONEPWA+, 2011). Locke (2011) mentioned that the humble village chicken is the key to global food security.

Family chickens played an important role in poverty alleviation, food security, nutrition and household incomes because they provided carers of the sick with additional resources to carry out their important task of supporting PLWHA. These results support Moreki (2012a) who reported that family chickens contribute to income generation, improved nutrition and economic empowerment of PLWHA.

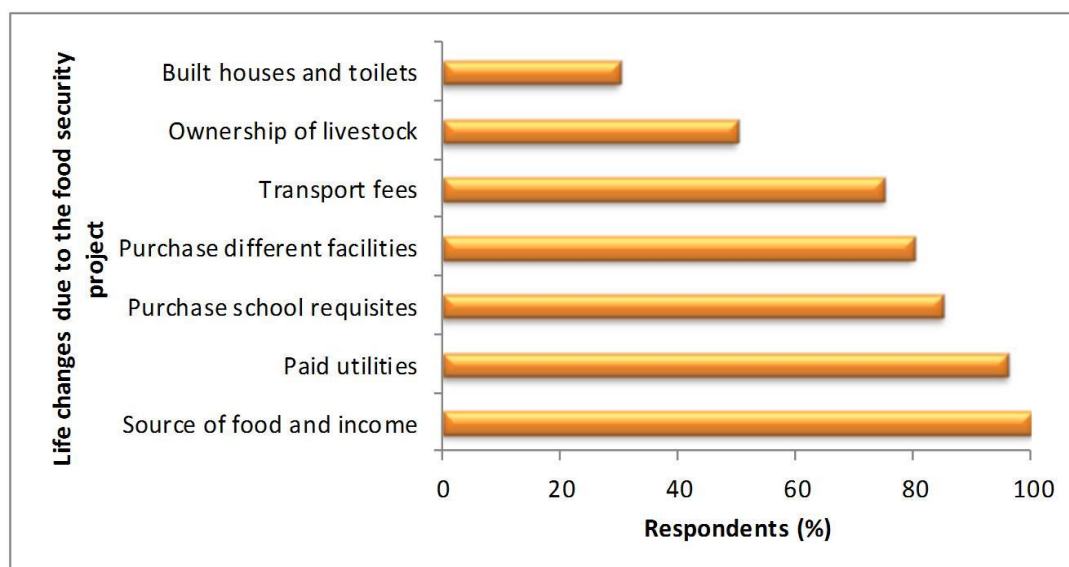
**Table 7.** Food security project outcomes experienced by respondents that benefited from BONEPWA+ food security project in four selected villages of Botswana

Variable (n=100)	Category	Mokubilo	Mogobane	Serowe	Khudumelapye	Overall
Food quality	Improved	23	23	21	24	91
	Not improved	2	2	4	1	9
Food quantity	Improved	20	9	12	23	64
	Not improved	5	16	13	2	36
Food affordability	Improved	20	9	12	23	64
	Not improved	5	16	13	2	36
Nutrition	Improved	23	23	21	24	91
	Not improved	2	2	2	2	9
Income generation	Improved	24	15	15	20	74
	Not improved	1	10	10	5	26

Life changes in the surveyed villages as a result of the food security project are illustrated in Figure 5. All the respondents said chickens were source of food and income. In addition, 96% of the respondents mentioned that chicken proceeds were used to pay for utilities such as electricity and water. Less than 10% of the respondents said the project had not changed their

lives because they never enjoyed the benefits of rearing family chickens as all the chickens died due to NCD before multiplication. This result is consistent with Moreki (2012b) who reported that money from chicken sales was used for transport to health facilities for medical treatment, to pay school fees and to purchase school requisites' for children.





**Figure 5:** Changes in respondents' life due to the BONEPWA+ food security project in four villages of Botswana

### Contribution of chickens towards food security and HIV and AIDS mitigation

All the respondents (100%) said the project has contributed towards mitigating the effects of HIV and AIDS in their communities. According to the respondents, there was a decline in the number of weak patients and no deaths were recorded due to improved nutrition, medication and knowledge about the disease and its effects. The respondents also said that HIV and AIDS patients were also cared for and given psychosocial support by group members. Furthermore, the respondents mentioned that they chickens were a source of food, nutrition and income. As a result, they no longer engaged in situations that placed them at risks of contracting HIV infections such as commercial sex or staying in abusive sexual relationships due to economic dependency. Miller *et al.* (2011) noted that food insecurity led to increased sexual vulnerability among women as they are often compelled to engage in transactional sex or remain in violent or abusive relationships due to their reliance on men in their communities to provide food for themselves and their children.

Furthermore, the respondents said that they were taught about HIV and AIDS by support group members resulting in them testing for HIV, accepting their statuses, protecting themselves and enrolling in ARV therapy on time. This result is in agreement with Moreki (2012a) who reported that food security project funded by Swedish International Development Agency in Botswana, Lesotho and Zambia has shown that family chickens play a crucial role in nutrition and food security among PLWHA. Also, Moreki *et al.* (2011) reported that the majority of respondents joined support groups to help in giving psychosocial support and to counsel PLWHA followed by others (17.4%) and those that needed counselling following HIV-infection (10.9%).

Twenty-five percent of the respondents mentioned that they encouraged community members to test for HIV through soccer tournaments and music

competitions where the teams that tested in high numbers were given a soccer kit. Furthermore, 30% of the respondents said there was reduced HIV infection rate even though there was increased number of people on ARV therapy. On the other hand, 27% of the respondents mentioned that the food security project had not mitigated the effect of HIV and AIDS because people were still engaging in situations that placed them at risk of HIV infections such as alcohol abuse and unprotected sex. In addition, 20% of the respondents said they did not know whether the food security project has mitigated the effect of HIV and AIDS or not. This finding is consistent with Moreki *et al.* (2010a) who also found that the majority of respondents (54.55%) said that family poultry play an important role in food security and HIV/AIDS mitigation mainly through meat and egg consumption and occasional sale of live birds, whereas the remainder (44.45%) could not correlate village poultry with HIV/AIDS.

### Suggested improvements to the food security project

The respondents' suggested improvements to the food security project included:

1. Providing beneficiaries with chicken feeds during feed shortages and medication;
2. Providing respondents who experienced 100% mortality with other chickens;
3. Providing training in chicken production to the beneficiaries;
4. Providing an incubator to beneficiaries in Mokubilo;
5. Constructing poultry houses where there are none;
6. Providing garden tools (shade nets, storage water tanks as there is lack of water and seeds) to improve backyard gardens;

### CONCLUSION

Family chickens were mainly used as a protein source (relish) and for income generation. Majority of

the respondents said they consumed eggs in summer and during rainy seasons to avoid spoilage. This indicates that egg consumption is seasonal. The majority of the respondents sold family chickens for cash while few used them for barter. Food quality, quantity and affordability were improved in all the surveyed villages. These results suggest that food security project has contributed towards mitigation of HIV and AIDS through improved nutrition and income generation for PLWHA.

## ACKNOWLEDGEMENT

The authors are grateful to the respondents (BONEPWA+ beneficiaries) in the four villages for their contribution in this study. The authors also gratefully acknowledge BONEPWA+ officials for their support during survey.

## REFERENCES

- Aganga AA, Omphile UJ, Chabanga CH, Motsamai GM and Motsumi LG (2009). Traditional poultry production and commercial broiler alternatives for small-holder farmers in Botswana. *Livestock Research for Rural Development*, 12(4). Retrieved 20/12/2009, from <http://www.lrrd.org/lrrd12/4/Aga124a.htm>
- Alders RG and Pym RAE (2009). Village poultry: still important to millions, eight thousand years after domestication. *World's Poult. Sci. J.*, 65(8): 181-188.
- Alders R, Bagnol B, Harun M and Young MP (2007). Village poultry, food security and HIV/AIDS mitigation. *LEISA Magazine* 23-3 September 2007:20-21.
- Badhaso B (2012). The status of indigenous chicken production and marketing system in Ethiopia, Addis Ababa. Retrieved from <http://en.engormix.com/MA-poultry/meat-industries/articles/the-status-indigenous-village-t2392/471-p0.htm>
- BONEPWA+ (Botswana Network of People living with HIV and AIDS) (2011). Annual Technical Report: Strengthening HIV and AIDS and food security copying and mitigation mechanisms among people living with HIV and AIDS in Botswana. Gaborone, Botswana.
- Dikinya O and Mufwanzala N (2010). Chicken manure-enhanced soil fertility and productivity: Effects of application rates. *J. Sci. Environ. Manage.*, 1(3): 46-54.
- Guèye EF (2003). Information dissemination for family poultry research and development; *Livestock Research for Rural Development*, 15(2). Retrieved from <http://www.lrrd.org/lrrd15/2/guey152.htm>
- Kaudia TJ, Kitalyi A (2013). Commercializing rearing of village chicken in Kenya. INFPDE-CONFERENCES: Retrieved from [http://www.fao.org/ag/againfo/themes/en/infpd/documents/econf\\_bang/add\\_paper12.html](http://www.fao.org/ag/againfo/themes/en/infpd/documents/econf_bang/add_paper12.html)
- Khusro M, Andrew NR and Nicholas A (2012). Insects as poultry feed: a scoping study for poultry production systems in Australia. *World's Poult. Sci. J.*, 68: 435-446. doi:10.1017/S0043933912000554.
- Kingori AM, Wachira AM and Tuitoek JK (2010). Indigenous Chicken Production in Kenya: A Review. *International Journal of Poultry Science*, 9(4): 309-316.
- Kugonza DR, Kyarisiima CC and Iisa A (2008). Indigenous chicken flocks of Eastern Uganda: I. Productivity, management and strategies for better performance, 20(9). <http://www.lrrd.org/lrrd20/9/kugo201317.htm>
- Locke S (2011). Village chickens and food security. Canberra, Australia. Retrieved from <http://www.abc.net.au/rural/content/2011/s3148600.htm>
- Magothe TM, Okeno TO, Muhuyi WB and Kahi AK (2012). Indigenous chicken production in Kenya: I. Current status. *World's Poult. Sci. J.*, 68: 119-132.
- Mapiye C and Sibanda S (2005). Constraints and opportunities of village chicken production systems in the smallholder sector of Rushinga district of Zimbabwe. *Livestock Research for Rural Development*. 2005; 17(10). Retrieved from <http://www.lrrd.org/lrrd17/10/mapi17115.htm>
- Mcaish CV, Kusina J, Madsen J and Nyoni O (2004). Traditional chicken production in Zimbabwe. *World's Poult. Sci. J.*, 60.
- Meseret M, Solomon D and Tadella D (2011). Marketing system, socio economic role and intra household dynamics of indigenous chicken in Gomma Wereda, Jimma zone, Ethiopia. *Livestock Research for Rural Development*, 23(6). Retrieved from <http://www.lrrd.org/lrrd23/6/mese23131.htm>
- Miller CL, Bangsberg DR, Tuller DM, Senkungu J and Kawuma A (2011). Food insecurity and sexual risk in an HIV endemic community in Uganda. *AIDS Behav.*, 15(07):1512-1519. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3110536/>
- Moreki JC (2006). Family poultry production, Poultry today. Ministry of Agriculture, Gaborone, Botswana; 1-11.
- Moreki JC and Chiripasi SC (2011). Poultry waste management in Botswana: A review. *Online J. Anim. Feeds Res.*, 1(6): 285-292.
- Moreki JC, Dikeme R and Poroga B (2010a). The role of village poultry in food security and HIV/AIDS mitigation in Chobe District of Botswana. *Livestock Research for Rural Development*, 22(3). Retrieved from <http://www.lrrd.org/lrrd22/3/more22055.htm>
- Moreki JC, Poroga B, Dikeme R and Seabo D (2010b). Ethnoveterinary medicine and health management in poultry in Southern and Western Districts, Botswana. *Livestock Research for Rural Development*; 22(6). Retrieved from <http://www.lrrd.org/lrrd22/6/more22107.htm>

- Moreki JC, Poroga B and Dikeme R (2011). Strengthening HIV/AIDS food security mitigation mechanisms through village poultry. *Livestock Research for Rural Development*, 23(2). Retrieved from <http://www.lrrd.org/lrrd23/2/more23030.htm>
- Moreki JC (2012a). Family chickens, poverty alleviation, food security and HIV/AIDS mitigation: The case of BONEPWA+. *J. AIDS HIV Res.*, 4(10): 229-233.
- Moreki JC (2012b). Use of ethnoveterinary medicine in family poultry health management in Botswana: A review, *J. Vet. Adv.*, 2(6): 254-260.
- Setlalekgomo MR (2012). Limitations to Tswana Chicken Farming among Women in Lentsweletau Village in Kweneng District, Botswana. *J. Anim. Prod. Adv.*, 2(11): 473-476.
- Simainga S, Moreki JC, Banda F and Sakuya N (2011). Socio economic study of family poultry in Mongu and Kalabo Districts of Zambia. *Livestock Research for Rural Development*, 23(2). Retrieved from <http://www.lrrd.org/lrrd23/2/sima23031.htm>
- Sloan S (2011). The Chicken and Egg of Food Security, GALVmed Global Alliance for Livestock Veterinary Medicines. England, United Kingdom. Retrieved from <http://www.mdg-review.org/index.php/sections/38-food-a-agriculture/234-the-chicken-a-egg-of-food-security>
- Sonaiya EB and Swan SEJ (2004). Small scale poultry production technical guide; Manual. FAO. 1-5.
- Worku Z, Melesse A and T/Giorgis Y (2012). Assessment of village chicken production system and the performance of local chicken population in West Amhara Region of Ethiopia. *J. Anim. Prod. Adv.*, 2(4): 199-207.