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An Analysis Of Factors Hindering The Development Of Indigenous Chicken Production In Smallholder Farming Communities Of Zimbabwe, A Case Of Ward 10 In Bindura District

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ABSTRACT:

The research was designed to analyze the factors hindering indigenous chicken production in Zimbabwe's rural communities with particular reference to Bindura district. A sample of 105 households was drawn from a population of 1050 smallholder farming households. A Questionnaire was administered and interviews conducted to generate date from the sampled participants. Collected data was analyzed using SPSS version 16.0 (1997). The response rate for this research was 95.2% which resulted in a sample of 100 households being actively involved in the study. The findings of this study revealed that village chicken production is an important facet of smallholder livestock production as it is rated highly for its multi-purpose functions and low input requirements. Farmers rarely sell village chickens as they are viewed as an investment to cushion unknown eventualities. Provision of manure, sanitation, entertainment and time telling were found to be latent functions of indigenous chickens. Low input production systems based on scavenging resulted in inadequate management in terms of housing, feeding and health care, which resulted in high incidences of predation, theft, malnutrition and diseases that caused high mortality rates and uneconomic productivity. High chick wastage rate were found to be the most significant factors hindering village chicken production ($p < 0.05$). Although farmers viewed high mortality and low productivity as the major constraints in village chicken production, the study revealed that mortality was a result of mediocre management systems practiced. The challenges were exacerbated by lack of funding which compromised research and extension and limited access to information on modern indigenous chicken production technologies. The study finally recommended that intervention strategies should seek to improve on housing, nutrition and health care to reduce chick mortality rates.

KEY WORDS: factors hindering, indigenous chicken production, smallholder farmers, multi-purpose functions, low input requirements

1.0 INTRODUCTION

Approximately 1.2 billion people in the world do not have enough food to meet their daily requirements (Gruēle, Giuliani and Smale, 2006). The majority are from impoverished developing

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countries, of which Zimbabwe is no exception. Food scarcity and poverty are common challenges that currently governments are battling to alleviate as evidenced by Millennium Development Goal No. 1 that aims at the eradication of extreme poverty and hunger (Kitalyi, 1995). In response to problems of hunger and poverty, most rural development agencies are now seeking state of the art production of underutilized food crops and livestock such as village chickens. In ward 10 of Bindura district, village chicken production is still underdeveloped and not used as a developmental alternative to alleviate poverty and hunger that prevail in most rural communities.

1.1 BACKGROUND OF THE STUDY

Ward 10 of Bindura South is a cluster of 10 villages found approximately 15 km Southeast of Bindura town. Resource poor smallholder farmers who earn a living through subsistence farming dominate the ward. The economy of the ward is sustained by a diversified subsistence farming system that includes both crop and livestock production. Most people in the ward are full time smallholder farmers who scratch a living out of mixed subsistence farming. Farming is both a source of livelihood and a business, although in most cases, production is inadequate to meet family needs. Surplus produce is sometimes sold for money or in a barter system, after family food needs have been met. Although crop production forms the economic background of the area, it cannot adequately sustain farmers; hence they sometimes supplement farming activities with other lucrative business ventures such as selling firewood, gathering and selling of edible wild fruits and roots, with farm brick molding and river sand extraction from river banks constituting the main livelihood activity.

Nearly every household owns some village chickens, which must be the focus for sustainable development. The potential of village chickens in poverty alleviation has however remained untapped in the area. This is despite the fact that various scholars and rural development agencies have come to recognize the importance of rural poultry in national economies of developing countries and its role in improving the nutrition status and incomes of many small farmers and landless communities in the last two decades (Kitalyi, (1995).The Kenya Economic report identifies indigenous poultry as one of the leading livestock enterprise that can contribute significantly, towards the attainment of the UN Millennium Development Goal number 1, of poverty and hunger alleviation (Kibet, 2013).The traditional production systems in the district are so primitive and subsistence, hence make village chicken production an insignificant opportunity for development. Each household owns a small flock of chickens kept in an extensive free-range system for meat and egg production to meet household protein needs. This is despite the fact that, village chicken products are in short supply in the market and that the enterprise can be turned into a highly productive enterprise to improve farmer's income (Nyagilo, 2013).

Village chicken production is also an integral component of integrated rural development programs to improve lives of the poor rural population and is an essential developmental opportunity for resource poor smallholder farmers who cannot afford other capital-intensive enterprises (Gueye, 1998). Given the agrarian background of the area, chicken production can be easily integrated to crop and animal production. The grains and legumes produced by farmers can be cheaply ground and mixed into chicken rations

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that can be used as cheap protein and energy supplements. Manure from cattle can be used to culture worms and caterpillars that can be used as a protein source for the chickens. At the same time, chicken excreta can be used as a protein supplement for ruminants.

More opportunities in village chicken production are found in the current health reform. With the speculated health consequences of genetically modified foods that have flooded the markets, people no longer trust artificially raised meats like broilers. The prospects of village chicken production are good, because of high demand for their meat, which is perceived to be tasty and of higher quality than that of exotic breeds (Crawford, 1992). A research carried out in Kenya cited that consumers are willing to pay 25% more for indigenous chicken meat and 41% for eggs than on imported chicken products (Federal Reserve Bank of St Louis, 2013). Due to this shift in preference, market of village chickens has increased. A dish served with village chicken in hotels and food outlets is more expensive than that served with broiler chicken. A mature village chicken at Mbare Musika (the biggest vending place for locally produced agricultural produce) goes at an average of $ 8 while broilers are sold at an average of $6. This shift in preferences is expected to be accompanied by an increase in production of village chickens to meet the ever increasing demand, which is not the case in Zimbabwe.

Given the circumstances of smallholder farmers in Bindura, village chicken production seems to be an attractive developmental alternative for the smallholder farmers, which can go a long way in the realization of Millennium Development Goal number 1 that seeks to eradicate extreme poverty and hunger in the country's rural communities. Despite all the above opportunities, village chicken production in most areas has remained subsistence and insignificant as a strategy for rural agricultural development. It is against such a background that the study sought to establish factors hindering village chicken productivity and production efficiencies in the smallholder farming sector of Zimbabwe, but with particular reference to Bindura district.

1.2 STATEMENT OF THE PROBLEM

Despite the fact that village chicken production is an essential developmental opportunity for resource poor smallholder farmers that can be used to achieve Millennium Development Goal number 1 of eradicating extreme poverty and hunger, village chicken production has traditionally remained primitive and subsistence in Bindura district, hence remaining insignificant as a strategy for rural agricultural development as most rural households continue to face critical food insecurity and live in abject poverty.

1.3 RESEARCH OBJECTIVES

- Establish Livestock Composition of smallholder farmers in Zimbabwe's communal areas, with particular reference to Bindura district
- To identify factors hindering the development of village chicken production for smallholder farmers in Zimbabwe's rural communities
- To evaluate village chicken production and management systems practiced by smallholder farmers in Bindura district

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2 RESEARCH METHODOLOGY

2.1 AREA OF STUDY

The study was carried out in ward 10 of Bindura South district. The district is located in Mashonaland Central province, North of Zimbabwe. The district is made up of 12 wards with an estimated population of 16 572 households (Central Statistics Office, 2012). The study area is made up of 10 villages with an estimated population of 1050 households. It is found in agro-ecological region 2b receiving an annual rainfall of between 700 and 1050mm per annum. Agricultural production in the area is mostly characterized with rain fed subsistence farming.

2.2 Population and sample size

The population for this study was made up of 1050 farming households in ward 10 of Bindura district. The study generated data from a sample of 105 households drawn from a population, which accounted for 10 % of the population. The sample size was in consistence with Francis and Jingura, (2010) who asserted that a sample of 10 to 30% of the population is a good representative of the population. To ensure this, probability sampling was therefore used to produce a miniature version of the population that represented the population.

2.3 Data collection, presentation and analysis

The research used questionnaires and interviews to solicit information from the sampled participants. Simple tables and graphs were used to present and summarize data collected. The Statistical Package for Social Sciences (SPSS Version 16.0, 1997) was used to analyze data. Regression analysis was used to statistically establish factors hindering village chicken production (independent variables) that were significantly associated to production (dependent variable) and the linear function obtained was used to predict production (dependent variable) per unit change of independent variables.

3 RESULTS

3.1 LIVESTOCK COMPOSITION

Livestock in ward 10 consisted of large ruminants, small ruminants, pseudo- ruminants and poultry. The pie chart below shows the relative composition of livestock in the ward.

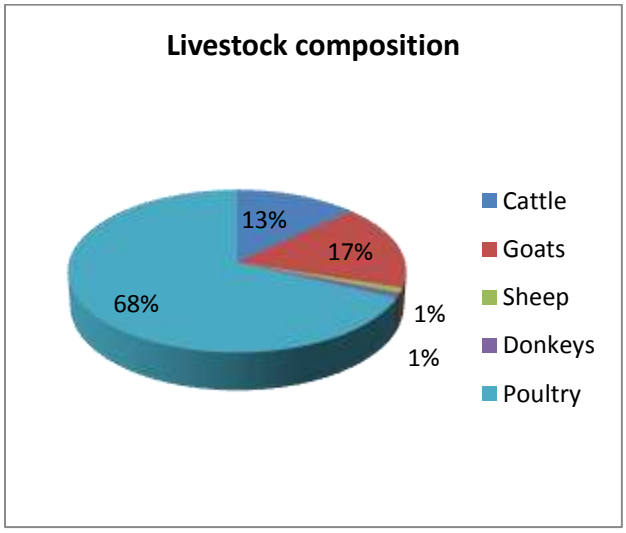

Figure 1: Livestock composition

Cattle were rated as the most important livestock by 68% of the respondents while 25 % indicated that poultry was the most important livestock. Only 7 % of the farmers rated goats as the most important livestock. Most of the respondents who rated poultry and goats as the most important livestock had no or few cattle. Most female headed households (52%) rated poultry as the most important livestock. Of the five farmers who

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had donkeys, 80 % of them had zero or one cattle. Eighty-three percent of the farmers owned cattle, small ruminants and poultry, 10%owned small ruminants and poultry only, 5% owned cattle and poultry only while the remaining 2% owned poultry only. Of all the farmers, 12% had no cattle while 100% owned poultry. The mean poultry flock per household was 26.78 followed by 6.67 for goats, 5.25 for cattle and 0.23 for both donkeys and sheep. Households with more cattle had bigger flocks of village chickens and the majority of the farmers who owned donkeys had few or no cattle.

3.2 VILLAGE CHICKEN MANAGEMENT

Regression Analysis

Regression analysis was carried to statistically determine the significance of various factors hindering village chicken production. The analysis indicated that from the 14 variables that were analyzed, six had a coefficient value $p<0.05$ while the other eight had $p<0.5$ values. Time of supplementing, time of shelter provision, reason for shelter provision, vaccination, contact with extension agents and chick survival rate had $p<0.05$ values. Type of supplementary, method of supplementing, method of disease management, facilitator of vaccination, knowledge of the disease vaccinated against, number of clutches per year and clutch size incubation rate had $p>0.05$ values. The results of the analysis are shown on table 4.10 below.

Table 1: Regression Analysis Coefficients

Nature of Variable	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	-31.343	27.597		-1.136	.259
	Time of supplementation	2.826	1.333	.162	2.120	.037*

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Management variables	Method of supplementation	1.151	2.431	.033	.473	.637 NS
	Type of supplements	-.321	.398	-.053	-.807	.422 NS
	Timing of housing	2.447	1.189	.168	2.058	.043*
	Reason for housing	4.607	1.002	.312	4.600	.000*
	Disease management	.405	1.508	.019	.268	.789 NS
	Vaccination	18.527	8.049	.636	2.302	.024*
	Facilitator of vaccination	4.780	2.979	.480	1.605	.112 NS
	Knowledge of disease vaccinated	-2.134	2.691	-.130	-.793	.430 NS
Research and extension variables	Contact with extension agents	8.45	2.976	.024	.284	.000*
Productivity variables	Number of clutches per year	-.733	1.806	-.031	-.406	.686 NS
	Clutch size	-3.669	1.881	-.126	-1.950	.054 NS
	Incubation rate	-2.784	2.157	-.086	-1.290	.200 NS

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	Chick survival rate	4.319	1.375	.258	3.140	.002*

a. Dependent Variable: Chickens

*, denotes significance at p = 0.05, NS – not significant; β0 - the intercept of the regression line

3.3 BREEDING

Results obtained showed that 100% of the farming households used uncontrolled breeding and they did not keep written breeding records. The researcher noted that although farmers did not keep written records, they kept important breeding records like clutch sizes, mothering ability and hatching ability among others in their heads. Fig 2 below shows the relative frequency of factors that were considered by farmers for hen culling and pullet selection. Body conformation was not considered a culling parameter by all farmers and only a few farmers used hen size and color for hen culling and pullets' selection.

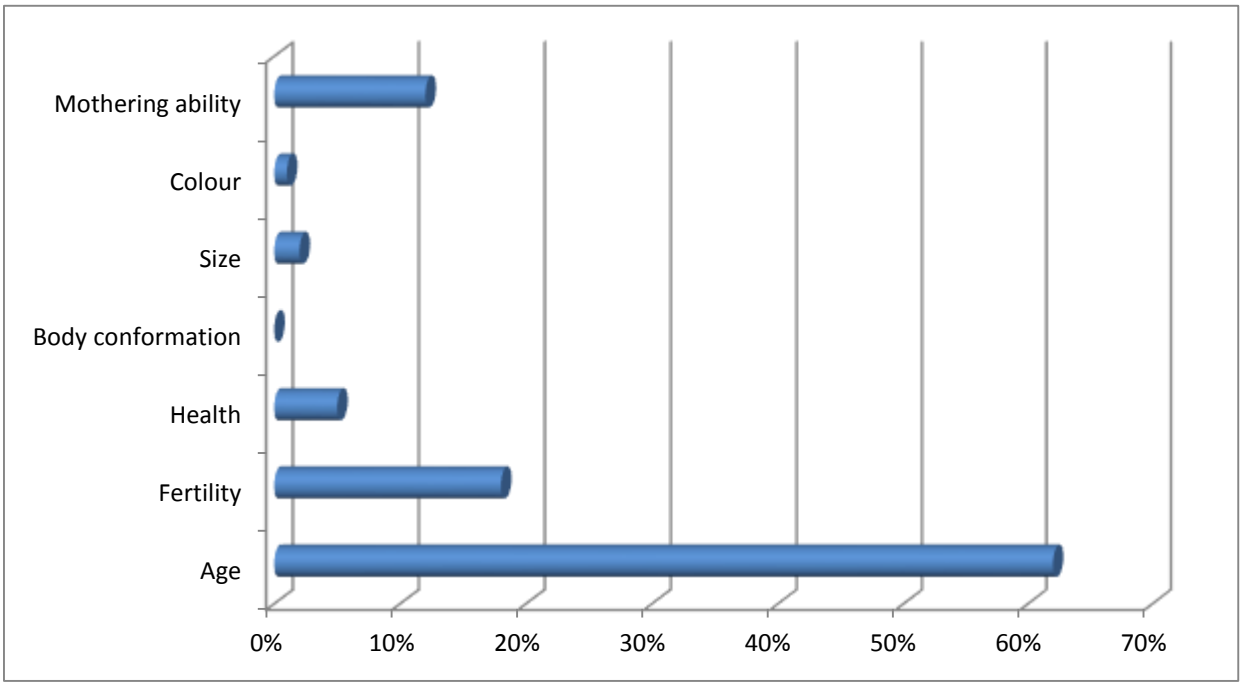

Figure 2: Reasons for hen culling by farmers.

Table 2: Shelter provision and flock size

Time of shelter	Reason for	Proportion of	Mean flock

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provision	housing	farmers	size
Only at night	Predation	29 %	10.8
	Theft	28 %	10.2
	Disease control	0 %	_
During critical growth stages and risk periods	Predation	31 %	21
	Theft	0 %	_
	Disease control	12 %	44

Findings from the study showed different reasons given by farmers as to why they provide shelter to their chickens. This had a bearing also on the mean flock size. Of these 31% provided shelter for their birds to prevent predation during critical growth stages while 29% and 28% provided it for predation and theft during the night respectively. 12% provided it for disease control during critical stages and this had a mean flock size of 44 compared to mean flock sizes of 21, 10.8 and 10.2 for predation during critical growth stages, at night and theft at night respectively.

Table 3: Methods of disease management and flock size

Method of disease Control	Proportion of farmers who used it	Mean flock size (Birds)
Veterinary	10 %	20.9
Ethno-veterinary	43 %	8.5
Both veterinary and ethno-veterinary	47 %	22.6

Results showed that only 10% of the farmers used veterinary medicines to treat their birds while 43% depended on ethno-veterinary and 47% used both veterinary and ethno-veterinary methods of disease control. This resulted in a mean flock size of 20.9, 8.5 and 22.6 respectively.

4 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

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Discussions

4.1 Livestock composition

The number of cattle and village chicken flock size had a weak correlation coefficient of 0.415. Although the coefficient is weak, it is however positive, which means that an increase in cattle herd will result in a weak but positive increase in village chicken production. This association implies that integration of village chicken production with cattle and crop production can improve village chicken production. Farmers with cattle have the capacity to produce more crops that are used as village chicken feed inputs because they have easy access to manure and draft power that enhances crop production. More so it was observed that most cattle pens were close to the households such that village chickens had easy access to the worms found in cow dung.

Integration of village chicken production to crop and other livestock enterprises however needs strategic planning so that its economic potential is realized.

4.2 Feeding systems

The observation that all farmers used the backyard system as opposed to the free-range system is quite positive as it indicates that farmers were quite aware of the importance of supplementary feeding and housing. Although all farmers gave supplementary feeding, the fluctuations in feed supply requires designing of appropriate strategic supplementation programs (Muchadeyi et al, 2004).Timing and frequency of feeding, what, how to feed and quantity to feed are important aspects to consider when developing strategies to improve nutrition of village chickens.

Timing of supplementary feeding had a correlation coefficient of 0.593 at 0.05 level of significance to the flock size, which means that an improvement in timing of supplementary feeding result in an increase in the mean flock size per household. These findings were supported by Moreki, (2010) who asserts that productivity of village chickens is determined by the relationship between the biomass of chicken population and the available feed resources. The impact of timing of supplementary feeding can also be explained by the observed regression analysis coefficient value of p=0.037, which indicates that time of supplementing is significantly associated to village chicken production. It therefore means that timing of supplementation is the most important factor to consider when designing a supplementary program.

Most smallholder farmers are resource poor and can hardly afford any other supplement besides maize, which alone cannot meet all nutritional requirements of the birds. Mlambo et al, (2010) say that the popularly grown white maize has very low crude protein content that is insignificant to the protein needs of animals. This implies that the maize supplement that was given to village chickens was inadequate in terms of quality, which exposed chickens to the risk of malnutrition.

4.3 Chick morbidity, mortality and survival rates

Better chick survivorship on households that gave commercial feeds may mean that chick wastage was due to poor nutrition, which is in consistence with Mwalusanya et al, (2002) who found out that the major constraint to improved village chicken production is poor nutrition. Commercial feeds provided balanced nutrients and were given to enclosed chicks, which also saved them from predation. The fact that only a few farmers used commercial feeds for supplementary purposes

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indicated that most smallholder farming households in the area are resource poor, hence cannot afford commercial inputs to support village chicken production. Provision of water in the open space created a health risk for the flocks since both wild and other domestic animals such as dogs, cats, goats among others had equal access to the watering points.

4.4 Provision of shelter

The observation that all farmers provided shelter for their birds during the night contradicts observations made by Mlambo, (2010) and Moreki, (2010) that smallholder farmers usually do not provide shelter for their flocks, instead the birds find shelter for themselves in trees and other hidden places. Provision of shelter only at night exposed birds to bad weather and day time predators such as baboons, eagles, hawks and dogs. The free-range system used during day time exposed chickens to the risk of diseases through flock mixing Nyangilo, (2013). Although shelter was provided at night, most of it was of poor quality, built from scrap materials, poles and grass. Poor quality housing units indicated that the provision of shelter was still at a rudimentary stage with little importance being attached to the type of housing (Muchadeyi et al, 2004). Resource availability could also have influenced the type of housing structures, since most of the chicken houses were made from local materials (Moreki, 2010). Substandard housing units expose birds to bad weather, predation, diseases, parasites and theft that promote chicken wastage.

Although the observation that some farmers shared their housing units with their flocks enhances security of the birds, it is a negative trend that limits the flock size, which explains the observation that such households had very small flocks. The main reason for the provision of shelter was not theft as was the case in studies by (Khalafalla et al, 2000; Mlambo et al, 2010; Muchadeyi, 2004), instead, most farmers provided shelter to curb predation. This was because most households were along mountain ranges that harbor both terrestrial and air predators such as wild cats, snakes, baboons, hawks and eagles.

The impact of shelter on village chicken production was also demonstrated using the regression analysis, which showed that the reason for and timing of shelter provision were the most important management factors that influenced production of village chickens, with significant values of $p=0.000$ and $p=0.043$ respectively. Reason for provision of shelter had a b coefficient of 4.604 while timing of shelter had a b value of 2.447. An increase by one unit, (reason for provision of shelter) would cause an increase of village chickens produced by 4.6 while the rate of flock increase per unit increase in timing of shelter is 2.4. The reason for housing influences timing while timing of housing is a response to the reasons for housing. Improved housing in terms of both timing and reason for housing minimizes predation, accident, bad weather losses and contamination of contagious diseases during critical periods (Nyangilo, 2013). It thus means that the provision of proper shelter is critical in disease, parasite, bad weather and predator management; however most farmers cannot afford it due to the associated costs of building materials and the required supplementary feeds. In this regard, inappropriate shelter provision in the study area was a significant constraint to village chicken production. Contact with extension staff had a significant effect on the production of village chickens at $p<0.05$. This shows that village chicken producers do not get assistance from extension staff on how to have a successful production. This deprives them of vital

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information useful to improve their chicken production.

Makokaha *et al,* (1999) showed that contact with extension staff has a major influence on the perception of farmers and hence their decision to increase production. This also agrees well with findings from Appiah *et al,* (2011) who found out that extension contact had a significant effect on the taking up of rabbit technologies. The constant meeting or constant contact between farmers and extension staff has the ability to enlighten the farmers resulting in better awareness of the profitable gains of improved technologies and other agricultural innovations, (Odoemenem and Obinne, 2010).

4.5 Health care

Most households were found to use both ethno-veterinary and veterinary medicines in their village chicken health management programs. This finding contradicted with that of Muchadeyi et al, (2004) in Rushinga and Mlambo et al (2010) in Zhombe that most smallholder farmers use ethno-veterinary medicines only. The difference is however almost the same since it was found out that most households were not consistent in their use of veterinary drugs since they did not always afford them. This also explains the insignificance of the methods of disease management in improved village chicken management as indicated by the regression coefficient value of p=0.789. Observations were that most farmers used them only when available, which means that the health management system in the area is based on ethno-veterinary medicines. This is because ethno-veterinary medicines are locally available and free to the households (Barua and Yoshimura, (1997) in Muchadeyi et al, (2004). The observation that only a few well up households used veterinary medicines indicated that convectional veterinary health care for village chickens was lacking due to the associated costs.

The wide use of traditional remedies could be ascribed to lack of knowledge in the use of vaccines (Moreki, 2008), low literacy rate and poor village chicken extension services in the area. Although this might be correct in some circumstances, in most cases, the hindering factor is the cost of veterinary medicines. Most smallholder farmers are so poor that they cannot afford veterinary medicines hence they resort to the use of locally available ethno-veterinary medicines. Maphosa et al, (2004) further found out that most of the smallholder farmers do not offer health interventions to sick birds due to lack of funds to purchase veterinary medicines and shortage of extension and veterinary services.

4.6 Breeding systems

The use of uncontrolled breeding by all farmers was a great limitation in the genetic performance of village chickens, which was attributed to lack of necessary infrastructure and the required technical knowledge. The observed none existence of meaningful breeding to improve the genetic properties of village chickens, was supported by Mhlanga, (2000: 171) who found that, "In Zimbabwe, indigenous poultry breeding is almost non -existent. It has been solely left to nature.'' Lack of breeding records was the main problem that made farmers unable to soundly select breeders since none of the farmers kept written records. This concurs with findings in Rushinga by Muchadeyi et al, (2004) who reported that there was virtually no record keeping on the performance of village chickens for selection and culling purposes. Regression analysis for breeding variables could not be computed since all the breeding variables were constant.

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4.7 Culling of unproductive birds

The finding that most of the farmers culled hens because of age is an indication that culling was done for wrong reasons, which does not improve the genetic properties of the flocks. Hens were kept as long as possible and then terminated at the end of their breeding lives. Mlambo et al, (2010) also found out that the main reasons for culling hens amongst smallholder farmers are age and poor health, which are not linked to genetic improvement of the flock. This however slightly differs with the findings of this research that showed that fertility is the second most important factor considered for culling hens. Lack of knowledge on the effects of body conformation on the productivity of village chickens made farmers ignore it as a selection criterion. In support of this, Mlambo et al, (2010) found that lack of knowledge to measure selection parameters results in uncontrolled culling of chickens. The observation that most farmers selected hens on the basis of reproductive traits such as age, mothering ability and fertility indicated the bias of farmers on numbers rather than quality of meat and eggs. This bias is however explained by the fact that farmers kept village chickens mainly for home consumption and not for business. Lack of systematic breeding means that genetic improvements in traits of economic importance will not be realized, which is detrimental to the improvement of village chicken production. This probably explains the observed problem of low productivity among village chicken flocks.

5 CONCLUSIONS

Based on the findings of this study, the following conclusions were made:

- Village chicken production is an important aspect of smallholder livestock production that is rated highly for its multi-purpose functions and low input requirements, which make it an affordable enterprise to produce quality proteins for household consumption.
- Factors hindering improved village chicken production were mostly management related, emanating from the low input production system used, which exposed chickens to predation, diseases, malnutrition and bad weather due to inadequate shelter, nutrition and health care.
- High mortality and low productivity that were identified by farmers as the major problems in management in terms of housing, health care and nutrition. Poor management practices are manifested in the form of high mortality rates and low productivity that are visible to farmers. The interaction of constraints in village chicken production we found to form a vicious cycle.
- Village chicken production was found to have a positive correlation to livestock and crop production on the farm. An increase in one results in an increase of the other.

6 RECOMMENDATIONS

Based on the results of the study, the following recommendations were made:

- Meaningful development of village chicken production can be realized through strategic interventions in village chicken funding, research and extension that will increase farmer access to inputs and knowledge required for better management.
- Village chicken management intervention strategies should focus on improved

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housing, nutrition, controlled breeding and flock health care with special emphasis on vaccination so as to reduce cases of malnutrition, theft, predation and mortality that are detrimental to productivity of village chickens

- Genetic improvements can be attained through the setting up of national performance recording centers and adoption of breeding technology such as use of open nucleus breeding and MOET among others.
- All stakeholders such as the government and NGOs should work together to ensure that funds are availed for the improvement of research and extension services on village chickens as well as procurement of inputs such as veterinary medicines, supplementary feeds and housing materials. This also includes funding of mass vaccination programs against Newcastle and related diseases.
- Farmers need to be educated on the potentials of village chicken production as a developmental opportunity so as to help them develop confidence and interest in it not just to meet household consumption needs, but also as a means of income generation.
- The wide use of ethno-veterinary medicines that is a potential opportunity for the resource poor smallholder farmers requires more research to determine and quantify their pharmaceutical properties and establish dosage quantities for age and mode of applications. Ways of effectively integrating them into the convectional veterinary health care programs should be established.
- An integrated approach should be used in the development of village chicken production, with special emphasis on crop and cattle production, which can be turned into inputs in village chicken production.

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