SOCIOLOGICAL ASPECTS OF INTRODUCING RABBITS INTO FARM PRACTICES

S U M M A R Y

(1) As far as I am concerned, I know of no sociologically adverse aspects for introducing Rabbits into Farm Practices.

(2) If there are problems, they should be related to those underlying factors, namely:-

(a) The need for funds for the expansion of more Rabbit Projects and thousands of back-yard rabbitries in support of the break-through now being experienced and proved in Ghana; and

(b) Aid to the back-yard and commercial breeders by way of cheap parent-stock, drugs and additives to make it possible for more and more people in the slender income group to produce, through the breeding of rabbits, quick and rich protein-meat for their families - thus forcing down the cost of other meats they need to eat for variety and good health.

METHODS OF SMALLHOLDER RABBIT PRODUCTION 1/

BY

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SUMMARY

A number of problems which may impede rabbit production in developing countries are enumerated. The approach of the Bunda College Rabbit Research Project to the problems of housing and facilities, breeding, alternative feedstuffs and disease are described along with examples of possible solutions to each problem. It is concluded that smallholder rabbit production is possible in the Central Region of Malawi but further work must be carried out before widespread introductions are made.

INTRODUCTION

Under high levels of management, a single doe should produce 32 offspring resulting in an output as much as 58 kg edible meat per year (Templeton, 1968). This high productivity, coupled with a ability to produce on feeds which are not in direct dietary competition with humans, gives the rabbit tremendous potential as a source of high quality animal protein. The value of rabbits as meat source in developing countries has been recognized and several projects have been initiated in these areas to promote rabbit production or to investigate methods of rabbit production which are less sophisticated and less capital intensive than the systems used in developed countries (Owen, Morgan and Barlow, 1977).

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As noted by Owen, Morgan and Barlow (1977), producers in developing countries raising rabbits using less sophisticated systems than elsewhere will suffer a reduction in productivity. This reduction is, however, acceptable as long as costs do not outstrip returns.

A smallhold farmer in a developing country who wishes to produce rabbits primarily for home consumption with the possibility of some saleable meat will wish to establish his rabbitry with minimum capital input. This means that cages, water and feed dishes and nestboxes should be constructed by the farmer using locally available materials as much as possible. In most cases this will preclude wire cages since suitable wire is expensive and may have to be imported. Where plywood is locally made, the farmer may use this material to construct very good nestboxes if he has suitable skills. Otherwise, alternative provisions will have to be made.

Discarded tins can be used for feed and water, but the problems of rust, spillage and sharp edges when using tins for rabbits have long been recognized. Automatic, piped, water systems are generally out of the question due to lack of running water and glazed crocks are not generally available locally. Self-fed hoppers often are not practical due to the type of ration used.

Once the farmer has his facility, he will require his initial stock of rabbits. These should be hardy, disease free, fast growing, prolific animals which will soon provide output to the neophyte farmer to encourage his continued production.

Assuming commercially prepared rabbit pellets are not available, the farmer will require information on what and how to feed his animals. These feeds should be low-cost and locally available. As far as possible the feeds used should not be those used for human consumption and should be relatively simple to grow. Formulation of complex concentrate mixtures should be avoided and components of the diet should preferably be available year around to avoid frequent changes in diet.

Disease such as coccidiosis, sarcoptic mange or pneumonia may be encountered and advice must be available on how to avoid, control and eradicate these diseases without use of expensive commercial modications.

Finally, the neophyte farmer will require frequent extension advice on his enterprise. Seemingly small errors in management may, over a long period, result in failure of the project. Many questions will arise on how the rabbits should be managed and, the farmer being human, will want to show off the results of his efforts.

The Bunda College Rabbit Research project was established in 1975 to investigate these requirements of the smallhold rabbit producer with the aim of promoting rabbit production among smallhold farmers in Malawi for production of meat for home consumption. This paper is an interim report on the project and describes some solutions which have been found suitable or at least workable. Undoubtedly some will be changed in the future or may be replace by better solutions. Others may be location specific due to dependence on local vegetation or human dietary preferences. Flexibility is one of the important aspects of the Project and being ever-willing to try something new has led to some important advance in the programme.

METHODS OF SMALLHOLDER RABBIT PRODUCTION

Housing

Housing for rabbits must be secure (to keep the rabbits in and predators out), provide protection from the weather, require minimal maintenance, be safe for the rabbits and easy to clean as well as being low cost, of relatively simple construction and of locally available materials.

The climate of Malawi is generally mild with temperatures between 5^{o} and 35^{o} C; the extremes being experienced for only a few days each July-August and October-November, respectively.

Rainfall in the Central Region where the College is located averages about 80cm per year. Most of this falls during the five-month period from November to March. Some areas of the country are hotter, colder, wetter or dryer than stated but these tend to be limited areas and still can be considered "moderate" climates.

Two types of housing felt suitable for smallhold farmers have been developed; the woven bamboo cage and the free-standing modification of the traditional poultry house used in Malawi. Photographs of these were included in the review by latter published (McNitt and Makhambera, 1976).

The bamboo cages are constructed by weaving freshly cut bamboo split into 6 to 8 millimetre withes. The walls are constructed by weaving an oval approximately 80x45cm on the major and minor axes, respectively. The cage is about 45cm deep. The floor was originally constructed of a mat of withes wired together lengthwise as shown by Owen, Morgan and Barlow (1977), but young rabbits tended to catch their legs between the strips so a criss-cross weave with holes about 1.5 cm square was substituted. The top of the cage was constructed of strips of bamboo wired together and attached to the cage so it would roll back approximately half the width of the cage to provide access (McNitt and Makhambera, 1976).

This cage is intended for the producer who intends to keep his rabbits in a building or is willing to construct a shelter surrounded by a fence; probably dried stems of Pennisetum purpureum (Napier grass). The cage is easy to construct using existing technology and requires only a small quantity of light wire. It is easy to clean and allows easy access but continual maintenance is required to replace chewed withes. The woven floor tends to be weak and sags if not well supported externally. If the cages are properly maintained, the rabbits will seldom escape but these cages provide little protection from predators since snakes and rats can enter through the floor and larger predators can easily break into the cage.

The modified poultry unit has been used for over a year in isolation from the main unit. Productivity of rabbits in the unit

was somewhat less than for the rest of the herd due to severe problems with sarcoptic mange and coccidiosis. These diseases are especially difficult to control in this unit due to the parasites lodging in the mud of the walls and floor. A new unit has been constructed which includes a woven bamboo ceiling to prevent the rabbits moving from cage to cage. The ground-to-floor distance has been increased to 106cm to provide more comfortable access for management of the rabbits and the individual cage size has been increased.

This unit is relatively inexpensive to construct and uses local materials ans skills. If rat guards are installed on the legs, rat and snake access is reduced and larger predators are more easily deterred by the greater height and stability and the increased security of having woven bamboo exposed only at the door. The unit provides adequate protection from rain expect in extremely heavy, driving rains and stays cool even on very hot days. The primary disadvantage of the unit is maintaining high standards of cleanliness and controlling parasites.

Nestboxes

Most kindling in the main breeding flock occurs in nestboxes contructed of plywood. These are ideal but the cost of materials may deter the smallholder. A pot made by a local potter using local clay and traditional techniques is under evaluation (see Owen, Morgan and Barlow,(1977) p. 16 for a photograph). Our criterion for evaluation is proportion of kits weaned from each litter. The comparison with the wood nestbox has been under way for six months but the results are confounded due to other factors; especially coccidiosis. Preliminary observations in the project herd and by a nearby producer indicate that the pot is reasonably satisfactory although death losses increase in the colder seasons; probably due to chilling of the kits.

Feed and Water Dishes

Owen, Morgan and Barlow (1977) included a photograph of the unglazed clay feed and water dishes used throughout the Project rabbitry. These were constructed of local clay by a potter using traditional techniques. Due to the heavy, flat base, the quantity

of clay required is high. This may lead to increased cost unless the purchaser is willing to supply the clay. These dishes have been used in the rabbitry for over two years and have proven satisfactory in all respects.

Breeding Stock for Farmers

The author is not aware of any reports of wild rabbits occurring in Malawi although two species of hare (Lepus saxatilus, the scrub hare, and Pronolagus crassicaudatus, the red rock hare, are found (Smithers, 1966). Representatives of Oryctolagus were probably brought by settlers and missionairies. Stocks present in the country and in the Project rabbitry are generally mixed although New Zealand White, Californian and Angora breeding is evident.

The Bunda College Rabbit Project is intended to act as a supplier of breeding stock for smallholder farmers wishing to establish rabbitries. No guidelines have been established for development of the stock to be sold although hardy, fast growing rabbits are selected for breeding stock. Efforts are also being made to elimante coccidiosis and sarcoptic mange from the flock so these will not interfere with the development of the smallhoders enterprise.

Feeds

Since locally produced commercial rabbit feeds are not easily available in Malawi, all feeds used in the Rabbit Project have had to be developed at the Project. The concentrate mixtures used for the breeding herd and other rabbits not on feeding trials are shown in Table 1. These concentrates are offered each afternoon and roughages of various types each morning.

Roughages used include vegetable waste, freshly cut Leucaena leucocephala, Amaranthus spp, and Tridax procumbens. Does on this regime in 1977/78 produced an average of 19.4 young per year and growth rates of weaners from 4 to 16 weeks of 15.0 gm per day were recorded in a trial in mid-1978.

Table 1. Rations routinely used in the Bunda College Rabbit Project

	Breeders ration 1/ %	Growers ration 2/ %
Maize meal	39.5	39.5
Maize bran	26.0	16.0
Groundnut oil meal	34.0	44.0
Salt	0.5	0.5

1/ Fed to breeding stock and growers over 16 weeks.
2/ Fed to lactating does and weaners up to 16 weeks.

While these rates of production are satisfactory, the diet itself, particularly the concentrate portion, does not meet the previously stated requirements for a ration since careful mixing is required, groundnut oil meal must be purchased and both maize and groundnuts are consumed by the people. Maize is the staple diet of a large proportion of the population of Malawi with the bran produced as a by-product. The maize bran is not normally eaten and is often sold (in exchange for salt) as livestock feed.

Because of the desirability of a concentrate not requiring mixing and the availability and low cost of maize bran, work has focused on using this as the sole concentrate with the roughage portion of the diet providing the remainder of the nutrient requirements. The proximate analyses of some of the feedstuffs which have been tried in the Project are shown in Table 2. Other feeds which have been used include commercial broiler-grower mash, Napier grass and Amaranthus spp.

Nutrient requirements of rabbits vary with function. Suggested compositions of rations for adult rabbits based on early nutritional studies in Ghana reported by Owen, Morgan and Barlow (1977) were minimal values of 18% crude protein and 3% crude fat and maximal values of 20% crude fibre and 10% ash.

Table 2. Representative proximate analyses of feedstuffs used as rabbit feeds.

Component	Maize bran	Leucaena 1/	Tridax 1/	Rumen contents	Dried blood
Dry Matter (%)	90.0	45.4	12.7	88.9	87.1
Crude protein 2/(%)	11.5	22.1	12.6	21.7	54.8
Ether Extract 2/(%)	7.6	2.9	3.0	4.0	0.6
Crude fibre 2/(%)	7.6	56.3	20.3	22.1	37.7
Ash 2/(%)	5.5	5.0	2.0	10.2	4.7
Nitrogen-free extract 2/(%)	67.8	13.7	62.1	42.0	2.2

1/ Values vary substantially depending on leaf: stem ratios of material analyzed.

2/ Expressed as a percentage of dry matter

Comparing the feedstuffs shown in Table 2 with these requirements, it is immediately apparent that maize bran is deficient in protein but otherwise suitable for rabbits. Leucaena leucocephala, a perennial shrub, and Tridax procumbens a common weed of lawns and distrubed lands, have been tried as companion roughages to maize bran. These were chosen since both continue to grow throughout the long dry period experienced each year in Central Malawi. Results of a preliminary feeding trial carried out in early 1977 to compare three roughages as supplements to maize bran are shown in Table 3. All rabbits were provided with the appropriate roughage each morning and maize bran each afternoon. Both were provided in excess of appetite. Salt and water were available at all times. The rabbits were 4 to 8 weeks of age at the start of the trial and were on the rations for 3 to 8 weeks.

Table 3. Effects of three roughages on growth rates of weaner rabbits

Roughage	Rabbits (No.)	Gain 1/ (gm/week)
Pennisetum purpureum	3	14.6 a
Tridax procumbens	2	35.8 a
Leucaena leucocephala	5	59.7 b

1/ Means followed by different letters are significantly different ($P < .05$).

Leucaena leucocephala appears to be a suitable supplement for use with maize bran while rabbits fed maize bran and Leucaena had signifcantly ($P < .05$) greater growth rates than those fed maize brand and Napier grass while the differences were not significant for rabbits fed maize bran and Tridax. No definite conclusions can be drawn with so few rabbits however. Qualitative experience indicates that Tridax and leucaena are useful roughages for rabbits when fed with the standard rabbitry rations. Napier grass is a low protein-high fibre grass which appears to have low palatability. No further work on this species is presently planned.

Rumen contents often are discarded at slaughter. While the feeding value will depend on the diet of the ox before slaughter, the analysis shown in Table 2 (from oxen which had been fed maize silage, chicken manure, cob meal and maize meal before slaughter) indicate that rumen contents could be useful for rabbit feeds although the dry matter and ask contents are somewhat in excess of the maximum values cited. In early 1978, rumen contents for rabbit feeding trials were collected and sun dried at the College Butchery. A trial was carried out to compare the relative palatabilities of rumen contents and growers ration. After four days acclimatization to the new feeds, the amount eaten in one hour was determined on each of three days when the respective feed was offered as the only concentrate. The average consumption per rabbit for 3 rabbits over three days each was 31.9 gm per hour per rabbit for rumen contents and 43.1 gm per hour per rabbit for growers ration. This difference was not significant. Use of rumen contents in a feeding trial is planned for the near future.

Blood meal is often used as a protein supplement in livestock feeds. The analysis values shown in Table 2 are for sun dried blood collected at the College Butchery. Its value as protein source is apparent although some problems with palatability were noted when fed at very high levels (31 to 50% of the concentrate portion of the ration). Only limited future work with blood is anticipated since blood is a highly prized human food and would rarely be available for use as livestock feed.

A trial was conducted in mid-1978 to compare the growth rates of weaner rabbits fed commercial broiler-starter mash with those fed growers ration. The trial lasted nine weeks starting with rabbits ranging in age from 4 to 9 weeks. During this period, both groups

received freshly cut Leucaena as roughage and water was available at all times. The results are shown in Table 4. The growth rates of rabbits receiving broiler-starter mash were slightly (but not significantly) better than rabbits receiving the growers ration. Perhaps the greatest advantage of the commercial feed is that it contains a coccidiostat thus providing some control of this parasite in the herd.

Table 4. Comparison of two concentrate rations as rabbit feeds after feeding for nine weeks

	Broiler starter mash	Growers concentrate
Rabbits (No.)	7	8
Mean initial weight (gm)	490	490
Mean final weight (gm)	1500	1420
Mean days on trial 1/	62	62
Mean gain (gm/day)	16.3	15.0
S.E. (±)	0.66	

1/ One rabbit in each treatment was on the trial for only eight weeks rather than nine.

Amaranthus spp. (pig weed) has been used as a routine feed in the Project rabbitry but no controlled feeding trials or analyses have been carried out. These are intended when numbers of rabbits permit.

Disease and Parasites

Due to crowded, inadequate facilities for the Project herd, isolation of newly purchased rabbits was not possible during the first two years. As a result, coccidiosis and sarcoptic mange were inadvetently introduced into the herd and both became serious problems.

Attempts to control coccidiosis have included early weaning, rigourous, frequent cleaning of cages and minimization of contact between rabbits. Chemicals used include 0.024% amproluim (Amprol 20%, MSD (Pty) Ltd.,), sulphacholoropyrazine sodium (Coxytrol, A.S. Ruffle, 0.03% a.i.) and sulphaquinoxaline sodium (Embazin, May and Baker). None of these have been entirely successful but moving the herd to a newly constructed rabbitry with all wire cages and regular treatment with Amprol have substantially reduced the incidence of clinical coccidiosis.

Sarcoptic mange generally does not kill the infected rabbits but lesions around the mouth, eyes, anus and reproductive organs may

severely reduce productivity. Early attempts at control included local treatment of lesions with 2.5% toxaphene (Coopertox 75% w/v toxaphene dilute 1:30 in mineral oil) or weekly dipping in 0.25% toxaphene (Coopertox diluted 1:300 in water. Due to toxicity problems with toxaphene rabbits are now treated with gamma benzene hexachloride ointment (Temedex, Burroughs Wellcome) which seems to give good control.

Rabbits are susceptible to attack by fly larvae (species unidentified) which develop under the skin. The hind feet are attacked first and, if not controlled, will spread over the entire body. Squeezing out the larvae or treating the lesions with Temedex provides control.

CONCLUSIONS

Based on the experience of the Bunda College Rabbit Research Project, smallholder rabbit production requiring low levels of capitalisation, utilizing locally available feeds and producing 16 to 20 edible carcasses per doe per year apperas feasible in the Central Region of Malawi. Factors requiring research include housing and facilities, feedstuffs and disease; particularly coccidiosis and sarcoptic mange.

Either the woven bamboo cage or the modified, traditional poultry unit are suitable for housing the rabbits. Which is used will depend on the situation. Plywood nestboxes, if available, are excellent. The value of clay nesting pots is uncertain at this point although offering an interesting alternative. Unglazed feed and water dishes made of local clay using traditional techniques are a distinct improvement over tins.

A ration with maize bran as the sole concentrate and freshly cut Leucaena leucocephala as the roughage is a suitable ration for growing rabbits although the effect of this ration over a long term with breeding stock is yet to be evaluated. Other feeds which may prove useful include Tridax procumbens, Amaranthus spp., dried bovine rumen contents and blood and commercial broiler starter mash. Napier grass is an unsuitable roughage due to low palatability.

Coccidiosis, particularly that caused by Eimeria steidae, is extremely difficult to control or eradicate under less-than-ideal management systems.The necessity for wire cages and chemical treatments for adequate control shows the importance of not introducing the disease in the smallhold situation. The best control for sarcoptic mange has been

obtained with regular application of benzene-hexachloride ointment to freshly scrubbed lesions. Other disease problems should be occasional, isolated cases provided the herd is properly isolated and quarantines are established for newly purchased or ill animals.

Based on the information currently available, field trials appear warranged provided the farmers are carefully selected and have intensive support in dealing with the problems which are certain to arise.

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