



A Research Review of Village Chicken Production Constraints and Opportunities in Zimbabwe

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ABSTRACT : Development of village chicken production can be a sustainable way of helping to meet the welfare needs of rural populations and raise their living standards. There is a dearth of information on research conducted to characterize, understand and develop the village chicken production systems in Zimbabwe. This review focuses on constraints, opportunities and research needs for the improvement of village chicken productivity in Zimbabwe. Village chicken production in Zimbabwe is extensive and dominated by indigenous chickens that exhibit remarkable adaptation to local environments. The multitude functions of village chickens, which include the provision of high quality protein meat and eggs, cash through sales and socio-cultural roles, are discussed in detail. Human gender aspects in village chicken production are highlighted. The factors that hamper village chicken productivity are reviewed together with opportunities and research needs. The major constraints include shortage of feed, poor health and housing management. Any improvements in these constraints may lead to sustainable increase in village chicken productivity. (**Key Words :** Constraints, Gender, Marketing, Mortality, Village Chicken)

INTRODUCTION

Agriculture plays a very important role in the economy of Zimbabwe, providing income for about 75 percent of the population and contributing over 40 percent of national earnings from exports (Faranisi, 1995). More than 80% of Zimbabwe is subject to conditions which make dry land cropping a risky undertaking because of low and erratic rainfall. Livestock and crop production are therefore important enterprises in most areas (Shumba and Whingwiri, 1988). The most important livestock species kept are cattle, goats and sheep (Kusina and Kusina, 1999). Poultry and pigs are popular although they are considered less important to ruminants (Muchadeyi et al., 2004).

The rural poultry population in Africa accounts for more than 60% of the total national poultry population, which has been accorded an asset value of US\$5,750 million (Kitalyi, 1998). Over 70% of the poultry products and 20% of animal protein intake in most African countries come from rural poultry sector (Kitalyi, 1998). Chicken production in

Zimbabwe like in most developing countries is two-dimensional; large-scale and smallholder (Faranisi, 1995). Large-scale production is characterised by intensive management, mechanization and specialization, and is dominated by few large companies which are both breeders and producers (Pedersen, 2002). The smallholder sector predominantly includes small-scale commercial (semi-intensive) and communal (extensive) farming. The semi-intensive production system is comprised of moderate management level, specialised breeds and is labour intensive. Extensive system is dominated by village chickens, which are not classified into specific breeds and scavenge for feed (Muchadeyi et al., 2004). In Zimbabwe and other sub-Saharan African countries, 70% of the total chicken population is reared under the extensive system of production.

Despite the fact that village chickens are adapted to harsh environmental stresses prevalent in most rural areas (Faranisi, 1995) their contribution to rural economies is low (Shumba and Whingwiri, 1988). There is limited reliable information on performance levels, constraints and opportunities of village chicken in Zimbabwe. This makes it difficult to design and implement village chicken-based developmental programmes that benefit rural livelihoods (Pedersen, 2002; Muchadeyi et al., 2005). Thus, there is

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need to understand the current constraints and opportunities faced by stakeholders within the existing village chicken production systems. Development of village chicken enterprises can be a sustainable way of improving food security and livelihoods of the resource poor farmers (Kitalyi, 1998; Miao, 2005). This review focuses on constraints and opportunities for improving village chicken production in Zimbabwe.

Contribution of village chickens in the smallholder sector

Although chickens are important in providing food and income, their monetary contribution to household economy is viewed as low (Pedersen, 2002; Miao, 2005; Muchadeyi et al., 2005). The low returns of village chicken production in rural areas can be attributed to insufficient empirical case studies, the use of conventional and sometimes inappropriate economic models to measure production and financial returns and failure to consider all uses. This is also due to the chickens' multiple non-cash outputs, such as manure, traditional purposes, home consumption, social obligations and status. Since poultry products consumed by the farming family only passes through non-formal marketing channels, researchers and decision-makers do not adequately appreciate the economic importance of such products. There is need to understand the perceptions of the farmers on the functions of village chickens and the value of their products under the existing production systems in order to improve village chicken productivity and sustainability in rural areas.

Village chickens provide cheap, readily harvestable protein-enriched white meat and eggs with high quality, digestible protein for immediate home consumption and sale for income generation (Dolberg and Petersen, 2000; Mapiye and Sibanda, 2005; Miao, 2005). Thus, there is need to assess the monetary value of chicken and eggs and estimate their contribution to household income and food security. Chickens are used as buffers or banks in cases where they are sold to pay for school fees, medical costs, village taxes and other uncertainties. The extent to which chickens are used as buffers or banks depends on the socio-economic status of each rural household (Julian, 1992; Muchadeyi et al., 2004).

Village chickens play a vital role through their contribution to cultural and social life of smallholder farmers (Dolberg and Petersen, 2000; Pedersen, 2002). In some cases farmers give birds and eggs as gifts to visitors and relatives, and as starting capital for youth and newly married women as well as token of appreciation for services rendered (Kusina and Kusina, 1999). Chickens are reserved for special guests or at ceremonial gatherings such as marriage feasts, weddings and funerals. Village chickens are used to strengthen relationships with in-laws and to

maintain family contacts by entrusting them to other family members (Muchadeyi et al., 2004). They are given as sacrificial offerings to appease avenging spirits and ancestors. Village chicken feathers are used to make special clothes (skirts, hats and pillows) for the traditional healers for their day-to-day use and for spirit mediums to wear during traditional ceremonies. The chickens perform a valuable sanitary function by eating discarded food and controlling pests in gardens. Cocks are also used as alarm clocks in rural areas (Kusina and Kusina, 1999). However, it is difficult to compare monetary values of sale and consumption to spiritual or socio-cultural benefits, hence a unilateral procedure is required to evaluate and compare the monetary and spiritual or socio-cultural contribution of village chickens to rural livelihoods.

Indigenous chickens are an important reservoir of genomes that may be used in future to produce hybrid birds since most strains have superior genetic constitution that has not been fully exploited (Pedersen, 2002). Another important role of village chickens is the provision of manure. Manure from chickens is applied in vegetable gardens, and is regarded to be of high value for vegetables in comparison to goat or cattle manure (Maphosa, et al., 2004; Muchadeyi et al., 2004). Village chicken litter, offals and feathers can be used as ruminant feed to supplement protein, hence if treated to eliminate bacterial infection can offer an attractive option for smallholder farmers. To date there are no detailed studies conducted targeting comprehensive description of use patterns of village chicken and its products, and understanding the associated socio-economic conditions, roles and functions of local chickens. This will have considerable relevance for future research and development. Therefore, research should be conducted with the objectives of understanding the use patterns of village chicken and its products, and its socio-cultural functions.

There are various advantages which make village chickens attractive in the context of poverty alleviation and quality protein supply in Zimbabwe than cattle, sheep, goats and pigs: village chickens in one form or another are kept in most areas and there are hardly any religious or social taboos associated with them (Pedersen, 2002). They have high reproduction rate per unit time, they are efficient in transforming feed protein and energy into human food, they use very low capital, labour and space, which allows chicken production to be practiced even by landless individuals (Muchadeyi et al., 2004). Village chickens are easily liquidated, and eggs and meat represent consumable units that do not require specialised storage and preservation facilities (Mapiye and Sibanda, 2005). Village chicken production plays a complementary role to other crop-livestock activities and therefore, can be the most dynamic sub-sector within the livestock poly-systems

(Muchenje and Sibanda, 1997). However, its complementary role to crop-livestock subsystems has not been fully established and it warrants investigation.

Human gender participation

In order to identify constraints and opportunities for technological interventions into smallholder village chicken production, gender analysis should be carried out. This will assist in preventing frequent misdirecting of technologies and services to the wrong gender group. Gender analysis is a tool for understanding men and women's roles and the responsibilities in various activities, their use of resources, access and control to resources and benefits, participation in decision-making and contribution to household income and food security (Kusina et al., 2001). The involvement in different types of agricultural work for men and women in most African communities depend mostly on social, cultural, local customs and religious influence (Dassie and Ogle, 1996; Tadelle and Ogle, 2001). The role of women in farming and village chicken practices was, until recently, largely unrecognised.

In Zimbabwe, more than 90% of households keep chickens, which almost entirely belong to women (95% of the households) (Kusina and Kusina, 1999; Maphosa et al., 2004). Women dominate most of the activities around village chicken production; feeding, watering, cleaning, selling of chickens and eggs (Kusina et al., 2001; Mapiye and Sibanda, 2005). The women look after the birds and earnings from the sales of eggs and chickens are often their main source of income (Muchadeyi et al., 2004). In addition to shelter construction, men are also dominant in the treatment and slaughtering of chickens (Muchadeyi et al., 2004). Women, even in those households headed by men, are responsible for most of the decision-making on chicken production (Kusina et al., 2001), but in some communities decisions are made jointly by males and females (Muchadeyi et al., 2004). Men participate more than women in most of the developmental meetings conducted by non-governmental and national organizations and this can be attributed to low literacy levels among many women and the many tasks women have to undertake at household level (Kitalyi, 1998). Low literacy levels must be overcome if village chicken production is to directly benefit women.

Management strategies in keeping chickens vary according to cultural systems of land use, labor division, sex and age group (Tadelle and Ogle, 2001). Further research should use data disaggregated by age, sex and socio-economic group since different categories of men and women have different interests, resources and possibilities regarding village chicken production. In general, all aspects of village chicken enterprise development from problem identification to implementation and dissemination have social implications. Therefore, development has to be

focused on specific needs and interests of a specific group; man, woman, boy, girl and same social-cultural groups in order to improve both equity and efficiency.

Findings confirmed that women own and produce many more chickens than men, dominate most of the activities around village chicken production and that the income generated from chicken production is spent in direct relation to nutrition, health and education of the family and have control and access to production resources and benefits of village chicken production (Kusina et al., 2001; Muchadeyi et al., 2004). Therefore, an engendered approach to village chicken production would increase production efficiency, improve food supply, reduce malnutrition and dependency of women on men, enhance family stability and assist in poverty alleviation. There is need to validate the above-mentioned assumptions by embarking on long-term studies to monitor changes in trends in response to imposed innovations on village chicken production, increased income/empowerment of women and increase food security in many areas.

CONSTRAINTS TO VILLAGE CHICKEN PRODUCTION

Production constraints

Reproductive wastage and mortality : Village chicken flock productivity is mainly determined by egg production, hatchability, chick survivability and growth rates (Tadelle and Ogle, 2001; Pedersen, 2002). Any management factors that would have a positive impact on egg production and chick survival can be used to increase the output from village chicken flocks. The flock size is a function of egg production per hen and the proportion of mature laying hens in a flock (Kitalyi, 1998). Various studies done in the smallholder communal areas showed average flock sizes of between 15 and 20 chickens (Lombrou, 1993; Pedersen, 2002) with a range of 1-50 (Muchenje and Sibanda, 1997; Muchadeyi et al., 2004). The flocks are mainly composed of chicks (Maphosa et al., 2004; Muchadeyi et al., 2004). Compared to performance reported on-station, village chicken productivity in the smallholder system is inefficient, characterized by high reproductive wastage and low productive performance (Tadelle and Ogle, 2001; Pedersen, 2002). When making comparisons of flock sizes, it is important to use the same base, that is, the location, type and timing of survey, as there are likely to be variations overtime (Chitate and Guta, 2001).

The reproductive performance is generally low, hens lay 30-80 small eggs/hen/year under smallholder conditions compared to commercial strains that produce up to 300 eggs. The number of eggs incubated per clutch varies from 8-14 and the average clutch size range from 2-3 clutches/hen/year (Kusina and Kusina, 1999; Pedersen,

2002). Smith (1990) estimates that under scavenging conditions the reproductive cycle consists of a 10-day laying phase, a 21 day incubation phase and finally a 56 day brooding period which is in line with the results of most studies in Zimbabwe. Pedersen (2002) reported that at any given time only 40-50% of the hens were productive (laying, incubating or brooding). Village chickens reach point of lay at 26-30 weeks (Pedersen, 2002). This is fairly late compared to layer breeds that normally reach point of lay at 18-22 weeks old. The local average egg weight is 52 g (with a range of 35-60 g) (Muchenje and Sibanda, 1997; Mapiye and Sibanda, 2005), thus very low compared to commercial strains that have an average egg weight of 60-70 g. Hatchability and survivability levels vary from 20-70% (Pedersen, 2002; Muchadeyi et al., 2005). Chick mortality represents a major loss in the studied village chicken production systems (Pedersen, 2002; Muchadeyi et al., 2004). Reports from other countries in Africa show that 50-70% of chicks die between hatching and at the end of brooding (Kitalyi, 1998; Tadelle and Ogle, 2001). Various studies recorded hatching weight values that range from 30-40 g (Maphosa et al., 2004; Muchadeyi et al., 2004).

Village chickens grow very slowly compared to exotic breeds (Pedersen, 2002). Results obtained on-farm showed that males on average had higher body weights (2.4 ± 0.7 kg) than females (1.5 ± 0.5 kg) (Maphosa et al., 2004) whilst on-station they had 2.714 kg and 1.756 kg, respectively (Pedersen, 2002). These results indicate that village chickens have a higher potential for growth than what was found on-farm. Maphosa et al. (2004) reported mean growth rates of 3.69 g/d and 4.44 g/d to eight weeks for females and males, respectively. Pedersen (2002) obtained daily growth rates of 6.8 ± 1.3 g and 7.4 ± 1.3 g until week 20 for males and females, respectively. The variation in growth rates might be due to differences in time of surveys, ages, genotypes and type of management practised by farmers. These results indicate that growth rates and mature weights are low, showing that village chickens are lightweight type of chickens and this might be an adaptation to local environment of poor feed resources and high ambient temperatures. Research is required to determine village chickens' point of inflexion on the growth curve.

Mortality was observed to be the major limitation to village chicken production in Zimbabwe (Kusina et al., 2001; Pedersen, 2002; Maphosa et al., 2004). Mortality claim more exits than other exits such as sales, consumption, gifts, exchanges or entrusted chickens (Muchadeyi et al., 2005). Village chicken mortality often exceeds 50% (Kusina et al., 2001; Pedersen, 2002) in communal areas and less than 20% on-station in Zimbabwe (Pedersen, 2002). Most chickens die during the hot-wet and hot-dry seasons (Maphosa et al., 2004; Muchadeyi et al., 2005). Mortality is due to a number of interacting factors such as diseases,

parasites, predation, accidents and bad weather among many others (Kusina et al., 2001; Muchadeyi et al., 2005). There is no accurate measurement of the contribution of each of these factors to mortality.

Predation and diseases were recorded as the major causes of mortality in many communal areas (Kusina et al., 2001; Pedersen, 2002). Most common predators are dogs, cats, snakes, eagles, hawks and thieves. Predation can be reduced by close monitoring of village chickens during scavenging periods and keeping them in proper houses during the night. Hunting, trapping or poisoning of predators can also lessen predation levels. Chicks are the most vulnerable; there are chick mortalities of up to 60% (Pedersen, 2002; Muchadeyi et al., 2005). Farmers are encouraged to provide extra care to their chicks by the use of locally made Hay-box brooder to reduce chick mortality. Pullets and cockerels comprise the exploited group since they provide an opportunity for cash and food security through sales and consumption (Muchadeyi et al., 2005).

Health management : Poor health management resulting in high mortality rates and compromised productive performance characterise most smallholder chicken production systems in Zimbabwe (Kusina et al., 2001; Pedersen, 2002). Tadelle and Ogle (2001) cited disease as the main cause of village chicken losses, reducing both numbers and productivity. The most prevalent diseases in Zimbabwean communal areas are Newcastle Disease, Avian Coccidiosis, Diarrhoea, Fowl cholera, Fowl coryza, Fowl pox and Marek's disease (Chitate and Guta, 2001; Kusina et al., 2001; Pedersen, 2002; Maphosa et al., 2004). The existence of multi-entities and their contact with the outside environment and wild animals makes it difficult to control disease outbreaks. Farmers do not keep records and diseases epidemiology is poorly understood. Contact with veterinary and extension personnel is not sound and a lot of problems go unnoticed (Muchadeyi et al., 2005). Unlike in commercial set-ups many complementary factors influence the health of smallholder chicken populations. Such complex phenomena make it even more difficult to design improvement strategies to overcome health constraints. Development of chicken health programmes is required to give reliable information on the epidemiology of diseases and the possibilities of reducing outbreaks (Mohanty, 1987; Chaheuf, 1990; Miao, 2005).

Smallholder farmers respond differently in times of disease occurrence; they do nothing, use ethno-veterinary medicine, modern (conventional) medicine or medicine originally intended for humans (Mapiye and Sibanda, 2005). High percentages of farmers do not offer health interventions to sick birds (Maphosa et al., 2004). Lack of response by the farmers can be attributed to lack of cash to purchase veterinary medicine and shortage of veterinary and extension services. Most studies done in communal

areas revealed that the majority of smallholder farmers that treat their chickens use ethno-veterinary medicine (Muchadeyi et al., 2004; Mwale et al., 2005). The wide use of traditional medicine is due to its low cost, local availability, easiness of application and it does not require modern technologies such as refrigeration.

Examples of herbs used to treat chicken diseases in rural areas are *Boswellia serata*, *Adansonia digitata*, *Addendum multiflor*, *Aloe vera*, *Cussonia arborea*, *Cygnium adonense*, *Cyperus articulatus*, *Allium sativum*, *Capsicum frutescens* and *Carica papaya* (Chaheuf, 1990; Pedersen, 2002; Muchadeyi et al., 2004; Mwale et al., 2005). Aloe species are the predominantly used plant species for chicken health management in the smallholder sector (Mwale et al., 2005). Aloe species have several pharmacological properties: it is antibacterial, antifungal, antivenin and has immunological properties. Ethno-veterinary medicine is also used to control predators for instance *Annona senegalensis* and *Allium sativum* repel snakes and *Cucumis pustulus* (muskmelon) repel hawks. *Trephrosia vogelii*, *Nasturtium trapaecolum*, *Ozoroa reticulata* and *Strychnos spinosa* are used to control parasites (Mwale et al., 2005).

In monitoring studies done in Rushinga communal areas, large flock sizes were obtained among farmers that used traditional medicine (Mapiye and Sibanda, 2005). This indicates that traditional medicines do work and have the potential to improve the health status of village flocks. Farmers justify the potency of the ethno-veterinary remedies in relation to chicken's health and production performance in terms of feed intake, body weight, carcass size and quality (Muchadeyi et al., 2005; Mwale et al., 2005). The use of locally available and cheap ethno-veterinary medicines is probably the most sustainable health management strategy for households with limited resources (Muchadeyi et al., 2005). Hence, there is a need for validation of the therapeutic functions, active ingredients and their effectiveness and determination of optimum dosages for various age groups and proper mode of application of ethno-veterinary medicine before their commercial application.

Ethno-veterinary medicine differs from place to place, among and within communities. It is developed through trial and error and intentional experimentations, and transmitted verbally across generations without any documentation (Mohanty, 1987; Gueye, 1999; Mwale et al., 2005). Ethno-veterinary medicine is less systematic, less formalized and not universally recognized as a valid method of diseases control in poultry (Mwale et al., 2005). However, farmers have a rich store of knowledge on herbal medicines that they have found effective over the years. Much of this valuable knowledge is being lost and/or replaced by modern techniques, therefore, has a danger of extinction (Gueye, 1999). Sharing this knowledge is vital to ensure that it is

used and is preserved for the future. Documentation of herbal plants is necessary because they are likely to be more important in the future, especially given the escalating costs of drugs and the focus on organic products in most developing countries. In addition, with the development of resistance of pathogens to drugs, ethno-veterinary medicine might be the route to take since herbs tend to be broad spectrum (Mwale et al., 2005).

Feeding management : Most smallholder chickens scavenge for feed and water for an average of 11.0 ± 5 h per day between 0500-1800 h (Maphosa et al., 2004). During the planting season the letting out is delayed to around 1100 h, to protect crops (Muchadeyi et al., 2004). The majority of the farmers practice supplementary feeding with locally produced feed to bridge the fluctuating feed supply gap (Kusina and Kusina, 1999; Mapiye and Sibanda, 2005). Supplementary feeds are provided more frequently during the dry season. The provision of supplementary feeding is indiscriminate and all age groups compete for the supplement (Muchadeyi et al., 2004). This non-preferential feeding might result in weaker groups, such as chicks getting sub-optimal nutrition (Tadelle and Ogle, 2001). The amount of supplement is not measured and varies from few grams to a kilogram for the whole flock at any given time (Maphosa et al., 2004). Different birds are known to require different amounts of nutrients (Tadelle and Ogle, 2001; Ogle et al., 2004), depending on the production stage. Hence, it is not clear whether the chickens get enough nutrients under these feeding systems. The fluctuations in the supply of feed resources require designing of appropriate strategic supplementation programmes (Muchadeyi et al., 2005). Timing and frequency of feeding, what, how to feed and quantity to feed are important aspects to consider in developing strategies to improve nutrition of village chickens (Mapiye and Sibanda, 2005).

Shortage of protein in scavenging feed resource base is not presumed to be a major constraint (Smith, 1990; Ogle et al., 2004). Chickens are expected to get adequate protein from scavenging insects, snails and leguminous grains. Sunflower is the most commonly supplemented protein source (Muchadeyi et al., 2004; Mapiye and Sibanda, 2005). Farmers are encouraged to use legume leaf-meals for protein supplementation. Energy is considered the first limiting nutrient in scavenging system. Smallholder farmers predominantly supplement their chickens using energy rich feed, especially maize, millet, wheat, sorghum and their by-products to ensure availability of energy to their chickens throughout the season (Kusina and Kusina, 1999; Muchadeyi et al., 2004). Some households use household-wastes. The portions that come as grain supplement vary with seasons and activities such as land preparation, sowing harvesting and threshing (Maphosa et al., 2004). Farmers use many fresh foods such as garden and kitchen waste, ash,

fruits, plants, red soils and other local resources to meet minerals and vitamins needs for their chickens (Muchadeyi et al., 2004). However, there is a need to estimate the economic or physical value of the local scavenging feed resource base as it is important in the planning of the production cycle for optimisation of utilisation for better returns (Roberts and Gunaratne, 1992; Dassie and Ogle, 1996; Miao, 2005).

In general, chickens given supplementary feed yield high flock sizes, high growth and fertility rates, and are less prone to diseases and parasites (Roberts and Gunaratne, 1992; Tadelle and Ogle, 2001; Ogle et al., 2004). These results indicate that supplementary feeding is a potential avenue for intervention since the majority of the farmers practice supplementary feeding with locally produced feed. Hence, there is a need for a good feeding program made up of home-grown feeds that ensures greater returns in terms of tasty meat, abundant eggs and good fertility. Farmers should be trained to formulate rations using home-grown feeds. Any attempt to intervene the existing village chicken production system by the way of supplements should carefully consider quality and quantity of the scavenging feed resource base. The levels of anti-nutrients in seeds and grains must be measured before their inclusion into chicken diets.

Housing management: Most farmers in Zimbabwe provide shelter for their chickens and few farmers leave chickens to stay on trees or open spaces overnight (Kusina and Kusina, 1999; Pedersen, 2002). Chicks are often kept in the kitchen in cages over night for 1-2 weeks after hatching (Maphosa et al., 2004). There are a variety of village chickens housing across the nation, and this is influenced by perceived threats to chicken survival and resource availability (Julian, 1992; Muchadeyi et al., 2004). The housing structures are either raised or on the ground mainly built up of locally available materials such as bricks, mud, wooden poles and tree branches (Kusina and Kusina, 1999; Mapiye and Sibanda, 2005). Brick housing structures are common to households that view predation as the main threat whilst housing structures made of wooden poles are regarded as effective for reducing infestation by external parasites (Muchadeyi et al., 2004). Therefore, it is important to assess the effect of variation in chicken housing design on flock productivity. The floors are made up of soil, wood, wood shavings, grass or straw. The roofs are thatched in most cases, iron and asbestos sheets are rarely used (Pedersen, 2002). Provision of perches to roost and nests is common whilst provision of feeders and drinkers is rare (Maphosa et al., 2004). Housing material depends on the size of the undertaking, land, capital, durability, warmth, ease of cleaning and feeding, and on the attitude of the farmer (Kusina and Kusina, 1999).

The use of shelter is mainly to shield birds from

environmental hazards and predation (Kusina and Kusina, 1999). Village chicken studies conducted in Sanyati, Chivhu, Guruve, Murehwa and Rushinga communal areas of Zimbabwe highlighted the need for good housing to reduce losses from predators, diseases and environmental hazards (Kusina et al., 2001; Pedersen, 2002). Most of the material used for houses and nests made favourite feeding and hiding places for parasites. Thus, proper housing must not only provide microenvironment or meso-environment that moderate environmental impact but must provide adequate ventilation for birds to lay eggs in nest boxes, as well as to feed and sleep in comfort and security (Kusina and Kusina, 1999). The construction of proper housing using cheap, durable, locally available resources and skills can go a long way in making village chicken production a viable and sustainable enterprise. There is need to further investigate the importance of housing and its economic efficiency according to farmers' perspective, as research in Zimbabwe and Africa at large is scanty.

Breeding and genetic improvement : In Zimbabwe, poultry breeding is essentially for the commercial sector, which utilizes imported breeds for production. Like in other developing countries, the indigenous chickens have remained insignificant due to lack of genetic improvement in commercially important traits (Kitalyi 1998; Mohd-Azmi et al., 2000; Li et al., 2006). Breeding and selection has been largely left to nature and to date no differentiations into broiler or layer strains have occurred (Faranisi, 1995). Consequently, production in both meat and egg has remained very low compared with commercial strains. Village chickens have not been genetically characterised into specific breeds, (Muchenje and Sibanda, 1997; Mhlanga et al., 1999) and no breeding programs have been put in place to improve these breeds. Phenotypic characterisation carried out by Pedersen (2002) revealed that village chickens are very heterogeneous in appearance within and between areas, relatively dark in plumage colour, but varied in appearance due to their different features like crested chests or naked necks.

More than 50% of day-old-chicks sold by large poultry breeding companies in Zimbabwe, are absorbed by smallholder farmers who raise them under free-range conditions (Kusina and Kusina, 1999). These hybrids run together with local ('indigenous') strains and have resulted in the 'contamination' of local genotypes (Faranisi, 1995). The chicken population among the smallholder farmers comprised of 74% indigenous strains, 14% hybrid broilers and 12% hybrid layers (Kusina and Kusina, 1999). There is concern that the continued dilution of indigenous chicken genotypes in developing nations will result in their subsequent disappearance before their production characteristics have been established (Faranisi, 1995; Mohd-Azmi et al., 2000; Li et al., 2006). Proposals have

been made for nucleus populations of indigenous genotype to be maintained at Government farms (Mhlanga et al., 1999). The smallholder sector is unable to provide the high levels of management and feeding levels required by improved breeds. While the commercial breeding houses are aware of the shortcomings of the current breeds in meeting the needs of the smallholder sector, there are no plans to develop a specific breed for this sector (Mhlanga et al., 1999). Kitalyi (1998) and Li et al. (2006) argued that development efforts in Africa and Asia are more focused on introduction of exotic high yielding breeds than understanding the production potential of indigenous chickens. The commercial sector is challenged to produce a chicken breed that has less demanding feed requirements, is more resistant to diseases, grow faster or lay many eggs and suits free-ranging conditions.

Use of genetically superior animals will ensure good returns from the initial investments (Barua et al., 1998). Imported breeds should however be used with caution as they succumb to diseases and poor performance under the existing feed regimes. Visual selection within local stocks if accompanied by good recording schemes might be a worthwhile management practice. Culling of unproductive hens will reduce unnecessary costs in feed and housing. Crossbreeding of local strains with some imported strains can increase productivity of flocks (Pedersen, 2002) but should be coordinated to avoid replacement of indigenous stock (Mhlanga et al., 1999). Use of nucleus centres is one of the breeding tools that can be used by farmers to improve their flocks. High rates of inbreeding should be avoided as they can reduce productivity.

Socio-economic constraints

Marketing : The success of a chicken production enterprise is judged by the quantity and quality of products sold (number of chickens and eggs) and consequently, the amount of profit gained. In Zimbabwe lack of markets and marketing skills are some of the major drawbacks of village chicken production system (Kusina and Kusina, 1999). These problems exist because there is no conscious effort made to identify an existing market before production starts and to maintain existing customers and attract new ones. Now that almost every one in the smallholder community produces some chickens and eggs for sale there is a need for effort by individual farmer to market their products. Marketing of chicken and eggs in the smallholder sector is informal and tends to be within the local communities, between farming households and to some non-farming households such as clinics, schools, business centers and growth points, using cash or barter transactions (Harun and Massango, 2000; Muchadeyi et al., 2005). Most farmers depend on hawkers or middlemen who buy birds for urban markets. Since meat and eggs are perishable goods and

smallholder farmers' financial position is poor they are encouraged to use the shortest routes to the customers to avoid loss of profits by going via the middlemen.

Sale of chicks and breeding stock in Zimbabwe is rare (Muchadeyi et al., 2005). Marketing of live birds is common under this system. In areas where markets are a problem, farmers are forced to keep the birds longer and this increases the costs of production by increasing the amount of feed required to keep the birds alive (Harun and Massango, 2000; Pedersen, 2002). Organised marketing is non-existent. Farmers are recommended to organise themselves into groups and set satellite centres with paraffin or electricity driven refrigerators so that they use the cold chain system of marketing. Selling cold dressed chickens ensures farmers do not have to keep live chickens for unnecessarily long periods of time. It is important to organise farmers into "chicken commodity groups" which will have more authority over their produce (Kusina and Kusina, 1999). Furthermore, small processing, packaging and value addition plants can also be set up at these centres to assist during times when there are large volumes of chickens. The advantages of farmer organisation also lie in the selling of products in bulk, attracting big markets and enjoying economies of scale.

In rural areas, transaction costs associated with selling village chickens are high. High transactions are caused by low amount of chicken and eggs sold at any given time, long distances travelled, poor infrastructure and lack of market information (Harun and Massango, 2000; Muchadeyi et al., 2005). Hence, farmers are urged to consider external factors such as level of market demand, nature of market competition, competitor prices and offers, government regulations and socio-economic factors in addition to internal factors such as cost of production in pricing a given product. Pedersen (2002) recorded higher prices for local chickens compared to exotic breeds. Apparently people prefer the meat from local chickens and claim that it is tastier and better suited to the traditional way of prolonged cooking (Pedersen, 2002). Advertising is also important as it informs the consumers about the products (chicken and eggs) with a view to making customers buy. It can be done through the use of both the print and electronic media and selection of appropriate media is important and farmers should understand the characteristics of each media. Government and other stakeholders are urged to assist poorly resourced farmers to access the technology they need to successfully market village chickens in the smallholder communities. Appropriate legislation should be created to allow smallholder farmers to produce village chickens collectively and thus enjoy the benefits of bulk purchasing of inputs and group marketing.

Infrastructural, institutional and technical constraints : Constraints can be subdivided into those that are

infrastructural, technical and institutional. Infrastructural constraints include lack of research and education on infrastructure serving the village chicken production system of the smallholder and poor physical infrastructure; roads, energy, water supply and communication technology (Kusina and Kusina, 1999). There is need for information technology revolution that enhances direct access to markets by smallholder farmers, who have traditionally been excluded from direct contact with markets and input suppliers. This would make it possible for smallholder farming communities to access up to date information on markets and prices of inputs and produce to improve village chicken productivity.

Lack of farm input supply services tailored to the needs of the smallholder farmers, lack of access to credit facilities and lack of access to profitable urban markets are some of the institutional constraints. Perhaps institutional support should be provided at various levels to cover all factors of village chicken production. Support can be in terms of credit provision, input supply and distribution, marketing, provision of stock, feed and general capital investment. This kind of support will allow for continuity and building up of farmer confidence and lastly sustainability of the village chicken production. Instead of on-station research for maximum production, the research institutions should focus on the problem of optimal utilization of available resources in the prevailing production systems (Kusina and Kusina, 1999).

Technical constraints include lack of knowledge, lack of farmer training systems, dearth of information about cost effective chicken and egg production at the level of decision makers and advisers at producer level and inappropriate system for supplying the farmer with technical assistance and advice. Marketing and promotion of village chicken-based technologies through the print and electronic media can also be useful. Field days, competitions, on-farm research, demonstrations, educational tours and training workshops can improve levels of awareness and adoption of village chicken technologies among smallholder farmers in Zimbabwe.

Very little has been done in terms of training farmers in village chicken production in Zimbabwe. There is lack of support and participation from training institutes. Support can be in terms of education, motivation and moral support within the household and the community at large (Kusina and Kusina, 1999). Programmes aimed at improving village chicken production should provide framework for training and capacity building in aspects of village chicken production and management, gender awareness, entrepreneurship, marketing, value addition, record keeping and budgeting. Awareness campaigns, through education of stakeholders to value and take care of their chickens are needed to change the attitudes (Kusina and Kusina, 1999).

CONCLUSION

Village chicken production is mainly hampered by feed shortage, poor health and housing management. Chief socio-economic constraints include lack of markets, poor marketing management, and poor infrastructural and institutional support. Better understanding and modulation of these constraints can improve food security and raise standards of living of the rural families. Use of locally available indigenous feed resources and ethno-veterinary medicine, and educating farmers can be viable options to improve village chicken in rural areas. There is need for more information to update and validate these existing constraints and opportunities in light of the land redistribution process and current economic challenges in Zimbabwe. The developmental support strategies should take a participatory action approach that enable full participation of stakeholders.

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