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CURRENT STATUS, CHALLENGES AND OPPORTUNITIES OF RABBIT PRODUCTION IN BOTSWANA

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ABSTRACT: *This review highlights the current status of rabbit production, challenges facing the industry and opportunities available. Rabbit farming in Botswana is in its infancy and the rabbit population is estimated to be less than 1000. However, this value is a gross underestimate due to poor monitoring by government extension services. In Botswana, rabbits are mainly kept in the backyards, indicating that intensive systems have not yet been developed. Rabbits have small body size, short gestation period, high reproductive potential, rapid growth rate and ability to utilize forages. Compared to beef, chicken, mutton, chevon and chicken, rabbit meat has low cholesterol, high protein and low fat contents. Rabbit production can be integrated into small farming systems, with the rabbits being fed on crop residues, weeds, poultry droppings, and kitchen and garden wastes. The manure can be used to fertilize soils. The major challenges in rabbit production are inadequacy of breeding stock, inadequate rabbit feeds, poor management (feeding, housing and health care), lack of research support, lack of technical support from extension services, lack of access to credit and inadequate supply of equipment. The major opportunity available to the rearers is that the market is vast due to the small rabbit population in the country. The attributes of rabbits suggest that rabbit farming is likely to play an important role in nutrition, poverty alleviation and food security, especially in countries with higher unemployment levels and HIV/AIDS prevalence rates such as Botswana.*

REVIEW ARTICLE

Key words: *Botswana, Challenges, Cholesterol, Manure, Opportunities, Rabbits*

INTRODUCTION

Domestic rabbits (*Oryctolagus cuniculus*) are ubiquitous, providing protein, fibre, research models, and companionship. Rabbits have high reproductive potentials and fast growth rate (Hassan et al., 2012), utilize low grain and high roughage diets and breed all year-round (Irlbeck, 2001). Other attributes are short gestation period, early sexual maturity, ability to rebreed shortly after kindling and short generation interval (Hassan et al., 2012). These qualities confer on rabbits a potential to bridge the shortage of animal protein in developing countries, where grain can only be justified for human use (Irlbeck, 2001; Hassan et al., 2012).

Rabbit farming is in its infancy in Botswana with an estimated population of less than 1000 (Tjetjoo, 2011). However, this value (1000) is a gross underestimate resulting from poor monitoring of projects by the extension agents who may not be interested in rabbits due to lack of technical expertise. In agreement with Owen (1979) who stated that in developing countries, the vast majority of meat rabbits are produced under small-scale or backyard systems, nearly all rabbit farmers in Botswana operate at subsistence level due to a number of factors including religious taboos and lack of knowledge on rabbit husbandry such as diseases and parasites (Moreki et al., 2011). For example, in the Old Testament the consumption of rabbit meat is prohibited. On the contrary, Schiere (2004) contended that there are few religious or other taboos on rabbit meat, except in vegetarian cultures. Islam does not prohibit consumption of rabbit meat.

Rabbit production plays an important role in improving livelihoods of resource-poor households. Lukefahr (2007) reported that in Bangladesh and India income earnings obtained from sale of rabbits from smallholder rabbitries contributed to women owning milk cows, bullocks and/or buffaloes, purchasing their own land, living in better homes, eating higher quality foods, sending their children to school, and depositing money safely in banks. This indicates that rabbit rearing could be a stepping stone to farmers owning large stock such as cattle and buffaloes, which are associated with status.

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To maximize food production in developing countries, all reasonable options must be considered and evaluated. Among these is the use of livestock species such as rabbits that for one reason or another have not played a major role in animal agriculture in most countries. Rabbit production can be integrated into small farming systems, with the rabbits being fed crop residues, weeds, waste fruits and vegetables (Cheeke 1986), whereas the manure can be used as a fertilizer for crops and gardens (Cheeke 1986; Schiere, 2004). Rabbit manure does not have strong smell, and rabbits do not make much noise therefore the neighbours will not complain (Schiere, 2004). According to Lukefahr (2007), a sustainable system of rabbit production involves the use of renewable on-farm resources, such as local breeds, feedstuffs from forage or garden plots, local materials for hutches and other equipment, and family labour.

There is little information on rabbit production in Botswana (Ramodisa, 2007). Therefore, this paper discusses the current status of rabbit production in Botswana, challenges faced by the industry and opportunities available.

Advantages of keeping rabbits

Small livestock such as rabbits have a number of characteristics that might be advantageous in the smallholder, subsistence-type integrated farming and gardening food production systems in developing countries (Cheeke, 2007). The advantages of keeping rabbits over other livestock are manifold. Schiere (2004) stated that starting a rabbit project requires minimal initial capital outlay. Additionally, a rabbit can be easily sold when a small amount of money is needed to meet immediate family needs.

Rabbits are characterized by small body size, short gestation period, high reproductive potential, rapid growth rate, genetic diversity, their ability to utilize forages (Mailafia et al., 2010) and disease tolerance (Begensel, 2008). In addition, rabbits require small amounts of feed and use inexpensive, easily constructed housing (Cheeke, 1986). Furthermore, rabbits do not compete with humans for grains as strongly as chickens (Price and Regier, 1982; van Dijk, 2003; Moreki, 2007a). Rabbits compliment well with vegetable production as garden wastes are fed to rabbits, whereas the manure is used to fertilize the soil (Price and Regier, 1982). Unlike poultry manure, rabbit manure will not burn the plants and can be applied directly to the plant or its roots. In the opinion of Schiere (2004), rabbit farming exposes children to learning to tend for and appreciate animals. Additionally, rabbits can relief stress and tension when they are watched jumping and vibrating noses or by touching their smooth furs (Ramodisa, 2007). Unlike bigger animals such as cattle, rabbits can be tended by women, children or men as they do not need force to be restrained (Schiere, 2004).

The small body size of a rabbit provides a small carcass that can be consumed by a family in one meal, eliminating the need for meat storage and refrigeration. The meat is stored on the live animal until needed resulting in rabbits being referred to as "biological refrigerators" (Cheeke, 1986). Rabbit meat is of high quality, being high in protein and low in fat content (Mailafia et al., 2010). Lane (1999) also stated that rabbit meat has less cholesterol, fewer calories, and a lower percentage of fat than beef, pork, chicken or lamb, and higher protein content. Table 1 gives the nutritional values of rabbit, chicken, veal, beef, pork and lamb.

Table 1. Nutritional values of meat products

Animal	Protein (%)	Fat (%)	Moisture (%)	Calories/lb
Rabbit	20.8	10.2	67.8	795
Chicken	20	11	37.6	810
Veal	19.1	12	68	840
Beef	16.3	28	55	1440
Pork	11.9	45	42	2050
Lamb	16.7	27.7	55.8	1420

Source: Lane (1999)

Breeds of rabbits in Botswana

According to Begensel (2008), the breeds of rabbits found in Botswana include American chinchilla, Flemish giant, Rex, California white and New Zealand white and black. However, it is not clear which of these breeds predominates and/or is doing well under Botswana's harsh climatic conditions. The breeding programme followed by farmers is unknown leading to the belief that inbreeding could be common.

Housing and equipment

Housing which serves to protect rabbits from inclement weather and predation may be simple or sophisticated. According to Shaeffer and Harper (2008), the rabbitry should be an enclosed building that has proper ventilation, lighting, heating, and cooling systems. Heating and ventilation are crucial because rabbits do not tolerate temperature extremes very well.

In Botswana, rabbit shelter is usually constructed using locally available materials. It must be endeavoured to make the house rat-proof to prevent litter from being preyed upon. Those producers who keep rabbits in the peri-urban and urban areas may design and develop multi-tier cages in order to be economical on the available space. Owen (1979) suggested that information on the design of housing using locally made and designed equipment is an area in which the exchange of information between countries would be beneficial. This implies that benching with African countries that have succeeded in establishing a commercial rabbit industry is crucial.

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Feeding and nutrition

Feeding rabbits can be very cheap or expensive. Although supplementation with concentrate or grain is sometimes necessary and will enhance growth rates, roadside grass, kitchen and garden wastes (especially leaves) can provide the main feed at almost no cost (Schiere, 2004). Products of the processing plants such as tomato pomace form feed resource for rabbits. Sayed and Abdel-azeem (2009) showed that dried tomato pomace can be utilized efficiently and safely in the rabbit diets up to level 20% without any adverse effect on the performance and carcass traits.

In Botswana, rabbits are usually fed mainly on garden waste (*e.g.*, cabbage leaves, carrots, bananas) and kitchen waste which may or may not be supplemented with complete diets. Kitchen wastes may be generated from the producers' home or from nearby restaurants. Schiere (2004) cautions the producers that feed their rabbits on garden wastes to watch out for herbicide/pesticide residues.

Rabbits require fresh, clean water daily. Automatic watering systems offer a continuous water supply while reducing waste and contamination. A doe and her litter need 3.79 litres of water a day in warm weather (Shaeffer and Harper (2008). In most smallholder rabbit operations in Botswana, water is given in various implements varying from old tins to modern drinkers.

Health Management

In order of prevalence, nutritional deficiencies followed by pneumonia and focalo granulomatous hepatitis are the most prevalent diseases in Botswana, whereas psoroptic mange (ear canker) is the most prevalent parasitic infection followed by *Moraxella spp*. (Moreki et al. 2011). Similarly, Begensel (2008) reported ear canker to be the most parasitic infection in Botswana. Moreki et al. (2011) attributed the high prevalence of nutritional deficiencies in rabbits to feeding of poor quality diets. Ear canker is caused by poor hygiene and mite attack, whereas pneumonia results from exposure of young rabbits to draft, indicating that construction of proper housing for rabbits is of paramount importance.

Marketing

Rabbits are raised not only for meat, laboratory use, breeding stock, and Angora wool but also for their skins and for youth programmes (Shaeffer and Harper, 2008). According to Moreki (2007b), rabbits reach market at about 8 weeks of age or less and they may be sold live or dressed. Usually, they are sold to individuals who keep them as pets or those starting backyard rabbitries. In addition, rabbits are sold to institutions such as schools for educational purposes (Ramodisa, 2007). It appears that in Botswana rabbits are kept mainly as pets.

In Botswana, market is vast (Begensel, 2008) due to the small number of rabbits in the country. A four months breeder rabbit sells for P500 (equivalent to USD67.66), which is almost the price of a goat. In Nigeria, Ozor and Madukwe (2005) reported marketing constraints in small-scale rabbit production, which were derived from the difficulty in transporting rabbits to the markets, poor acceptability of rabbit meat, low prices of rabbit meat and its products and minimum sources of ready markets for rabbits and its products.

Challenges

The main challenges in rabbit production in Botswana include:

- Unavailability of rabbit feeds (Begensel, 2008). Due to the small number of rabbits raised by smallholder farmers, rabbit feeds are not produced locally but are imported, usually at high prices and in adequate amounts. Ozor and Madukwe (2005) also reported nutrition and housing as some of the constraining factors in the adoption of improved rabbit technologies by small-scale farmers. Similar observations were made by Oseni et al. (2008) in Western Nigeria.
- Poor housing. As rabbits are not yet commercialized, they are not accorded proper housing resulting in poor animal performance. Generally, housing is basic and is constructed using locally available material. Ozor and Madukwe (2005) also reported housing as one the major challenges in small-scale rabbit production.
- Lack of technical knowledge in rabbit farming by farmers and advisors (Ramodisa, 2007). Oseni et al. (2008) also cited lack of access to information on rabbit management under smallholder units as one of the major challenges in rabbit production.
- Lack of research support (Ramodisa, 2007). Testik (1992) in Turkey reported insufficient incentive supporting measures and scientific knowledge in rabbit production to be one of the challenges in rabbit production.
- Inadequate technical support. Lukefahr and Cheeke (1990) noted that extension methodologies relevant to rabbit project development are generally lacking and are paramount to rabbit projects' success.
- Lack of access to credit. As rabbit farming is relatively new in Botswana, it is not easy to attract funding compared to other livestock such as chickens and smallstock (sheep and goats). However, this may not be the case for youth who can access small funding through Youth and Culture funding source.
- Lack of government support. Unlike cattle, chickens and smallstock, rabbits do not receive government support under Livestock Management and Infrastructure Development (LIMID) support scheme. For rabbit farming to grow and play a significant role in supplying high quality protein in both rural and urban areas there is need for increased government support.

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- Health care inadequacies. As rabbit farming is in its infancy, diseases and parasites of rabbits are not known to the extension agents who are not adequately equipped to impart knowledge and skills to rabbit producers. Ozor and Madukwe (2005) reported health care challenges in small-scale rabbit production in Nigeria. The health care challenges included difficulty of rabbit producers to procure specific drugs for specific treatments of rabbit illnesses, inability to promptly isolate sick animals and difficulty of access to veterinary services.
- Inadequate supply of equipment. Rabbit equipment such as cages, drinkers and feeders are difficult to find in Botswana. Testik (1992) noted that difficulties in acquiring equipment (cages, feeders, drinkers and other equipment) was also one of the major challenges in smallholder rabbit production.
- Inadequate breeding stock. There are no known rabbit breeders in the country and this contributes to the industry not growing. Oseni et al. (2008) found the principal challenges facing the smallholder rabbit production to be difficulties in getting reliable and stable sources for foundation/replacement stock and theft. According to Testik (1992), other challenges include breeders' difficulties to find good quality animal material, insufficient technique and practical knowledge of breeders, modern production techniques are not applied, insufficient advertisement and marketing problems and insufficient integration and organization.
- There is no culture of eating rabbit meat in the country. Similarly, Testik (1992) also reported that Turkish people were not used to eating rabbit meat.
- Lack of defined rearing system. Lukefahr and Cheeke (1991) identified raising rabbits under confinement as one of the common traditional hindrance in rabbit production. This challenge can be eliminated by effective farmer demonstrations.

Opportunities

1. Market is available (Begensel, 2008) and broad (Ramodisa, 2007). Although the national requirements of rabbit meat have not been determined, it is probable significant quantities of rabbit meat could be consumed in the country.
2. Rabbit industry in Botswana is small and evolving, indicating that opportunities exist to start new operations or to expand the existing ones.
3. Backyard gardening, which is supported by government as a poverty eradication strategy provides an opportunity for rabbit farming to be integrated into the farming system to enable utilization of garden wastes. Rabbits are efficient in turning garden and kitchen wastes into high quality protein. Additionally, rabbit manure can be used as a fertilizer in gardens and orchards.

Recommendations

1. To address the issue of inadequacy of breeding stock, Government should set up the National Rabbit Breeding Centre with an objective of making available breeding stock to the producers countrywide. The Centre could also be used to train staff and farmers. In Mozambique, Gaspari (1979) mentioned that a National Centre and Provincial Centres were established to provide housing designs, breeding stock and training facilities as a way of facilitating the growth of the industry.
2. The extension service should encourage formation of rabbit association(s) that will in consultation with government promote and facilitate the growth of the rabbit industry.
3. Extension agents should be trained in rabbit production to enable them to effectively impart knowledge and skills to the rabbit producers.
4. There is a need to undertake survey research in order to investigate the characteristics of the rabbit industry and also to estimate rabbit population in Botswana

CONCLUSION

1. Rabbit producers do not receive government support to start rabbit rearing. For the benefits of rabbit production to accrue to the producers, the support of government and Non-governmental organizations is crucial.
2. Efforts should be made by extension agents to organize training for rabbit producers through seminars, workshops and agricultural shows.
3. Government poverty eradication strategies including LIMID and backyard gardening should consider including rabbit farming.
4. Technical support to the rabbit producers is inadequate as extension agents are poorly equipped to advice producers on general rabbit husbandry management.

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