

Constraints and Opportunities to Rabbit Production in Zimbabwe: A Case Study of the Midlands Province, Zimbabwe

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Abstract: A study was conducted to determine the productivity and constraints of smallholder rabbit production in the Mberengwa and Zvishavane districts of the Midlands Province in Zimbabwe. 42 households were randomly selected to respond to a standard questionnaire. 79% of the respondents had an average rabbit rearing experience of less than five years. The average clutch size per household was less than 10 mature rabbits. The rabbits were acquired through purchase (88%), gifts (7%), or in exchange for labor. However 76% of the rabbits were sourced from within the local area. Only 17% of the farmers fed commercial feeds. The prevalent diseases were mange (68%), coccidiosis (24%), and foot rot (8%). 23% of the farmers used veterinary drugs and medicines to treat the common diseases, whilst 67% sourced the locally available herbs and plants for the same purpose. Survivability of the rabbits was significantly affected ($P < 0.001$) and strongly correlated ($r = 0.$) with housing system. Rabbit meat was mainly used to generate household income and for home consumption.

Keywords: bunny, productivity, smallholder

1. Introduction

Rabbit (*Oryctolagus cuniculus*) rearing largely comprise of limited-resource farmers who maintain small-scale operations with the aim of producing meat and income [11]. The vast majority of meat rabbits are produced under small scale or backyard systems. It is in such systems that the rabbit can make a valuable contribution towards supplying meat for the rural African communities.

Best known for being prolific, rabbits are also herbivores which efficiently convert fodder to food. The whole point of meat production is to convert plant proteins of little or no use to people as food into high-value animal protein [2].

Rabbit production has an immense potential. It also has good attributes which include high growth rate, high efficiency in converting forage to meat, a short gestation period, high prolificacy and a relatively low cost of production. The meat has a high nutritional quality which includes low fat of 6.8% (lower than all livestock species), low sodium and cholesterol levels [5]. It also has a high protein level of about 20, 8%, high dressing -out percentage of 60% (higher than all livestock except poultry) and its consumption is bereft of many cultural and religious biases [2]. The presence of caecal microbes enables the rabbit to digest large amounts of fibrous feeds which most non ruminant species cannot [17]. The rabbit is small enough (av. 1.5kg live weight) such that a family of average size can consume all the meat in one or two meals, eliminating the necessity refrigeration or other meat preservation methods. Feeding rabbits is also much cheaper as compared to other livestock species even though supplementation with concentrates or grain is sometimes necessary and definitely will increase the growth rates. Road side grass, kitchen waste without animal products and garden vegetable leaves provide the main feed at almost no cost to the farmer [9].

Rabbits have a number of characteristics that might be of great importance in the smallholder, subsistence-type integrated farming and gardening food production systems in developing countries [4]. The advantages of keeping rabbits over other livestock are many. Starting a rabbit project requires minimal initial capital outlay [14]. Additionally, a rabbit can be easily sold when a small amount of money is needed to meet immediate family needs. In addition, rabbits require small amounts of feed and use inexpensive, easily constructed housing [4]. Furthermore, rabbits do not compete with humans for grains as strongly as chickens [11], [12] and [18].

The per capita consumption of meat protein in Zimbabwe of 13kg [24] and indeed that of the African continent (16kg) falls below the recommended minimum of 16.5kg [6]. Animal protein intake is on the decline and more so in the rural areas which make up 85% of the extreme poor in African countries [7]. This deficit has led to increased imports of meats from developed countries [7]. The rabbit's potential to increase meat production among hungry countries should be given greater recognition [10]. Despite its abundance, potential and popularity, the rabbit has largely remained unimproved genetically as an alternative meat source in rural Africa.

1.1 Objectives

The objective was to identify the conditions and constraints faced by farmers engaged in all forms of rabbit production, so that scientific studies can be carried out for possible solutions. The sub objectives were to:

- Determine the current levels of production in the communal area and establish if there is potential to increase rabbit production in the area
- Determine the level of interest the communities have towards production of rabbits
- Describe the socio-economic characteristics of rabbit producers in the study area.

2. Materials and Methods

2.1 Study area

The research survey was conducted in Mazvihwa area, Zvishavane District in Midlands Province. The area is under Natural Region IV and V and lies in a transition area between the middle veld and low veld of Zimbabwe. The geographical coordinates are 20°34' South and 30°24' East. Daily summer temperatures occasionally reach 40°C and can drop to 8°C at night. In winter temperature can reach 30°C but are sometimes reduced by influxes of South East cool moist air.

Rainfall is usually received in summer from November to March and mostly unreliable at an average of 500-600 mm per annum. Perennial natural surface water is extremely scarce at an altitude of 860 meters. The central part of the village areas has gneiss as the main parent rock while on the extreme east and south-east are older granites. The overlying soils are freely drained, reddish brown clays and generally shallow with a poor structure. The rest of the village areas soil types on the arable top lands are mostly granite soils of rather poor fertility often shallow on some ridges with a gravel layer on or near the surface. The natural vegetation consists of trees, shrubs and grasses. Climate, soils, altitude and human disturbances influence the species types and their spatial distribution. The environment in this area requires farming systems based on livestock production which can be intensified to some extent by the growing of drought tolerant crops.

2.2 Data Collection and Analysis

2.2.1 Survey

Since the whole region could not be covered due to logistic problems, the Zvishavane district was selected for the survey. Households selected were based on ownership of rabbits. Information was solicited from respondents by administering a well-structured questionnaire, and Participatory Rural Appraisal methods (PRA) relevant to rural rabbit production. Information generated from PRA was used to design structured questionnaires to justify the claims. 42 households with some experience in rabbit production were randomly chosen and interviewed. The illiterate farmers were assisted in filling the questionnaires after explaining the rationale of the survey.

The questionnaire was structured in a way to establish the background of sampled farmers and rabbit production practices and constraints. Information collected included the historical information about the farmer, clutch sizes and utilization, housing, farmers' selection criteria, disease challenges etc.

2.3 Analysis of Data

The Statistical Package for Social Sciences [16] was used for entry and analysis of quantitative data to generate descriptive statistics (means, standard deviations and range)

3. Results and Discussion

3.1 Household Characteristics

Households were largely male headed (90%), and almost all household heads (98%) attained some form of formal education, with 67% at secondary school level. The average age of the respondents was 41 years. The majority of the respondents (79%) had less than five years experience of producing rabbits.

3.2 Adoption and ownership

The study revealed that younger people owned more rabbits than adults (71% vs. 20%). 76% of the respondents acquired foundation stock from neighbours with 29% used their own bucks, 6% exchanged males and 2% captured the animals from the wild.

This fuels the perception that rabbit production is a peripheral activity relegated to the youth who breed them for pocket money. Adult males are generally least bothered to breed rabbits as they bring in negligible income. Most men spent most of their time panning for gold in the rivers and most of the cropping is done by the women folk.

3.3 Housing

About 98% of farmers had houses and cages where the rabbits were kept. However 43% of the housing systems in place were largely of sub standard materials. The mature bucks were separated from the rest of the animals. Housing is made in such a way that no predators like mice, dogs, cats and snakes attack and eat the rabbits. The housing is made of mesh wire, wood, iron scraps and other locally available materials. Mesh wire has many advantages when used for rabbit housings, especially for floors and the front of cages due to its durability and prevention from predator attack

3.4 Education and Experience

Table1: Rabbit production and experience of respondents

Years	Frequency	Percentage
≤ 5	33	78.6
6-10	5	11
11-15	4	9.5
Total	42	100

Mean=14 Variance=2.71 Range=4-33
Standard deviation =16.4

The results obtained on education levels attained showed that all respondents attended formal education and the majority have attended secondary education (66.7%). 33.3% attained at least some primary education. Only 9.5% of the households had more than 10 years experience in rearing rabbits and the majority of 78.6% had a maximum of 5 years in rabbit production. This showed that rabbit production had been adopted in recent years by the farmers in the area, mostly as a result of the effort of the many Nongovernmental organizations that work in the area.

All the farmers interviewed have some basic education. They can all read and write. Potentially all these farmers are trainable.

3.5 Extension Services

All the farmers have access to extension services through government officers deployed in the area. Only 31% of the respondents got technical advice on effective rabbit production systems. The lack of technical advice and training in rabbit production was evident in the poor management practice observed. Extension workers interviewed revealed that they had limited expertise in rabbit breeding and production.

3.6 Consumption Patterns

The reasons for rabbit production given by the respondents were a) consumption and income generation (52.4%) and those who did it as a hobby (2.4%), income generating only (26.2%) and those who produce only for consumption (19%). 57.1% of the respondents have standard rabbits housing while 42.9% have sub-standard rabbit housing in the area. The high percentage on standard housing statistics were supposed to give us a positive increase in rabbit population in the area but due to high ambient temperatures experienced in summer reproduction is affected due to heat stress resulting in low rabbit population.

36.7% of the respondents got an annual income from sales of \$50.00, and 23.3% got an annual income of more than \$150. There is no proper market for rabbit meat in Zimbabwe, and therefore most rabbits are sold live at prices ranging from \$4.00- \$6.00 depending on the buyer's potential.

3.7. Clutch Structure and estimates of production parameters

Table 2: Clutch Structure

Flock composition	Total number of rabbits(n)	Percentage (%)
Bucks	31	5.5
Does	185	32.5
Bunnies	345	62

Total no. =561, proportion (%) according to class of rabbits

3.8 Breeding

76.2% of the respondents got their rabbits from other local farmers and neighbors, and 23.8% got their rabbits from areas outside the study area but within the district. There is a possibility of increased chances of line-breeding and inbreeding taking place in the area. The average buck to doe ratio was 1: 6 instead of the recommended minimum ratio of 1:10. This indicates that the bucks are largely underutilized.

3.9 Feeds and Feeding

Only 17% of the farmers use commercial feeds, 31% use both commercial and non-commercial feeds such as green grass, vegetable leaves from the gardens and kitchen waste and 52% use non-commercial feeds only. The highest percentage of respondents used non-commercial feeds due to their local availability and cheap access. The use of

commercial feeds is less due to high feed and transport costs incurred when they are purchased from towns.

3.10 Diseases and their Control

The prevalence of diseases encountered were mange (68%), coccidiosis (24%) and foot rot (8 %.). The use of traditional remedies in controlling diseases predominated in all the villages (67%), especially in the remote areas where drugs and vaccines were not easily accessible. Used motor vehicle oil and aloe vera juice was commonly rubbed on the affected skins to treat mange. Most farmers used ethno veterinary drugs such as the aloe to treat sick animals. However, there were divergent views on their efficacy in controlling and treating diseases. Most of the knowledge on ethno-veterinary medicines is passed on orally to future generations, with a danger that the knowledge will become extinct or distorted if it is not recorded properly.

The very low use of vaccines by the respondents could be attributable to the fact that most vaccines come in large doses (i.e. 50 doses), despite the fact that the average rabbit herd size per household is 13. General knowledge of vaccines and vaccinations in rabbits is nonexistent. Lack of cold chain also contributes to the respondents' low use of vaccines. There is need to repackage the vaccines so that they are presented sold in smaller units that are affordable to farmers.

4. Constraints Faced By Rabbit Farmers

The constraints identified by the farmers in order of importance were increased mortalities in the bunnies, lack of funds to build shelters and poor marketing, lack of technical support, lack of shelter. Other constraints mentioned were inadequate supply of veterinary requisites, inadequate feed supplies, parasites and poor growth rates. Cases of theft were also reported. Increased mortality cases were reported especially when the bunnies were born during the rainy season and cold weather conditions as they are susceptible to chilling. Exposure to bad weather such as rain, cold or heavy dew, and parasites like mites and lice. External parasites, mites, bugs and lice were found in most the houses. The uses of traditional herds like aloe have recently been acknowledged in the study area, although veterinary support is needed.

4.1 Opportunities

4.1.1 Rabbit skin

In some cases, the rabbit skin is of more value than the rest of the carcass but it should always provide a useful income to the breeder to offset some of his costs. Rabbit skins, when properly processed and made into garments, are very attractive and command a high price. While it is not suggested that the production of fully processed skins is within the capacity of small- scale breeders, dried or salted skins can easily be produced and, if due care is taken in their preparation, can give a good return [1]. In study area rabbit skin production was never done and the farmers are not aware of it due to lack of market of the skins in the area and nearby towns. The furs are normally singed over the fire and

the whole skin in then rendered edible by this fire treatment, during processing of the meat.

4.1.2 Rabbit Manure

Rabbit manure is very useful, its dry matter content being about twice that of horse manure and over three times that of dairy cow manure under conventional UK farming systems [13]. Moreover, rabbit manure is relatively rich in phosphorous and nitrogen when compared to the manure of other livestock on a dry matter basis [3].

4.1.3 Marketing

There is no organized marketing for rabbit meats and products in the district, and indeed in the country, as it is done on small scale in some African countries such as Nigeria and Botswana [11]. There is however an opportunity to improve the marketing of the animals, meat and other products.

5. Conclusions and Recommendations

The major finding of this study is that rabbit sizes were small (Av. mature weight 1.2kg) and their production needs to be improved to increase productivity. This study revealed that many factors limit rabbit production under smallholder conditions, and these included predators, high bunny mortality, inconsistent feed supply, limited extension services, growth depression due to inbreeding and health management. To increase rabbit production in rural areas, it is essential to provide suitable shelter. This constitutes the first protection against predators and the elements weather. Regular feed supply has to be provided, particularly to bunnies that require a high-protein diet in the starting period (during the first 4 weeks). Finally, prophylactic and sanitary programs must be considered, focussing on the rabbits to prevent mites and lice.

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