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**SMALL HOLDER AGRICULTURAL PRODUCTIVITY  
PROGRAMME**

*Normal resources  
Management*

**MALAWI**

**WILDLIFE FARMING SCHEMES AS VILLAGE COMMUNITY  
PARTICIPATORY PROJECTS IN MALAWI**

by

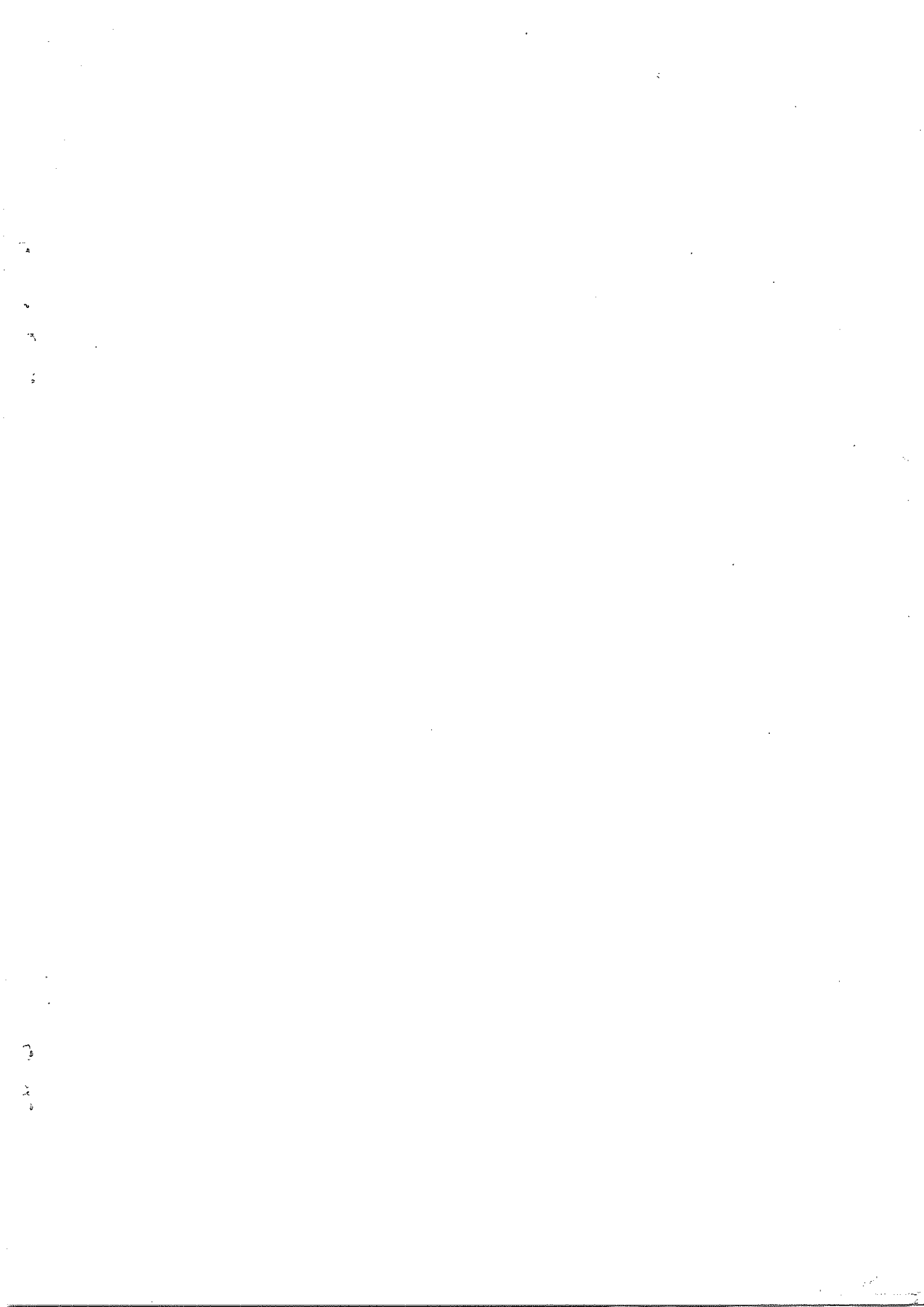
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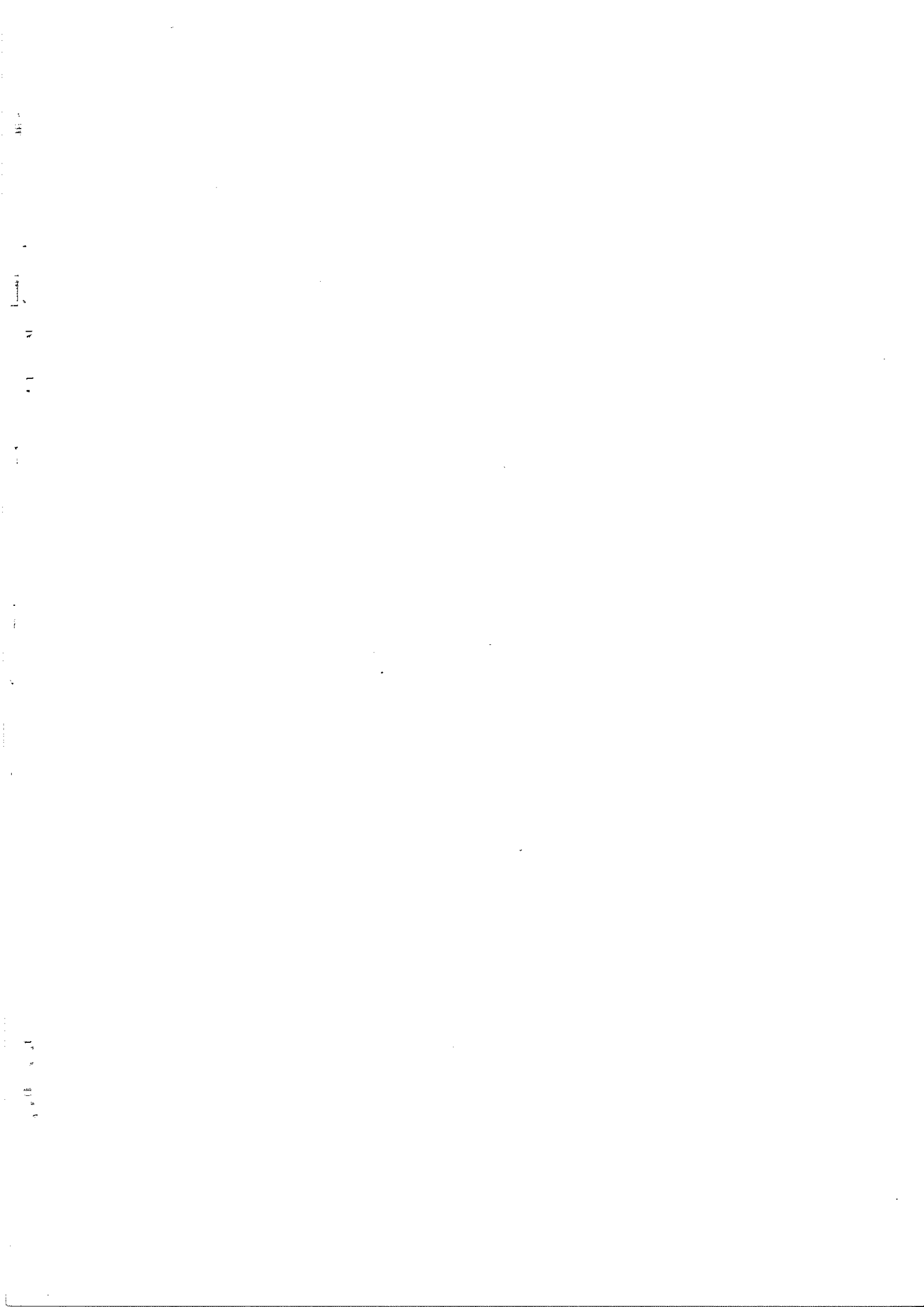
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## i. SUMMARY

The consultant was in Malawi from 5 October - 13 November 1994 on a project entitled: "Wildlife Farming in Malawi". It is part of the wildlife utilisation sub-component in the overall UNDP Component V programme on Agricultural Productivity for the Utilisation of Natural Resources for Poverty Alleviation in Malawi. The project is a local community participatory entrepreneurship targeted mainly to village women for income generation.

The consultant's main activity in the mission was to design an appropriate and sustainable farming scheme for wildlife species that have a wide social acceptance and marketing potential in Malawi. He was requested, among other things, to identify credit facilities for such schemes and make recommendations for a marketing structure of farm products, mechanisms for promotion of community mobilisation for wildlife farming for extension services and training.

A national tour was, therefore, undertaken to establish the choice of animal species by the Malawi people for wildlife farming. The national "votes", scored by the eight most favoured wildlife species, were as follows: Guineafowl 38.37%; Francolin 20.54%; canerat 18.37%; Greyduiker 9.13%; Bushbuck 8.15%; Hyrax 3.26%; Nyala 1.09%, Bushpig 1.09%

However, from the point of view of biological productivity and technical feasibility the guineafowl and canerat were finally selected for the farming schemes. Furthermore, based on the consultant's findings during the national tour the following recommendations were made for the location of pilot projects in the six Local Impact Areas (LIAs): Nkhata Bay: Kande village in Chintheche area; Mangochi: Chembe village in Cape Maclear; Thyolo Kapota village in Cholomana Area; Nsanje: Gatoma village in Fatima-Chiromo Area; Dedza Mkhwi village in Linthipe area; and Mchinji: Nyoka village in Mdura area.

Technical details of the farming schemes were provided to cover the following items: acquisition of animals for the establishment of virile-parent breeding stocks, housing and caging, (design-details and illustrations were provided), food and nutrition, parasites and disease control and routine animal husbandry techniques. The multidisciplinary nature of wildlife farming was stressed and the need to set up a National Committee, comprising a wide range of professionals (to include a nutritionist and a veterinarian), that will coordinate all wildlife farming activities in Malawi. Since the objectives of the project necessitate that the wildlife farming programme be a low-input, cost-effective system, one of the tasks of a nutritionist will be to source locally available, cheap food ingredients, which can be substituted for the conventional sources of protein and minerals, particularly for guineafowl. For example, water sedge, *Tytha capensis*, which grows on the shore of Lake Malawi, was discovered to be the only supplement to maize chaff fed to guineafowls under traditional peasant husbandry by local people in Mangochi LIA. Since there was an evidence that those guineafowls thrived and produced eggs, then it is worth a thorough scientific investigation on this "weed" and its future place as a possible source of proteins and minerals for guineafowl.

The administrative structure for the promotion of wildlife farming and community mobilization was also provided with recommendations on recruitment, training and operations of extension workers. The present and future activities of NGOs in wildlife farming were

presented with particular reference to the active and complementary roles of the Wildlife Society of Malawi and the Hunters Association of Malawi. Their future roles in the establishment of pilot schemes and the acquisition, control, disbursement, monitoring and repayment of credit facilities were outlined. Of all the possible credit facilitators identified, the American Peace Corps Organisation appeared to be more potentially favourably disposed, to the wildlife farming schemes. If a project proposal is prepared, whereby 75% of the cost is born by the Peace Corps and 25% (in kind) by the Village Communities, i.e. a kind of partnership arrangement that would enhance a sense of responsibility by both parties and ensure sustainability, such a proposal may meet their requirements for provision of financial support.

There is no doubt whatsoever that this project is in consonance with the priority needs of Malawi to meet the animal protein requirements of the people and for generating income for small-holders. However, its success will depend largely on the commitment and determination of the implementors of the programme, in setting up the right multidisciplinary team and giving appropriate and effective training for the first set of extension workers for the commencement of the pilot project. In this regard, it is proposed that this same consultant, who produced the farming schemes, returns to Malawi in January 1994 for a period of one year as a United Nations Volunteer or under an FAO consultancy programme, to supervise the take-off of the project and to translate the present "design work" and recommendations into practical reality.

## ii. INTRODUCTION

Programme Component V, No 92/010/D/99, entitled: "Natural Resources Management" is part of the overall UNDP Small holder Agricultural Productivity Programme for the Government of Malawi. Programme Component V is designed for smallholder local community participation in natural resources utilisation and development for poverty alleviation.

There are two sub-components:

- a) Community Forestry, and
- b) Wildlife Utilisation.

The Community Forestry project introduced a variety of methods of involving village communities, particularly women and children, in producing and managing fuelwood and other forest products for village development. The Wildlife activities were designed to enhance crop protection and wildlife farming with small holder community participation for poverty alleviation. The present project entitled "Wildlife Farming in Malawi" is a segment in the Wildlife Utilisation Sub-Component.

The consultant's terms of reference were to design appropriate wildlife farming schemes for small holders (with emphasis on women's participation) based on technical, social and economic feasibility and sustainability; determine the market potential and propose marketing arrangements for its products and also to identify possible credit facilities and mechanisms for obtaining such credits.

The consultant was also expected to recommend necessary extension and training and community mobilisation support systems, propose organisational arrangements for promotion of wildlife farming and institutional linkages with concerned agencies, particularly with NGOs. Finally, the consultant was to assess the possible negative impact of the Wildlife Farming project and propose mitigation measures. Major findings and recommendations were to be discussed and cleared by the Government of Malawi before the consultant's departure from the country. The duration of consultant's contract was 1.5 months starting on 2 October 1994. Details of the consultants terms of reference are shown in Annex I.

### iii. JUSTIFICATION FOR WILDLIFE FARMING

Wildlife has been a traditional source of meat in Africa. Bigalke (1965) found that wildlife was 5 - 10% of total animal protein produced in Rhodesia (now Zimbabwe) in 1965. In Nigeria wildlife accounts for about 20% of the mean annual consumption of animal protein by people in rural areas (Ajayi, 1979). In Ghana, Clotey (1969) reported 65% as the annual contribution of 'bushmeat' to the diets of rural dwellers. The annual bushmeat consumption in Ghana is about 8,486 tons valued at 7,358,172 US Dollars. Rodents formed a significant portion of the total meat consumed in Ghana and in one market alone in Accra, Asibey (1970) found during one year 73 tons of canerats made up of 15, 564 animals valued at 73m,000 US Dollars.

However, from past records of European settlers, it is evident that wildlife populations have been on the downward trend everywhere in Africa. Pollock (1969) stated that due to unregulated hunting of wildlife for meat and trophies, wildlife has declined at an alarming rate during the 20th Century and Ajayi (1992) attributed the aggravation of this situation to increasing demands for wildlife by-products in the world market. Furthermore, although Africa is blessed with the greatest diversity of wildlife, it has contributed very little to the world of domestic animals (Talbot et al, 1965). The reason for this is not clear. It was probably due to the great abundance of wildlife from which the prehistoric Africans could always make their choice; there was, therefore, no real urge to develop the technology involving domestication.

Now that meat is scarce and the cost of production of domestic livestock has risen considerably in recent years, Africa is now compelled more than ever before to domesticate some of its fast-breeding and socially-acceptable wild animals. The production of animal protein has not been high enough to meet demands. FAO (1970) put livestock production in developing countries in general at 1.5 - 2.0% per annum while demand is growing at 4 - 5 annually. While FAO (1970) called for an increase in livestock production it also called for an intensification of management of non-conventional sources such as wildlife. Undoubtedly, wildlife farming provides a possible means of achieving these objectives. It is against this background that wildlife farming is an integral part of the UNDP 5th Country programme, targeted to the relatively poor rural poor communities, as a means of producing cheap animal protein for consumption, and for generating income.

## METHODS

### THE CONSULTANT'S NATIONAL TOUR OF MALAWI

#### 1. OBJECTIVES OF THE NATIONAL TOUR

A national tour of Malawi was undertaken with the following objectives which are in consonance with the consultant's terms of reference.

Determination of species of wildlife which are prevalent in each LIA and the peoples' choice for wildlife farming, selection of site for location of pilot projects, determination of market potential for products of wildlife farming, identification of credit facilities and existing organisation for promotion of wildlife farming.

#### 2. ITINERARY

There are six districts in Malawi designated as Local Impact Areas (LIAs) for the purpose of implementing the UNDP 5th Country Programme on Local Community Forestry/Wildlife Utilisation Projects for Poverty Alleviation. Wildlife farming is part of the wildlife utilisation sub-component and, therefore, the consultant's activities inevitably focused on these LIAs, namely Nkhatabay (North); Dedza and Mchinji (Centre); Mangochi, Thyolo and Nsanje (South). The LIAs are designated by UNDP and the Malawi Government to cover the major ecological/geographical zones of the country.

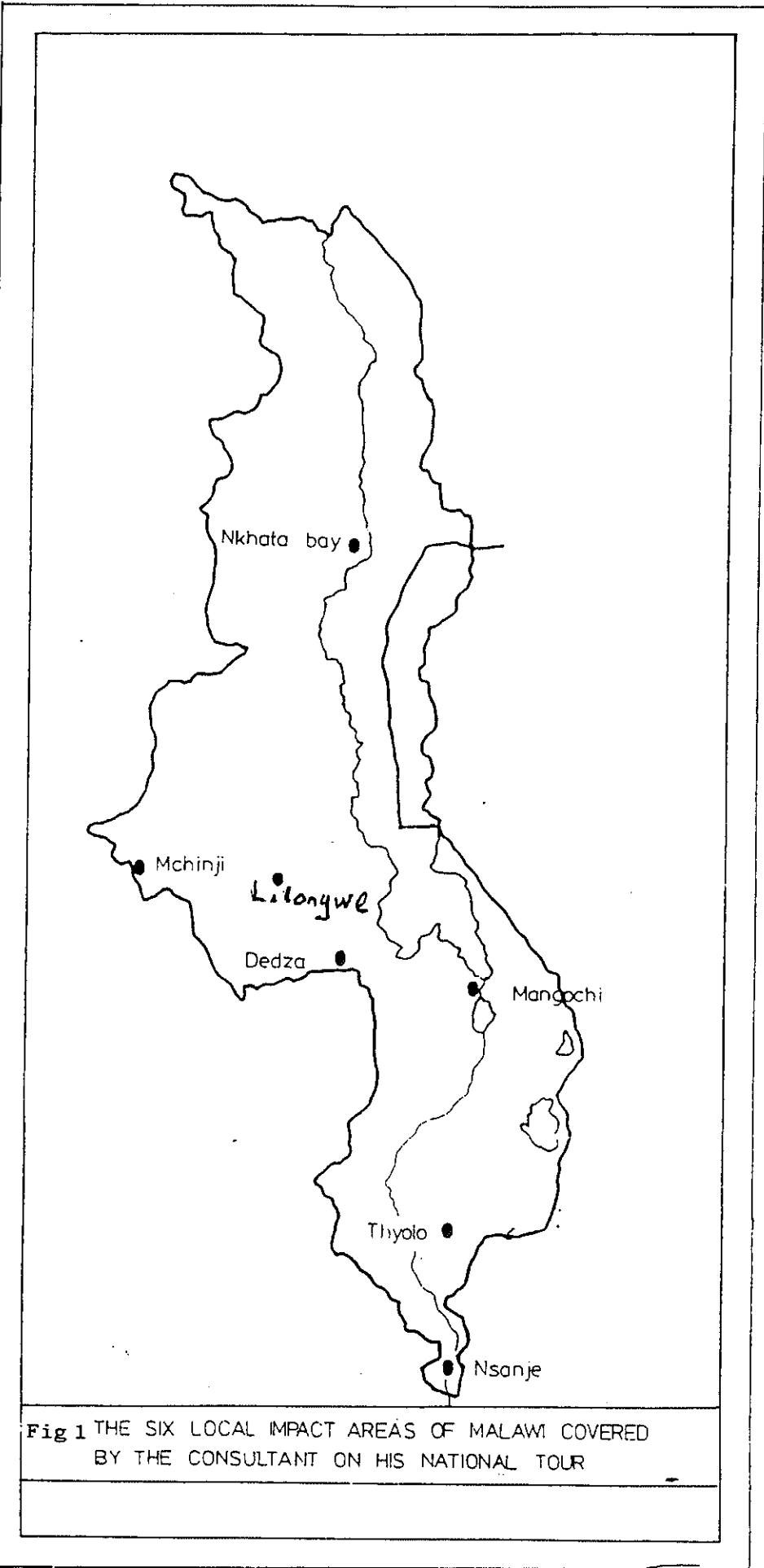
The itinerary of the national tour by the consultant, 11 - 28 October 1994, covered all the six LIAs and the itinerary is shown in Fig. 1 and Annex II, with details of the consultant's route.

Lilongwe - Kasungu - Mzuzu - Nkhatabay - Chinteché - Kande Village - Lilongwe. Lilongwe - Salima - Mua - Monkey Bay - Lake Malawi National Park (Cape Maclear) - Mangochi - Biantyre - Thyolo - Ntambanyama - Makwasa - Molete - Masambanjati - Cholomwana are - (Kapota Village - Gatoma - (Nsanje Project Area) - Fatima Village (Nsanje Project Area) - Bangura Trading Centre - Nchalo - Lengwe National Park - Tomali - Biantyre - Balaka Market - Nicheu - Dedza - Lilongwe - Mchinji - Nyoka - Kamadekha - Mikanda - Mchinji - Lilongwe.

The entire journey covered a total of 3,025 km by road. Villages and towns underlined in Annex II were places where meetings were held or where questionnaires were administered. They also indicate places where interviews were held with relevant government officials and organisations.

#### 3. ADMINISTRATION OF QUESTIONNAIRES

The above surveys were carried out by means of interviews and questionnaires by the consultant, the National Wildlife Farming Officer and the Coordinators for each Local Impact Area (Table 1). Questionnaires were designed to cover all the objectives above and they were targeted to four categories of respondents who are relevant to the project, namely:



**Fig 1** THE SIX LOCAL IMPACT AREAS OF MALAWI COVERED BY THE CONSULTANT ON HIS NATIONAL TOUR

a) Government officials who have been involved in wildlife utilisation at District level;

b) Office of the District Commissioner and where possible, any member or members of the District Development Committee. The District Development Committee and other respondents represent the highest legislative body at District Level and they coordinate all development activities of the District in which the LIA exists;

c) Village women whom the wildlife farming project is targeted; and

d) Hotel and restaurant operators who are ultimate consumers of the products and by-products of wildlife farming. A sample of the questionnaire is shown in Annex III.

Administration of questionnaires was, therefore, stratified. The consultant and his Malawian counterpart (the National Wildlife Farming Officer), were mostly responsible for completion of the questionnaires, but valuable assistance was also provided by Regional and District Coordinators in each of the LIAs.

A previous national preliminary survey on wildlife utilisation was carried out in 1993 and 1994 by the National Wildlife Farming Officer. The report was very informative and it listed 8 species of wildlife as the national preference for wildlife farming. The list of species in the questionnaire was, therefore, based on this national preference from which respondents were requested to indicate the three most preferred, based on availability and technical, socio-cultural and economic feasibility.

#### 4. VILLAGE MEETINGS AND INTERVIEWS

a) Meetings were held in several villages in each LIA, including those recommended for the location of the pilot project. Details of these villages are also shown above - which presents the consultant's route during the national tour. Objectives and benefits of wildlife farming and the advantages of participatory projects such as this were given to village communities by the consultant, through the National Wildlife Farming Officer who acted as an interpreter throughout the tour. Response to questionnaires by village communities was done as a group (each village being designated a "group" of respondents) with the village headmen acting as a spokesman after reaching a consensus with his subjects (especially the women) on each item of the questionnaire. Village communities were, however, allowed to ask questions on a wide range of topics pertaining to wildlife farming.

b) Interviews were also held with government officials at Local and National levels and with non-Governmental Organisations such as the Wildlife Society of Malawi, the National Hunters Association and Donor organisations such as the Japanese International Corporation Agency, the American Peace Corps Organisation in Malawi, the World Wildlife Fund, German GTZ, Malawi DEMATT - Development Malawian Traders Trust, SEDOM - Small Enterprise Development of Malawi etc.

- c) Information was obtained on areas of credit facilities and mechanisms for wildlife Farming, suitable organisational arrangements for wildlife farming and institutional linkages with concerned agencies including NGOs through the various interviews and discussions.
- d) Because of the limited time available for this survey the task of determining market the potential for each of the wildlife species was done mainly by hotel and restaurant operators through their responses to the "judgement box" in the questionnaire. This category of respondents are the most probable major consumers of the products of wildlife farming. Their "judgement", since they have related to customers over a period of time, are likely to represent the true market potential of wildlife farming.

The results for each species was then summarized for each District.

## 5. DATA ANALYSIS

For each LIA respondents were counted and classified according to:

- a) the three most favoured animal species in order of preference. This was done by counting the number of respondents that "voted" for each species;
- b) potential market for the products of farming each of the wildlife species listed above was determined by finding the mean percentage "scores" for each species in a) above;
- c) the location of the pilot project was determined by a summary of recommendations in the questionnaire made by local Government officials (usually those that have been involved in wildlife utilisation at District level with a thorough knowledge of local environment) and also from the office of the District Commissioner;
- d) information on the possible negative impact of wildlife farming was also obtained through a summary of responses to this particular item in the questionnaire.

Table 1 Survey Team for Local Impact Areas

Local Impact Area	Survey Team, (Names)	Designation
Nkhatabay	S. S. Ajayi Andrew Bwanali Lewis J.P. Siwakwe	FAO Consultant National Wildlife Officer District Coordinator
Mangochi	S. S. Ajayi Andrew Bwanali C.P. Chirambo P.C. Mbota	FAO Consultant National Wildlife Farming Officer District Coordinator, Mangochi Park Manager, L. Malawi National Park
Nsanje	S.S. Ajayi Andrew Bwanali C.M. Mbewe Patricio Ndadzela	FAO Consultant National Wildlife Farming Officer Regional Coordinator (South) Park Manager, Lengwe National Park
Thyolo	S.S. Ajayi Andrew Bwanali C. Mbewe George Zuru	FAO Consultant National Wildlife Farming Officer Regional Coordinator (South) District Game Scout/Extension Worker
Dedza	S.S. Ajayi Andrew Bwanali Mark Tengeletu	FAO Consultant National Wildlife Farming Officer Regional Coordinator (Centre)
Mchingeji	S.S. Ajayi Andrew Bwanali Mark Tengeletu Joe Chinguwo	FAO Consultant National Wildlife Farming Officer Regional Coordinator (Centre) District Coordinator



## **RESULTS: THE CONSULTANT'S FINDINGS**

### **II. ANIMAL PREFERENCE AND LOCATIONS OF PILOT PROJECT**

Choice of animals for wildlife farming by the people of Malawi:

Animals which a previous general survey of wildlife utilisation in Malawi by Bwanali (1994) have shown to be potentially acceptable for utilisation are: Nyala, Bushbuck, Grey-duiker, Cane Rat, hyrax, Francolin, Guineafowl and bushpig. The consultants' national tour was, however, undertaken to find out among other things, the most acceptable two or three species in order of priority with which to start the pilot projects and their locations in the six Local Impact Areas. Annex IV. presents the detailed results for each Local Impact Area according to categories of respondents, while Table 2 presents a summary of choices for each Local Impact Area. It also shows the proposed location of pilot projects. Table 3 gives the total (scores), both in number and percentage, of the total votes scored by each of the eight species of wildlife. Guineafowl was highest, 38.04% followed by Francolin 20.65% and Canerat 18.48%. Other species - Grey duiker, bushbuck, hyrax, Nyala and bushpig together scored 22.8% of the national "votes". This means that guineafowl was the most popular choice practically everywhere.

#### **Final Selection of Animals for the Pilot Project by the Consultant**

Although the socio-cultural and religious considerations of the wildlife species have been expressed through people's response to questionnaires as analysed and presented above, further consideration has to be given to their biological, technical and economic feasibility. The final choice of animal species for farming will, therefore, be screened using the above criteria, if the project is to be made sustainable.

Details of the behavioural assessment used are species' level of docility and their adaptability to captivity.

Table 2: Summary of choices of all categories of respondents for Wildlife Farming and location of Pilot Projects for each Local Impact Area

Local Impact Area	Total Numbers of Respondents	Animal Preference (in Descending Order for each LIA "votes")	Recommended locations of Pilot Projects	
			(Village)	(Area)
Nkhatabay	38	Guineafowl = 14 Francolin = 12 Cane rat = 8 Bushbuck = 3 Grey duiker = 1	Kande	Chinthече
Mangochi	29	Guineafowl = 12 Francolin = 6 Cane rat = 6 Bushbuck = 3 Grey duiker = 2	Chembe	MonkeyBay in Cape Maclear Mangochi
Mchinji	33	Guineafowl = 14 Francolin = 6 Cane rat = 5 Grey duiker = 4 Bushbuck = 2 Bushpig = 2	Nyoka	Mduwa
Dedza	50	Francolin = 7 Guineafowl = 16 Cane rat = 10 Bushpig = 5 Grey duiker = 2	Nkhuwi	Linthipe
Thyolo	13	Guineafowl = 6 Francolin = 3 Grey duiker = 2 Bushbuck = 2	Kapota	Choloman/ Thekerani
Nsanje	21	Guineafowl = 8 Grey duiker = 6 Cane rat = 5 Nyala = 2	Garoma	Fatima/ Chitromo
Total Respondents	184			

**Table 3: Number and % - age respondents that "voted" for each wildlife species Nation-wide**

Wildlife Species	No. of "Votes Scored"	% Age of total Votes Scored
Guineafowl	70	38.37
Francolin	38	20.54
Canerat	34	18.37
Greyduiker	17	9.13
Bushpig	15	8.15
Hyrax	6	3.26
Nyala	2	1.09
Bushpig	2	1.09
Total	184	100

Animals, which are easily tamed for example, and which can be manipulated, were considered from the point of view of behaviour, suitable "candidates" for farming. Animal species which do not constitute a health hazard to humans are also favoured. Productivity in all aspects was an important criterion and selection was in favour of those species which attain physical and sexual maturity at an early age and with a high reproductive rate, i.e. number of young/litter, number of litters per year and time interval between successive births, etc. Another yardstick is the food habit.

A wildlife species with high digestive efficiency and which does not compete with humans in the varieties of food it eats and which can thrive on cheap, locally available food materials, was favoured from the point of view of economic sustainability.

Francoilin was, however, not selected for the pilot schemes on the following grounds:

- a) it is a very nervous bird which does not readily adapt to captivity;
- b) it rarely lays eggs even after being kept for several years in captivity.

Grey duiker and Bushbuck were excluded largely because of low productivity. They attain maturity at one and half year, reproduce twice a year (maximum) producing one young at a time. Their biology in captivity is relatively unknown and, therefore, it was considered uneconomic to start a small holder village women wildlife farming scheme, aimed at income generation with species of low productivity and whose performance in captivity as producers of meat are shrouded with unknowns. Bushpig also falls into this category of animals with an unpredictable future.

However, Guineafowl and canerat were finally selected on the basis of their wide socio-cultural acceptance, biological, technical and economic feasibility. They reproduce relatively fast and their turnover rate is high. Experiences elsewhere in Africa show that they have been successfully used as domesticated laboratory animals and it is likely they will perform sustainably well under farm conditions. Indeed, a large number of guinea-fowls are being kept in Nigeria by households using "peasant husbandry" methods (Ayeni and Ajayi, 1981). Canerats have also been successfully domesticated in Nigeria, Benin and Togo and their biology in captivity are well documented (Ajayi, 1986).

It was against this background that the following schemes were designed to farm guinea-fowl and canerats as pilot projects in areas where they are readily available in the Local Impact Areas.

### III. MARKETING POTENTIAL AND MARKETING ARRANGEMENTS FOR PRODUCTS OF WILDLIFE FARMING

#### 1. Market Potential

For each LIA the summary of the market potential for each species is shown on Table 4. Guineafowl, which came on top of social acceptance in most of the LIAs, also has 100% market potential everywhere. There seems to be no taboos, religious or socio-cultural prejudices against its consumption. Hotel and restaurant operators attested to the popularity of its meat and eggs and asserted that Malawians, tourists and resident expatriates, are likely

to buy all the guineafowls that the wildlife farming schemes may produce. Indeed, the optimism for the potential of this bird as a farm animal was found to be very high everywhere. Guineafowl is so popular that it is regarded as a delicacy at the local level, as a kind of local turkey, specially favoured at Christmas and other festivities. Grey duiker, a second choice in Thyolo and Nsanje, and a third choice in Mchinji and Dedza also scored 100% on market potential. Likewise, there were no socio-cultural or religious taboos against its consumption. Bushbuck and Nyala and Francolin, although not abundant, in some parts of Malawi also have 100% market potential.

The market potential for other species were as follows: Bushpig - 80%; Canerat - 60 - 80% and hyrax 60%. For bushpig, Islamic religion may be against its consumption because it is a wild "eco-type" of the domestic pig. Canerats and hyrax, for some religious reasons, have less than 100% market potential because some Christian sects may be against their consumption because they are not "hoofed animals". However, it is note worthy that where these animals were common (canerats were prevalent in Nkhatabay, Mangochi and Thyolo, while hyrax were common in Mangochi, particularly in the area of Cape Maclear, in Monkey Bay, where the consultant recorded three species: rock hyrax, tree hyrax and yellow-spotted hyrax) the meat of these rodents constitutes the bulk of the animal protein of the rural dwellers. Since the wildlife farming will be targeted to rural communities, particularly women, as a participatory project, future development of this programme should not ignore this fact.

In summary, Table 4 shows the Guineafowl, Francolin, Grey duicker, bushbuck, bushpig, canerat and hyrax have a wide social acceptance in Malawi and their market potential is accordingly high, ranging from 60% for canerats in some localities to 100% for guineafowl, francolin, bushbuck and Grey duicker.

Table 4: Market Potential of Chociced animals for Wildlife Farming

Local Impact Area	1st 3 species selected by respondents	Market Potential: Average/Animal/District (%)
Nkhatabay	Guinea fowl Francolin Cane rat	100 100 80
Mchinji	Guinea fowl Bush pig Grey duckler	100 80 100
Dedza	Guinea fowl Bush buck Grey duckler	100 100 100
Mangochi	Guinea fowl Hyrax Cane rat	100 80 60
Thyolo	Guinea fowl Grey duckler Cane rat	100 100 80
Nsanje	Guinea fowl Grey duckler Nyala	100 100 100
	Total Number of respondents	201

## 2. Marketing arrangements

The proposed marketing arrangement is shown graphically in Fig. 2. The potential consumers for the products of wildlife farming, as identified during the consultant's national tour, are first hotel and restaurant operators, followed by schools, colleges and corporate organisations, supermarkets and roadside buyers, such as tourists, resident expatriates and civil servants.

Since the wildlife farms will be located in villages in rural areas with considerable distances from urban centres, there will be a need for retail traders with their vehicles, to buy the products wholesale (as live animals or as dressed carcasses depending on the targeted category of consumers) and distribute to other buyer in towns. This is why recommendations for the location of pilot projects were made to ensure that production sites were not far from the consumers. Furthermore, the experience of beekeepers at Nkhata Bay, L.I.A., indicated that the farther the pilot projects from towns and cities, the more difficult it is to find retail traders who will be willing to go to these places to evacuate the products.

It is expected that most of the animals will be sold live, particularly in the case of birds, while others may be slaughtered and dressed by village women and retail traders before selling to consumers. The latter case makes it imperative that production sites be close to urban areas (a maximum of 40 - 50km) because of the absence of refrigeration in rural areas for storing meat.

## IV GUINEAFOWL FARMING SCHEME

### 1. Guineafowl, *Numida meleagris galeata* - Some aspects of its biology

The Guineafowl can be found in the open savanna and herbaceous grassland which it utilizes as a feeding ground during the day. Habitats with dense tree canopy cover usually provide it with places of escape, particularly when in danger and as roosting sites at night. The food of guinea fowl in the wild consists of seeds of wild grasses, bulbs of *Cyperus* sp., leaves, worms and insects. Wallowing or sandbathing is usually observed in pulverished sandy soils and sits containing wood ashes. Worms and insects are most abundant during the rainy season and it is implied that the availability of these rich sources of protein restrict the breeding of guinea fowl to the rainy season. The guinea fowls are gregarious animals and they are at their greatest numerical strength during the dry season. They fly together until the beginning of the rainy season when pairing begins to take place for the commencement of reproductive activities.

MARKETING ARRANGEMENTS FOR PRODUCTS AND BIPRODUCTS OF WILDLIFE FARMING

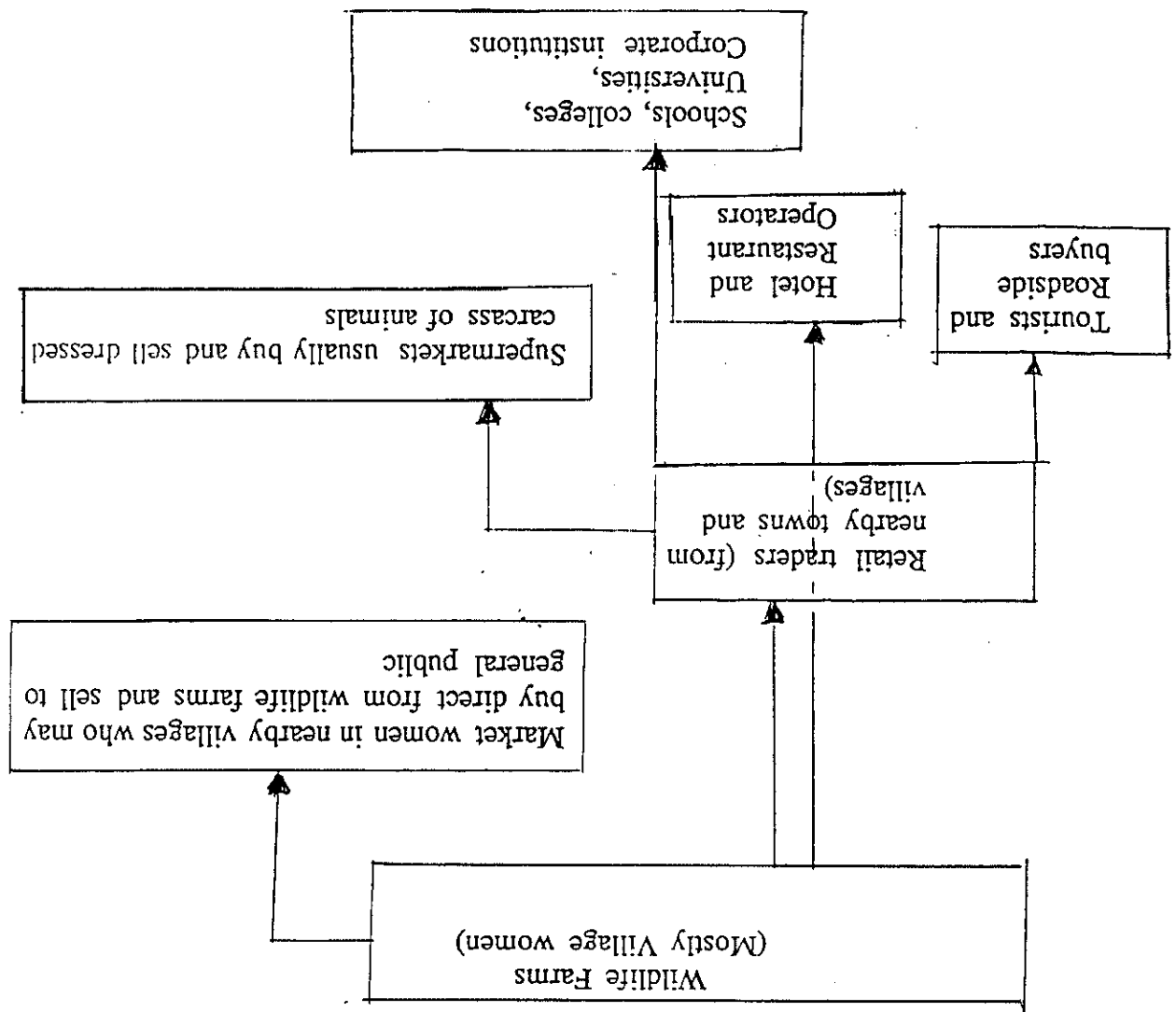


FIG 2:



## 2. Trapping of wild birds and establishment a breeding colony

There are two main practical, cost-effective methods by which Guineafowls can be obtained to establish a parent, breeding colony.

- a) The easiest way to establish a parent stock is by collecting the eggs of wild birds and incubating them with domestic hens. Ajayi (1981) and Ayeni and Ajayi (1981) reported that there were about 300 million semi-domesticated guineafowls in Nigeria, restricted mainly to the savanna region in the north of the country. They have been kept successfully be household through a system of "peasant husbandry". Parent stocks were established by domestic hens incubating guineafowl eggs which were found in the wild in large quantities. Care is taken not to mix guineafowl eggs with those of domestic hens. The reason is that eggs of domestic chicken have a shorter incubating period and may hatch first. As soon as this happens the hens may abandon the yet unhatched guineafowl eggs. An adult female guineafowl has the potential of producing 54 eggs per year, with a fertility rate of about 28%. Incubating period is usually about 27 days. Although the fertility is low under intensive management it may rise to about 34%. Under intensive management osteoporosis may occur among newly-hatched chicks, which may result in lameness. The service of veterinary officers have to b requested if this occurs.
- b) **Trapping of wild birds**

The local communities in all the LIAs where guineafowls do occur naturally have well-developed traditional methods for trapping wild bids alive. This system may be a relatively slow method but rural communities have perfected it to such an extent that it cannot be ignored in any wildlife farming that involves guineafowl.

## 3. Guineafowl aviary and husbandry techniques

Since the wildlife farming scheme is targeted to village women as a small-holder project aimed at poverty alleviation, it is important that the "housing" for this bird be simple and cost-effective.

It is for this reason that an aviary has been designed in such a way that it will not require expensive materials and where the village women can practice "peasant husbandry" with deep litter system of management for the maintenance of a healthy and productive guineafowl stock.

The ground plan and the side-elevation view are shown on Plate 1. It consists mainly of two parts: a playhouse and a nesting chamber. The playhouse and the nesting chambers are sub-divided (partitioned) as shown in the diagram. The floor of the nesting chambers are not cemented and are provided with nesting facilities such as sand and sawdust for the guineafowls to lay and incubate their eggs. The nesting chambers are provided with little ventilation as the windows are small and made to be snake-proof so that the rooms are warm and dry enough for incubating eggs to hatch. The "playrooms" consist of mud wall (at the bottom) about out metre high. On top of the mud wall are wooden poles and chicken wire. The chicken wire is made to cover the entire length, breadth and top and the partitioning. The partitioning is in

line with that of the nesting chamber. Guineafowls can, therefore, be placed in groups, each occupying a nesting chamber provided with a playroom where they can feed, range and fly. The management is the deep litter system.

#### 4. Feeding

Bearing in mind the objectives of the wildlife farming project, it is important to devise a management system which will ensure that the food of the guinea-fowl is readily available, cheap and nutritionally balanced in order to maintain a sustainable, viable and healthy population. Furthermore, guinea-fowl competes with humans for food because they also eat all the grains and tubers eaten by man. It is, therefore, imperative that suitable substitutes are found to these local food items that will cost little or nothing to feed the guinea-fowl. For example, the recommended gross composition of food ration for guinea-fowl under ideal laboratory conditions that will promote a healthy normal growth is shown below.

First, according to Ayeni and Ajayi (1981) the young guinea-fowl keets require about 28% protein level while the adult can thrive on 18%. The ingredients to attain the requirements for growth for guinea-fowl after 8 weeks old is as follows:

Ingredient	Nutrients:	Gross (%) Composition
Maize	carbohydrate	53.4
Groundnut cake	proteins	31.3
Fish meal	minerals and vitamins	5.6
Dried yeast	vitamins	2.6
Lurn leaves	vitamins	3.1
Oyster shells	minerals	2.1
Bone meal	minerals	1.6
Salt (NaCl)	minerals	0.3

Two facts emerged from the consultant's national tour of Malawi which may result in finding suitable substitutes to the major ingredients in the food ration above. First is the availability of maize chaff in large quantities in several milling houses in Malawi which can easily be obtained at little or no cost to replace the maize grain (53.4%) in the standard composition.

Secondly, it was discovered at Mangochi LIA that guinea-fowl were being kept by household and fed entirely on maize (as a source of carbohydrate) and water sedge *Typha capensis* (as a source of other necessary nutrients). Guinea-fowls started feeding on water sedge as from eight weeks old up to its laying age of 18 weeks. If this supplement is so favoured by the guinea-fowl and if it can promote growth as well as egg laying (as observed by the consultant), then the nutritive value of water-sedge as a food of guinea-fowl is worth investigating. It may well replace several other ingredients that constitute the sources of minerals, vitamins and proteins. Furthermore, fishmeal, a source of minerals and vitamins can be substituted by cichlids from fishermen's "wastes" around Lake Malawi although this

may not be very cheap to obtain. However, it can be an advantage to guineafowl farming in locations around Lake Malawi where cichlids can be found cheaply on sustainable basis.

It was also noted that a lot of household food wastes at village level include local beans which can form rich sources of protein. Because of time limitation the consultant could not go into details of feed formulation and substitution of standard ingredients with local, cheap materials. The following Table 5 is an attempt that can presently be made on food substitution.

**Table 5: Standard nutrient requirements for growth by guineafowl**

Substitutes	Original standard Composition	% composition
maize chaff	{ maize	carbohydrates 53.4
Local beans/soya beans	{ groundnuts { cake	protein 31.3
Fishermen's cichlids wastes from Malawi	{ Fishmeal	minerals and vitamins 5.6
Water sedge can possibly be substituted for a wide variety sources of minerals and even vitamins	{ Dried yeast { "Lurn" { Oyster shells { Bone meal { Salt (NaCl.)	vitamins 2.6 vitamins 3.1 minerals 2.1 minerals 1.6 minerals 0.3

Therefore, in simple practical terms, a guineafowl farm extension worker may compound a feed ration for adult guineafowls, as follows:

Ingredient:	% Composition
Maize chaff	53.4
Local beans or soya beans	31.3
Cichlid fish and water sedge	15.3

Table 6: Proximate composition of feeds, including some common plants

Feed	Moisture	Crude Protein	Ether Extract	Crude Fibre	Ash (Minerals)	Nitrogen Free Extract
Centrosema	70	15.97	1.7	18.9	9	54.4
Cassava	62.5	1.09	0.05	5.25	3.05	90.56
Maize grain	10.0	6.76	1.75	2.65	0.9	87.94
Groundnut cake	12.5	41.6	8.1	7.6	5.2	39.5
Yam	59.0	2.5	0.4	4.0	2.65	90.4
Cocoyam	64.0	3.72	0.5	2.85	2.7	90.2
Sweet potato	60.0	4.8	0.15	3.95	3.0	88.1
Rice (partially underhusked)	15.0	15.09	1.6	4.7	1.4	77.4
Guinea corn	11.6	12.68	3.0	4.4	0.2	79.7
Groundnut Seeds	4.6	30.2	47.6	9.61	1.8	10.79
Poultry ration	10.5	16.3	5.3	5.7	2.6	70.1
Pig ration	10.2	23.0	2.1	5.2	5.7	64.0
Palm kernel cake	9.2	19.4	5.0	14.0	3.7	57.9
Yellow maize mill	11.5	12.0	2.2	2.9	1.3	81.6
Potato flour	10.7	5.12	0.14	5.35	4.6	83.8

Further work is essential to establish the nutritive value of water sedge to find out to what extent it can be a local food substitute and also to source other local foods that may provide the essential minerals and vitamins for the guineafowl. Table 6 shows a similar attempt by Tewe and Ajayi (1979) in finding the proximate nutritive values of foodstuffs commonly eaten by wild rodents in order to enable local substitution be made for their standard laboratory requirements. This is a key area of investigation and management which will undoubtedly require the collaboration of a Nutrition Department, perhaps at Bunda College of Agriculture and Natural Resources, near Lilongwe.

## 5. Treatment of parasites and diseases

The knowledge of the parasitic infections and disease problems of guineafowl are required in order to understand the possible health hazards that they pose to man and to the guineafowl itself.

The guineafowl is a hardy bird and is not susceptible to the common poultry diseases such as "Newcastle", Cyumboro, fowl typhoid and chronic respiratory disease, which have brought considerable loss to poultry industry in Africa in spite of the huge investments made into vaccinating chicks. However, guineafowl harbours several intestinal parasites which can inhibit their performance in captivity and, therefore, have to be removed on the establishment of a breeding colony. Below is a list of intestinal parasite of guineafowl and the incidents of these parasites each host as recorded in Nigeria (Ayeni & Ajayi, 1981).

*Capillaria sp*  
*Ascardia galli*  
*Subulura suctoria*  
*Heterakis gallinarium*  
*Choanotaenia infundibulum*  
*Hymenolepis species*  
*Raillietina tetragona*  
*Raillietina echinobothida*  
*Syngamus trachea*  
*Eimeria Sp.*

Helminthiasis can be cured using 10 ml piperazine in 6 litres water and allowing guineafowls to drinks for five consecutive days.

The blood parasites consists of Leucocytozoon, Aegythinella and plasmodium. The external parasites are mainly lice, (Damalinia species) and tick (*Argas periscus*).

Coccidiosis was cured using Davisol- R (Diaveridine 0.64% w/v, sulphaquozaline 2.5% w/v for eight days with no medication on the fourth and fifth days

## 6. Productivity of guineafowl and some economic considerations

Guineafowl can lay about 54 eggs at a time under a deep litter system. Thus, a flock of 20 female guineafowls theoretically can produce about 1,080 eggs per year. Egg fertility in wild birds is about 28% although this may rise to about 34% under intensive management system. Eggs hatch at about 27 days with day old keets weighing about 22 grams. Mature wild birds have an average weight of 0.95 kg but under captive conditions can weigh up to

1.27 kg in about 16 weeks. The killing out percentage is about 82.8, while the edible carcass is as high as 62.8% of the live weight.

Ayeni and Ajayi (1981) stated that the cost of producing home-grown chicken in Nigeria is very high: cost of feed 65%; day old chicks 18%; medication 4%; labour 9.5%; transportation 2%, while miscellaneous expenses was calculated to be 1.5%. Furthermore, day old chicks of domestic poultry are very expensive because of the high mortality which is estimated at about 30% before they reach their destination. Poultry feed is expensive because most of the constituents are imported. With these limitations, it is difficult to produce cheap poultry meat and eggs not only in Nigeria but in most parts of Africa where economic conditions are similar. Herein lies the desirability of using an alternative indigenous African bird, such as the guineafowl noted on Table 5 which can be substituted by cheap local materials as is being planned, it is then possible to eliminate most of the 65% of the cost of production. Likewise, the 18% cost of day old chicks can be eliminated because it is expected that guineafowl farms will be producing their own keets. Furthermore, the cost of labour can be minimal since guineafowl farms are designed to be a village-women community participatory project.

## V. CANERAT FARMING SCHEME

### 1. Some aspects of the biology of the Canerat *Thyonomys Swindrianus*

The canerat, otherwise known as the grass cutter, is a rodent which is closely related to the porcupine, capybara or guinea pig. It is found in forests and savanna areas of most part of Africa, South of the Sahara. It is entirely herbivorous and its favourite food is the succulent nourishing internode of savanna grasses, particularly, the elephant grass  *Pennisetum purpureum*. The canerat shelters in hollows of trees but does not burrow. Forest is cleared for agriculture, both in the savanna and tropical areas and for sugar cane plantations. Although they can thrive entirely on grass they also show preferences to tubers of sweet-potato and cassava. Canerats have, therefore, been incriminated as pests of farm crops, including rice.

### 2. Reproduction

The female canerat reproduces twice a year. Two litters of 2 - 6 young per year is the norm. The gestation period is 5 months but the reproductive year of the female is long, about 5 years.

Mortality of the young is about 15% or less. The young are born with their eyes open and their coats fully developed. The young rat is capable of following its mother immediately after birth. The canerat can grow to a considerable weight with males reaching about 100kg (Bapista et al, 1986).

### 3. Trapping of wild rats and establishment of a parent stock

a) One of the easiest and most practical ways to establish a breeding colony of canerats is by the use of nets on sugarcane plantations. Canerat populations are relatively high on sugar cane plantations and the local communities have perfected a method of skilful placement of nets in a particular direction when

the farm is being burnt for harvests. Canerats that run into the nets are trapped by a careful but swift manipulation of the nest sometimes assisted by dogs. Although this method is fast, it nevertheless has its own disadvantage, since it can only be used during the sugarcane harvesting season. However, local communities have used this method elsewhere where canerats are found in large quantities.

- b) The second method is by the use of standard "Havahart trap" size 4. This a perforated rectangular box with openings at both ends and the trigger system at the middle. The bait, which is a potato or cassava tuber, is placed firmly on the flat metal plate of the trigger inside the box. Canerats are trapped when the trigger is released closing the iron flaps at both ends of the trap. Although canerat favours potato and cassava tubers, the most effective bait for this animal is human urine on a lump of soil. Cane rat's preference for human urine is so strong that places where urine is deposited on farmlands are always intensively licked and scattered. Although this method of trapping ensures the safety of captured animals, it is nevertheless a very slow process to establish a parent breeding stock.

#### 4. The Farm House and routine husbandry

The habitat requirements and the behaviour of canerats are the principal factors that have influenced the design and construction of a farm house for this species. Farm house for canerats are usually located in shady environments to maintain a cool temperature during the day time since the rodent is a shade-loving animal. The house, as illustrated in plate 2, is multipurpose in that it can be constructed to cater for animals at different stages of their domestication and development.

The two-side rooms of three compartments each are "rehabilitation rooms" where wild rats are acclimatized to captive conditions. The floor is usually bare soil and not cemented since, for some reason previous experience has shown that mortality among canerats released on cement rather than bare soil floors can be very high.

The "rehabilitation" rooms open into an open fence courtyard (which has been made to be snake-proof). The outer enclosure may be several metres high to prevent dogs and thieves.

Fresh elephant grass, and where available, potato tubers and water are placed daily in the open courtyard and the rehabilitation rooms where canerats feed *ad-libitum*. Canerats are usually shy of humans at this stage of their captivity. It is, therefore, imperative that a lot of fresh grass is provided at each corner of the rooms for adequate protection. Furthermore, canerats should be left as undisturbed as possible for the first seven days in captivity. The behaviour patterns usually follow the following general pattern.

#### 5. Adaptation to Captivity: The first 7 days within the enclosure

The first day that the canerats are released they hide themselves in piles of grass at all corners of the enclosure and were not observed eating any food provided. The little movement observed is usually in assessment of their safety. From the second day the newly-captured rats usually start eating from about 18.00 - 12.00 hours, they venture out of their

confinement to eat. On the seventh day a large proportion of the succulent part of the elephant grass is eaten and this stage is considered a threshold when wild rats have overcome the shock of captivity.

#### Adaptation to Captivity: Days 8 - 14

From the 8th to 9th day captive rats begin to exhibit gregarious behaviour as they began to congregate into groups (even if they have been captured from different localities). They eat during the day but their feeding period is predominantly at night. From the 10th to 14th day extensive movements around the rehabilitation rooms and the open courtyard also take place, particularly at night.

#### Adaptation to captivity days 15 - 28

Wild canerats are now so acclimatized and used to humans that they no more react to human's presence in the pens. They even come out to eat during the day. By the 28th day canerats are so accustomed to their confinement that they begin to move freely in the "rehabilitation" rooms.

At this stage they may be transferred into the "rehabilitation" and later, the breeding cage, or simply left in the rooms for breeding, if their breeder cannot afford the costs of cage construction, although the advantage of caging is for maximum reproduction, where a male comes in contact with a female for optimum opportunities for mating.

Although they become acclimatized after about one month the general behaviour of canerats patterns do indicate slowness to adapt to human.

#### 6. Feeding

Canerats are herbivorous and under captive conditions they may feed entirely on fresh elephant grass. They are usually fed ad-libitum and potato and cassava tubers' and dry maize may be used to supplement their diets. Other supplementary feeds include maize chaff and brewer's spent grains. However, its preference for tender part of grass internodes after peeling makes it "a food waster". Its general food consumption rate on grains, grass and other foodstuffs in Nigeria are shown on Tables 7 and 8 (Ajayi and Tewe 1980). If fed ad-libitum, as advised above, it may waste its supplementary feeds of tubers and grains also. There is an obvious economic advantage in its feeding habits and food preferences. As a monogastriac herbivore it can thrive entirely on fresh grass and, therefore, needs not compete with man for his food. The protein requirement is about 16% for adults and 18% for young rats.

#### 7. Caging and husbandry

Published information on wild animal husbandry has shown that the management of rodents in captivity is usually based on caging. UFAW (1972) gave an account of several species of rodents of the sub-order hysticomorph which have different behaviour patterns but thrived well in cages. The plains Viscacha *Lagostomus maximum*, a South American rodent, which weighs 3 to 8 kg. has bred successfully when placed in pairs in cages. Wild



guinea pigs, *Cavia aperea*, the cuis; *Galea musteloides*, the degu, *Octodon degu*, all natives of South America have been reared successfully in cages, Egoscue (1992) also bred the East-Central African long-tailed pouched rat, *Beamys hindei*, in wooden cages. These account of past efforts in managing rodents in captivity show that the animals can adjust to the abnormal conditions of captivity and that they thrive well in wooden cages.

In order to design cages for canerats in captivity its habitat requirements and behaviour were considered and simulated as much as possible. Canerat is a nocturnal rodent with most of its feeding activities taking place at night and this was an important factor in designing its cages. Temperature and relative humidity were also found to be important parameters to keeping them successfully as farm animals. For example, the relative humidity should not be lower than 45% and the temperature not less than the ambient temperature of 20 - 26 °C. A relative humidity of 50 - 60%, with the temperature slightly higher than ambient temperature is ideal for the canerat. Using the above factors and information on the habitat requirements of the canerat the following two cages have been designed and used successfully to rear cane rats in captivity with optimum productivity, (Ajayi, 1976).

Table 7: Averagedaily consumption of feeds by cane rats and standard error of mean of cane rats for phase 3 (n = 6)

Food item	For consumption (g/day)	
	Fresh basis	Dry mater basis
Elephant grass)	401.4 <sup>a</sup> ± 10.2	140.4 <sup>a</sup> ± 10.2
Maize Grain	14.8 <sup>a</sup> ± 1.4	13.8 <sup>a</sup> ± 6.8
Rice	19.2 <sup>a</sup> ± 4.8	16.3 <sup>a</sup> ± 0.9
Guinea Corn	42.7 <sup>b</sup> ± 0.2	38 <sup>b</sup> ± 2.3
Groundnut	19.1 <sup>b</sup> ± 2.3	17.67 <sup>b</sup> ± 6.9

Means with common superscripts within columns are not significantly different from each other. Others differ at a probably level of 0.05 or less.

**Table 8:** Average daily consumption of feeds by cane rats for phase 4 (n = 6)

Food item	For consumption (g/day)	
	Fresh basis	Dry mater basis
Elephant grass)	387.0 <sup>a</sup> ± 4.4	135.5 <sup>a</sup> ± 6.1
Maize mill	11.3 <sup>b</sup> ± 1.3	9.6 <sup>b</sup> ± 1.4
Poultry ration	3.5 <sup>b</sup> ± 0.9	1.6 <sup>b</sup> ± 2.4
Pig ration	1.8 <sup>b</sup> ± 0.3	1.6 <sup>b</sup> ± 0.4
Groundnut meal	1.1 <sup>b</sup> ± 1.1	0.99 <sup>b</sup> ± 0.6
Palm kernel cake	1.3 <sup>b</sup> ± 0.06	1.2 <sup>b</sup> ± 0.03

Means with common superscripts within columns are not significantly different from each other. Others differ at a probability level of 0.05 or less.

a. The "rehabilitation" cage

This cage was designed to house canerats temporarily for about one month when they are newly trapped so that they become accustomed to living in cages. The components of the cage (Plates 3a, 3b) consist of four equal compartments which are designed to hold four rats at a time. Each compartment has a solid wooden wall nesting box and a playroom with the same floor area of 0.45 x 0.30 m. Aluminium trays are placed on the floors to collect urine and faeces. The nesting box opened into the playroom by means of an entrance 12 cm x 15 cm.

Each compartment has a door made of screen wire. Behind the door are two plywood partitions 9.6 mm. x 0.45 m., one by the nesting box and the other by the playroom. The plywood partitions can be slid up and down in 12 mm. wide grooves. When both are slid up the rat can be viewed in the compartment through the screen wire door.

The playroom is cleaned first by opening the screen wire door backwards, raising up the plywood partitions of playroom to about one quarter the height of the cage and by means of an iron rod, gently driving the rat through the door to the nesting chamber. The entrance of the nesting chamber is then closed by means of an aluminium door which slides up and down the entrance. The collecting tray is then cleaned and replaced, the entrance re-opened, plywood partition of the playroom slide down to rest on the tray and the rat driven back into the playroom. The process is then repeated for the nesting chamber.

b. The breeding cage

This is a "duplex" cage with two wooden nesting boxes at both ends of a rectangular playroom. The components are shown on Plates 4a, 4b. The playroom is divided into two halves by means of plywood. The playroom is made of chicken wire 1.8 cm. mesh to keep snakes out of the cage and reinforced by strong fence wire-netting 7.2 cm mesh and 3 mm. thick to prevent rats from biting their ways through the cage. The playroom and nesting box have floor areas of 0.4 m. x 0.4 m., and 0.9 x 0.4 m respectively.

At the back of each nesting box are plywood and glass dividers which slide up and down on an aluminium collecting tray. When the plywood is raised rats are observed in the nesting box through the glass. The nesting box opened into the playroom by means of an entrance 12 cm x 15 cm.

The nesting box is cleaned first by "persuading" the rats to move from the nesting box into the playroom and closing the entrance. The plywood and glass partition at the back of the nesting box is then raised, the underlying collecting tray removed and cleaned. The playroom is also cleaned by allowing the rat to go back in the nesting chamber, closing the entrance and sliding out the collecting tray.

Each half of the breeding cage was designed to hold a breeding pair of rats or a nursing female with its young up to weaning age.

## 8. Parasites and diseases

Like other animal species canerats suffer from parasites and infectious diseases, although the former is not fatal to them in captivity. However, epizootics caused by clostridia, have been recorded among canerats under domestication and a quick response by veterinarians with an administration of a multipurpose vaccine can easily put this under control.

## 9. Productivity and some economic considerations

According to Ajayi (1981) the canerat reproduces twice a year with a maximum litter size of 6 - 8 young. It attains physical maturity of about 5.8 kg. in 8 months. It is possible for males to attain a weight of 10kg. It has a killing out percentage of 63.8 and it is a very rich source of protein and minerals. Theoretically, given this reproductive and growth potential a female can produce 14 rats in one year and in the eighth month of the following year, and a total of 94.4 kg live weight or 62.9 kg dressed carcass of meat. This means that in about 20 months a population of 10 females and 2 males cane rats can produce about 620.9 kg of meat. Farming cane rats as a village-women participatory project can be a profitable venture only if the capital outlay and the running costs are made as negligible as possible, so as to break even at the third or fourth year of operation.

The housing should be made as simple as possible, but should be snake and dog-proof. Daily husbandry is essential when the animals have been accustomed to captivity with the right temperature and relative humidity within the area recommended above for optimum growth, will ensure an establishment of a healthy, viable colony.

## VI. POSSIBLE NEGATIVE IMPACTS OF WILDLIFE FARMING

Available information that emerged from the questionnaires, interviews and from the overall experience gained from the consultants national tour of Malawi showed that wildlife farming, involving those species indicated on Tables 2 and 3, can be environmentally friendly. This means that from the point of view of village community environment there is no hazard or any form of negative impact expected by farming these animals.

However, from the standpoint of health, hyrax, which is the second choice of animals at Mangochi L.I.A., stands out as the only candidate that can pose a problem to humans. It was reported during the tour as a possible vector of rabies, although this has not been confirmed scientifically. It is possible that wildlife species may have a future as a possible farm animal but its biology under captive conditions is largely unknown and it may not be technically and socially feasible to include it on the pilot project.

From the experience of domestication of the other species in some parts of Africa, particularly in Nigeria, Benin, and Togo, it is believed that they may not have a negative impact on the health of the village communities.

**VII. ORGANIZATIONAL STRUCTURE FOR SMALL-HOLDER WOMEN PARTICIPATORY PROJECTS SUCH AS WILDLIFE FARMING IN MALAWI**

There is already in existence an organizational administrative structure for the promotion of small-holder rural women participatory projects like wildlife farming at District level. This structure, which is shown in Fig. 3, has also embraced similar other projects in the UNDP Fifth Country Programme and because of its workability and effectiveness, it is recommended that the operations of the wildlife farming project be channelled through the same institutional framework at each of the Local Impact Areas. It has been enlarged to include the National Wildlife Farming Committee. The main components and functions of the organisational structure are as follows:

**1. The National Committee for Wildlife Farming**

It is envisaged that a National Committee for wildlife farming will be constituted at the office of the Chief Parks and Wildlife Officer, in the Ministry of National Parks and Tourism. It will consist mainly of professionals of diverse disciplines as may be necessitated by the multidisciplinary nature of wildlife farming. Although the Minister is designated as the statutory chairman of this national committee, the Chief Parks and Wildlife Officer shall be its effective overseer since his Department is the most relevant and the Custodian of the project.

Their main functions and responsibilities will be, among others, as follows:

- (a) to coordinate wildlife farming activities in Malawi - i.e. administrative, technical and financial responsibilities will be enshrined in this committee;
- (b) to solicit funds, nationally and internationally, for wildlife farming activities. It will also act as a clearing house for all technical aids for wildlife farming in Malawi. This responsibility may, however, be sub-contracted to responsible, relevant NGOs such as the Wildlife Society of Malawi and the Hunters Association of Malawi. This responsibility may be sub-contracted to relevant NGOs, such as the Wildlife Society of Malawi and the Hunters Association of Malawi, etc...
- (c) It will be an organ for the formulation of National Policy for Wildlife farming and will be responsible for making necessary provisions for legislative and legal backing for wildlife in Malawi.

**2. The District Development Committee (D.D.C.)**

This is the highest administrative and legislative body in each of the 24 Districts of Malawi. It also occurs in the Districts where all the six Local Impact Areas exist.

**Composition:**

- Chairman: District Commissioner (this is a Civil Servant representing the Central Government of Malawi).
- Secretary: District Development Officer (who is also the chairman of the District Technical Committee).
- All Members of Parliament in the District.
- All Chiefs.
- Chairmen of Political Parties.
- 2 Representatives of African Business Association (ABA).
- Chairman of District Council - (a man elected to represent all councilors in the Local Government).
- 2 Representatives of NGO's.
- All Chairmen of the Area Development Committee. (It is proposed that the local Wildlife Farming Officer is coopted as an observer to this Committee).

**3. District Technical Committee**

This is an advisory planning committee to DDC. It is composed of professionals. New projects such as wildlife farming are usually channelled to this committee which approves the socio/political and technical feasibility of the project in relation to the overall Master Plan of the entire District. Recommendations for project implementations are then put to the DDC. The Chairman of the District Technical Committee is the Secretary to DDC. It is proposed that the Regional and the local District Wildlife Coordinator becomes a permanent member of this committee.

**4. Area Development Committee**

It comprises the local leaders and village heads. This committee is at the grass-root level and it connects village women to the District Development Committee. Its functions are crucial to the mobilization of village women for wildlife farming, i.e the penultimate phase of mobilization of village women is by Area Development Committee through its Chairman.

**5. Credit Committee**

This is a credit component of the Area Development Committee. The Committee deals with small enterprise development programme such as the Wildlife Farming Projects.

This Committee recommends to DDC credit facilities from small-scale development projects. Money is finally obtained through the Credit Component of the Ministry of Commerce and Industry (their responsibility for disbursement of such credits have been sub-contracted to the Christian Service Committee (an NGO).

6. Village Development Committee

The Village Development Committee is responsible to the Area Development Committee and is ultimately responsible for mobilizing the village women for participatory wildlife farming. Any material or financial assistance for wildlife farming by the village women group will be channelled through this committee.

7. The Village Women Group

This is the local community group that is ultimately charged with the responsibility of wildlife farming through participatory work.

VIII. EXTENSION TRAINING AND COMMUNITY MOBILIZATION SUPPORT SYSTEMS

The experience of bee-keeping and other local community participatory forestry projects in Malawi show that extension work and community mobilization will be of immense importance to the success of wildlife farming. It is against this background that the following recommendations are made for recruitment and training of extension workers.

I. Recruitment of extension workers

This should be done entirely by the Department of National Parks and Wildlife for the following reasons:

(a) The Department of National Parks and Wildlife is the originator and executor of this project and is, therefore, charged with the responsibility of overseeing the general success of the project.

(b) The Department of National Parks and Wildlife has already pioneered two similar local community participatory projects and has, therefore, a measure of experience in extension work, e.g. i) Community Forestry and ii) beekeeping women projects.

There are already in existence Lady Scouts in the Department of National Parks and Wildlife dealing with extension work in beekeeping. Similarly, wildlife farming extension workers can be recruited alongside beekeeping Lady Scouts. The two categories will work at village level in the same rural areas and it is envisaged that extension services will run parallel to each other.



2. Selection of this and other categories of extension workers may be done in such a way that it represents the three regions of Malawi, i.e. North, Centre and South. This is to ensure an even geographical/ecological coverage of all the project areas.
3. It is necessary to have a training course for extension workers of about 2 weeks duration before the commencement of the project. This will equip extension workers with the technical details of game farming.
4. It is proposed that the extension workers at District level, i.e the District Co-ordinator and the Regional Coordinator in the Department of National Parks and Wildlife, liaise very strongly with the District Development Committee (the highest legislative body at District level that with development matters) through its:
  - a) District Technical Committee
  - b) The Area Development Committee and
  - c) The Village Development Committee for Wildlife Farming. Indeed it is further suggested that the Regional and District Co-ordinators be permanent members of the Technical Committee of the District Development Committee for effective mobilization of all the committees at the District level.
5. The Department of National Parks and Wildlife can also utilize agriculture extension workers who already have an established tradition of meeting farmers at the village level once a month. This category of extension workers can also join the staff of the Department of National Parks and Wildlife to mobilize village women for wildlife farming.
6. The organizational structure on Fig.3 shows the mobilization support through which extension workers can function effectively for the mobilization of all categories of people, including village women, for wildlife farming.

#### **IX. IDENTIFIED CREDIT FACILITIES FOR WILDLIFE FARMING SCHEMES**

Although the wildlife farming scheme is designed to be a low input system, it is, nevertheless, important to note that a small amount of capital would be required, particularly for acquisition of building and food materials and other running costs. Since the capital for this development has to come from somewhere, the consultant, during his national tour of Malawi, identified the following organizations that may be willing to provide such credit facilities.

1. Under the UNDP Fifth Country Programme there are two credit schemes for small holder projects:
  - a) District focus for rural development: under this scheme government gives a lump sum of money for development to each District Development Committee. This money is disbursed to projects (as approved and prioritized by the District

Development Committee) to Area Development Committees for small holder projects such as wildlife farming.

b) Small enterprise development programme: there is a credit component in the Ministry of Commerce and Industry for small holder projects. The responsibility for project evaluation and discharge of credit facilities have been subcontracted by this committee to a Non-Governmental Organisation known as Christian Service Committee. This later committee is also based in the Ministry of Commerce and Industry.

The process of obtaining credit facilities from this source is at District level. The District Development Committee considers similar requests coming from various Area Development Committees and after evaluating them those projects approved are prioritised and sent to the Christian Service Committee for funding.

2. The Women's World Bank of Malawi and the Development of Malawi Trade Trust (DMATT)

Small-scale women holders have recently benefited from loan facilities offered by the Women World Bank of Malawi. It is a Non-Governmental Organisation that promotes, trains and equips women with financial capital investments in their businesses. Some previous recipient of such loan facilities are the Soche Business Women's Association which received K25,000 and Hesta Enterprises which received K10,000. Since the proposed small-holder village women's participatory wildlife farming project falls into this category, it can also benefit from the Women's World Bank loan which is repayable in one year with an interest of 26%.

Whilst the bank can be approached for credit facilities, another organisation called Development of Malawi Trade Trust (DMATT), may also find alternative sources of credits and, in addition, include the Women Wildlife Farmers as part of their regular short-term training on women entrepreneurship skills, where they will learn group formation, saving and borrowing money, project identification and survey programmes.

3. The Department of National Parks and Wildlife through the proposed National Committee of Wildlife Farming may assign fund-raising responsibilities and sourcing of credit facilities for the Wildlife Farming project to the following two notable Non-Governmental Organisations which are already directly involved in the project:

a) The Wildlife Society of Malawi; and

b) The Hunters Association of Malawi. The two NGO's are already involved in wildlife farming and their activities in other areas are indeed complementary to the efforts of the Government of Malawi in wildlife conservation.

4. From the discussions with several organisations and individuals on the mechanisms for obtaining credit facilities for sustainable development of the wildlife farming project, the

consultant is of the view that a basic philosophy and administrative machinery could be adopted, whereby the participatory local women are given an absolute responsibility for this project and government role to be that of "advisers". This is because government transfers, change of government, leading to change of emphasis and possible declining interests on the part of government, may make an otherwise viable project unsustainable. This is one area of operation which donors are likely to scrutinize in the interest of sustainability before committing themselves. Furthermore, it project operation is devised in such a way that 75% of the finance cost comes from credit facilitators and the remaining 25% (mostly in kind and not in cash) from village women, then the following donors, who already operate with that approach on similar projects, are possible credit facilitators for the wildlife farming programme:

- a) United States Ambassador's funds.
  - b) Canada funds.
  - c) The British High Commission funds.
  - d)
    - i. Peace - Corps Partnership
    - ii. Small-Project Assistance (jointly funded through Peace Corps and USAID).
5. Dutch Government Fund (Technical Cooperation) as a Trust Fund through FAO. Proposals may be prepared stressing the cardinal issues of the project such as poverty alleviation of rural communities, women participation, i.e. gender issues, environmental issues, research and development. The conditions for (d) i. and ii. above are that the projects must be prepared, submitted and administered by the Peace Corps. This means in practical terms that when the funds arrive in Malawi they will be disbursed and directed by the Peace Corps.

The wildlife farming project can be made in such a way as to involve the Peace Corps Volunteers in the Department of National Parks and Wildlife. The Peace Corps in Malawi already has a project plan to "involve" local people surrounding national parks and protected areas. These "local people" and their "involvement" can embrace the participatory village women and wildlife farming. The Department of National Parks and Wildlife can present this project to the Peace Corps and specifically request volunteers to support it.

3. The Japanese International Corporation Agency is another Organisation with general interest in wildlife and environmental conservation. It is already providing support to some wildlife utilization projects in Malawi and can also be a source of credit facilities for the wildlife farming project.

## X. RECOMMENDATIONS

1. It is suggested that the wildlife farming projects begin as pilot project in the six LIAS. It is also suggested that only two species of animals be involved, i.e. the guineafowl and the cane rat. The guineafowl may be formed in all LIAS and the cane rat at Nkhata Bay where it is a choiced species. They are species which are peoples choice and whose biology in captivity, husbanding techniques and to some extent, food, nutrition and parasites and disease control, are known. Other species on the list of peoples' preferences in the LIAS are still shrouded with unknowns, particularly as farm animals. The hyrax for example, is a possible vector of rabies.
2. Wildlife farming in Malawi should adopt the approach of the team work involving several disciplines, the most crucial to the success and sustainability of which are nutritionists and veterinarians. It is important to involve these professionals at national and district levels because wildlife farming is a multidisciplinary programme where the role of an ecologist is as crucial as that of a veterinarian or nutritionist.
3. It is also suggested that the nutritionist in the National Wildlife Farming Committee be engaged, as matter of priority, in finding suitable local foods, particularly those that can easily be obtained at little or no costs, as substituted for the standard for requirements of the cane rat and the guineafowl.
4. If the project is capital-intensive with high running costs, it may be an unprofitable venture and the project may, therefore, become unsustainable. The meat project may be out of reach of the common people and it may eventually a "class food" of rich people. For wildlife farming to be a profitable venture, it should be, as far as possible, a low-input system, because it is primarily a village-women participatory project aimed at generating income. This means that both the housing and the feeding of farm animals (i.e. the two items which constitute about 90% of their production costs), should be with little capital outlay and should be cost-effective.
5. From the point of view of sustainability and obtaining credit facilities it is suggested that the Department of National Parks and Wildlife gets the American Peace Corps Organization involved in the Wildlife Farming Project. The implication of these recommendations have been stated in this report, but it is up to the Malawi Government to take a decision on whether these conditionalities do not conflict with their national policy and objectives with regards to wildlife conservation.
6. i) It is recommended that the Chief Parks Officers, the Sub-Component Manager and the National Wildlife Farming Officer undertake tours to some specific locations in West Africa (Nigeria, Benin and Togo) and some European countries (Belgium and Germany) where wildlife domestication is relatively advanced. This in order to broaden his views and experience and to know the problems and successes of wildlife domestication.

- ii) It is further suggested that the National Wildlife Farming Officer undergoes an overseas training in the general area of community forestry/community integrated natural resources conservation. This programme should lead to a B.Sc. degree or a post-graduate degree of M.Sc., i.e. if his certificate and diploma in Wildlife Management from the College of African Wildlife, Mweka, Tanzania can be made equivalent to a University degree of B.Sc. This is with the view to upgrading his qualifications and to equip him for the gigantic task of coordinating a National Wildlife Farming Programme through the British Council Scholarships in the Department of Forestry at the University College of North Wales, Bangor, United Kingdom.

It is suggested that the National Wildlife Farming project be conducted in collaboration with the existing participatory Community Forestry and Beekeeping projects. In this way the experience gained on individual projects (such as extension work) can be of mutual benefit to all projects that are based on participatory local community projects.

7. It is suggested that the establishment of pilot projects begins as soon as possible in order to take the seasonal advantage of collecting guineafowl eggs keets from the wild and trapping cane rats from sugar cane plantations at this time that sugar cane is being harvested.
8. For successful and sustainable mobilisation it is suggested that the organisational structure that is proposed in chapter VII be adopted, particularly at District level. It is also important that both the District and Regional Coordinators are permanent members of the Technical Planning Committee of the District Development Committee in each LTA. This is because of the importance and effectiveness of these two Committees in the overall Development of their District, particularly those relating to small holder community-based projects such as wildlife farming. It is also the most effective means of mobilising from the level of District Commissioner to village communities.
9. It is also recommended that the FAO consultant on wildlife farming be recalled to provide guidance on technical details for the establishment of the pilot projects, for construction of farm houses and cages, for acquisition of parent stock of animals and for the training of the first set of extension workers. His presence will greatly facilitate the take-off of this project which will link up and translate the present "design" work to practical realization of wildlife farming. This, in effect, means that the FAO consultant should return for another period of one year. The project document has already made a provision for the position of UN Volunteer and it is recommended to FAO and the Government of Malawi to re-appoint this same consultant who designed the wildlife farming schemes to supervise the first year of its take-off. It is suggested that the formalities for this reappointment be completed as soon as possible to enable the consultant, under an FAO programme, as the UN Volunteer, return in January 1995 in order to take advantage of the breeding season of guineafowl and cane rat to establish the first parent stocks in the pilot schemes.

10. The roles and function of two Non-Governmental Organisations were found to be very complementary to the efforts of the Government of Malawi in wildlife conservation. The Wildlife Society of Malawi and the Hunters Association of Malawi can join the government efforts in wildlife farming as "partners in development". They can also assist the government in: a) soliciting credit facilities; b) direct involvement and participation in establishing pilot project in wildlife farming in villages; c) participation in other aspects of government income-generating, community-based wildlife utilisation projects, including crop protection and rational game cropping.

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## XII. ACKNOWLEDGEMENT

I would like to acknowledge the Office of the United Nations Food and Agricultural Organisation Representative in Malawi, the Department of National Parks and Wildlife and their various field offices in Malawi whose invaluable assistance has made this work possible.

## TERMS OF REFERENCE

### WILDLIFE FARMING CONSULTANT

Under the overall supervision of the Director, Forestry Operation, FAO HQ, and with the guidance of the designated technical and operations officers at FAO HQ, and in close collaboration with the component Manager/Sub-Component Manager (Wildlife Utilization) and national experts MLW/92/010, the consultant will:

- design appropriate wildlife farming schemes for smallholders (with emphasis on women's participation) based on technical, social and economic feasibility and sustainability;
- determine market potential and propose appropriate marketing arrangements;
- identify possible credit facilities and mechanisms;
- recommend necessary extension, training, and community mobilization support systems.
- propose organizational arrangement for the promotion of wildlife farming and intutional linkages with other concerned agencies, including NGOs;
- asses the negative impacts of wildlife farming and propose solutions to mitigate them;
- prepare a draft report, including his findings and recommendations, which should be discussed and cleared with the Government authorities concerned before departure from the country. The consultant will then present the report to FAO HQs (within one month of leaving the country) and will amend it in the light of comments received.

Duration: 1.5 months

Duty Station: Lilongwe, Malawi

EOD: As soon as possible

Language: English

**NATIONAL TOUR PROGRAMME FOR THE WILDLIFE FARMING CONSULTANT**  
(prepared by the Department of National Parks and Wildlife).

A wildlife farming consultant, Professor Ajayi, is now in the country and will be visiting all local impact areas for the UNDP/GOM 5th Country Programme. The following is his tentative programme. Should there be any changes, we will communicate them to you.

- Tuesday, 11 October : Depart Lilongwe for Msuzu
- Wednesday, 12 October: Meeting with the Regional Officer (N), Mr. Ramosh Jiah and the National Wildlife Farming Officer, Mr. Andrew Bwanali.
- Thursday, 13 October : Visit Nkhatabay with the National Wildlife Farming Officer
- Friday, 14 October : Work in Nkhatabay
- Saturday, 15 October : Return to Lilongwe
- Monday, 17 October : Meeting with the Chief Parks and Wildlife Officer. Depart for Mangochi and overnight at Cape Maclear
- Tuesday, 18 October : Meeting with the District Coordinator for Mangochi, Mr. Pearson Chirambo and the Officer in charge of Lake Malawi.
- Wednesday, 19 October: Work in Mangochi together with the District Coordinator
- Thursday, 20 October : Proceed to Blantyre. Meeting with the Principal Parks and Wildlife Officer, Mr. Leonard Sefu, the Regional Project Coordinator, Mr. C.M. Mbewe, and District Coordinator for Thyolo, Mr. Makolija. Courtesy call on the Wildlife Society of Malawi
- Saturday, 22 October : Travel to Nsanje. Work in Nsanje
- Sunday, 23 October : Return to Lengwe and hold discussions with the Park Management in Lengwe National Park.
- Monday, 24 October : Travel to Dedza to be joined by the Regional Project Coordinator for the Central Region, Mr. G. Tengeletu, who will travel by bus to Lilongwe.
- Tuesday, 25 October : Work in Dedza

NOTE: The National Wildlife Farming Officer will accompany and work with the consultant for the whole period that he will be visiting all the local impact areas.

Wednesday, 26 October : Return to Lilongwe. Meeting with the Regional Officer for the Central Region, Mr. Haxwell Jamusana, and the District Coordinator for Mchinji, Mr. Chinguwo.

Friday, 28 October : Work in Mchinji

Saturday, 29 October : National Wildlife Farming Officer travels back to Mzuzu

QUESTIONNAIRE FOR THE TOUR OF MALAWION NATIONAL WILDLIFE FARMING

DATE.....

- 1. Local Impact Area (LIA) .....
- 2. Name of Respondent .....
- Tribe .....
- Status.....
- Age.....
- Sex.....
- 3. a) i. Please, indicate (by circle), three of the following species of animals you will prefer for a wildlife farming scheme:
  - Guinea fowl.....Bushhuck .....
  - Bushfowl (francolin).....Reedbuck .....
  - Cane rate.....Nyala .....
  - Common duiker.....Bushpig .....
- ii. Why do you prefer these 3 species? .....
- .....
- .....
- b) i. What are the cultural, tribal prejudices or taboos against eating the meat of the animals you encircled? .....
- .....
- .....
- .....
- ii. What are the cultural/tribal prejudices or taboos against eating of the meat of the species you did not encircle? .....
- .....
- .....
- .....

Species	100%	80%	60%	40%	20%	0%
a)						
b)						
c)						

chosen "The Judgement box"

Determine the market potential for the 3 species you have

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.....  
 .....

iv. Do they reproduce in captivity?.....

.....  
 .....

iii. What do they eat?.....

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 .....

ii. How are they housed in captivity?.....

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 .....

i. How are they captured alive?.....

.....  
 .....

b) What are the traditional methods of farming the wildlife species?.....

.....  
 .....

you prefer?.....

4. a) Were there previous attempts at domesticating/farming any of the 3 species

6. What are the negative consequences of farming these wildlife species?
  - a) .....
  - b) .....
  - c) .....
7. Suggest site in this LIA for the pilot project on Wildlife .....
8. Identify existing institutional facilities e.g. Government Establishment, Local Women Cooperative Group., Forestry Community or local branch of National Wildlife Society that can form the nucleus of the Pilot Project on Wildlife Farming.
9. Identify potential creditors for the wildlife farming project in Malawi

Nkhatabay Local Impact Area

Analysis of Questionnaire according to categories of respondents

Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Gov. Officials relevant to project	Guineafowl = 5 Canerat = 5 Francolin = 4	Kande, in Chintheche area
Village Women Groups	Guineafowl = 3 Canerat = 3 Francolin = 2	Kande, in Chintheche area
Market Women	Guineafowl = 2 Francolin = 2 Grey duker = 1	Kande, in Chintheche area
Hotel and Restaurants Operators	Guineafowl = 4 Francolin = 4 Bushbuck = 3	Kande, in Chintheche area
Summary of "votes"	Guineafowl = 14 Francolin = 12 Canerat = 8 Bushpig = 3 Greyduiker = 1	Total Number of votes = 38



## Mangochi Local Impact Area

## Analysis of Questionnaire according to categories of respondents

Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Govt. Officials relevant to project	Guineafowl = 5 Hyrax = 4 Canerat = 3	Chembe, in Monkey-Bay Area
Village Women Groups	Guineafowl = 4 Hyrax = 3 Canerat = 3	Chembe, in Monkey-Bay Area
Market Women	-	-
Hotel and Restaurants Operators	Guineafowl = 4 Bushbuck = 3 Greyduiker = 2	Chembe, in Monkey-Bay Area
Summary of "votes"	Guineafowl = 12 Hyrax = 12 Canerat = 6 Bushbuck = 3	Total Number of votes = 29

Analysis of Questionnaire according to categories of respondents

Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Govt. Officials relevant to project	Guineafowl = 3 Grey dukker = 3 Nyala = 4	Gatoma Village, near Fatima Mission
Village Women Groups	Guineafowl = 5 Canerat = 5 Grey dukker = 3	Gatoma Village, near Fatima Mission
Market Women	-	-
Hotel and Restaurants Operators	-	-
Summary of "votes"	Guineafowl = 8 Hyrax = 6 Canerat = 5 Bushbuck = 2	Total Number of Votes = 29

### Thyolo Local Impact Area

#### Analysis of Questionnaire according to categories of respondents

Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Govt. Officials relevant to project	Guineafowl = 3 Francolin = 3 Canerat = 2	Kapota, Cholomwana Area
Village Women Groups	Guineafowl = 3 Grey duiker = 3 Bushbuck = 2	Kapota, Cholomwana Area
Market Women	-	-
Hotel and Restaurants Operators	-	-
Summary of "votes"	Guineafowl = 6 Francolin = 3 Grey duiker = 2 Bushbuck = 2	Total Number of Votes = 13

Dedza Local Impact Area

Analysis of Questionnaire according to categories of respondents

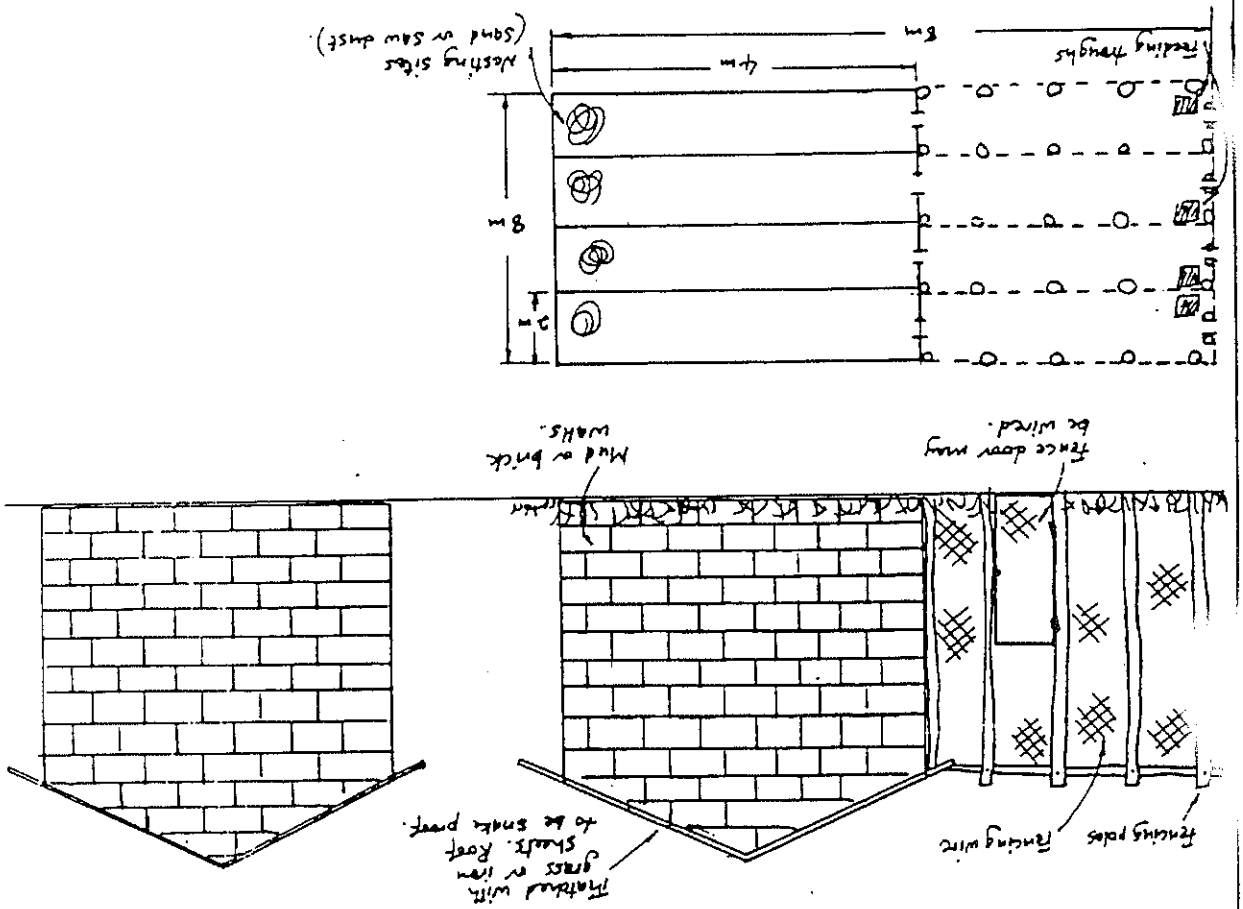
Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Gov. Officials relevant to project	Guineafowl = 3 Francolin = 2 Bushuck = 2	Mkhuwiju Area
Village Women Groups	Francolin = 15 Bushuck = 2 Caneral = 10	Mkhuwiju, Area
Market Women	-	-
Hotel and Restaurants Operators	Guineafowl = 3 Bushuck = 3 Grey duker = 2	Mkhuwiju Area
Summary of "votes"	Guineafowl = 17 Francolin = 10 Grey duker = 5 Bushuck = 2	Total Number of Votes = 50

### Mchinji Local Impact Area

#### Analysis of Questionnaire according to categories of respondents

Category of Respondents	No. of Respondents and their "votes"	Proposed site for location of Pilot Projects
Govt. Officials relevant to project	Guineafowl = 3 Bushpig = 2 Bushbuck = 2	Nyoka, Mduwa Area
Village Women Groups	Guineafowl = 2 Francolin = 6 Canerat = 5	Nyoka, Mduwa Area
Market Women	-	-
Hotel and Restaurants Operators	Guineafowl = 3 Grey duiker = 2 Bushbuck = 2	Nyoka, Mduwa Area
Summary of "votes"	Guineafowl = 14 Francolin = 16 Canerat = 5 Grey duiker = 4 Bushbuck = 2 Bushpig = 2	Total Number of Votes = 33

Plate 1: An Aviary for Farming Guinea Fowl and Francolin.



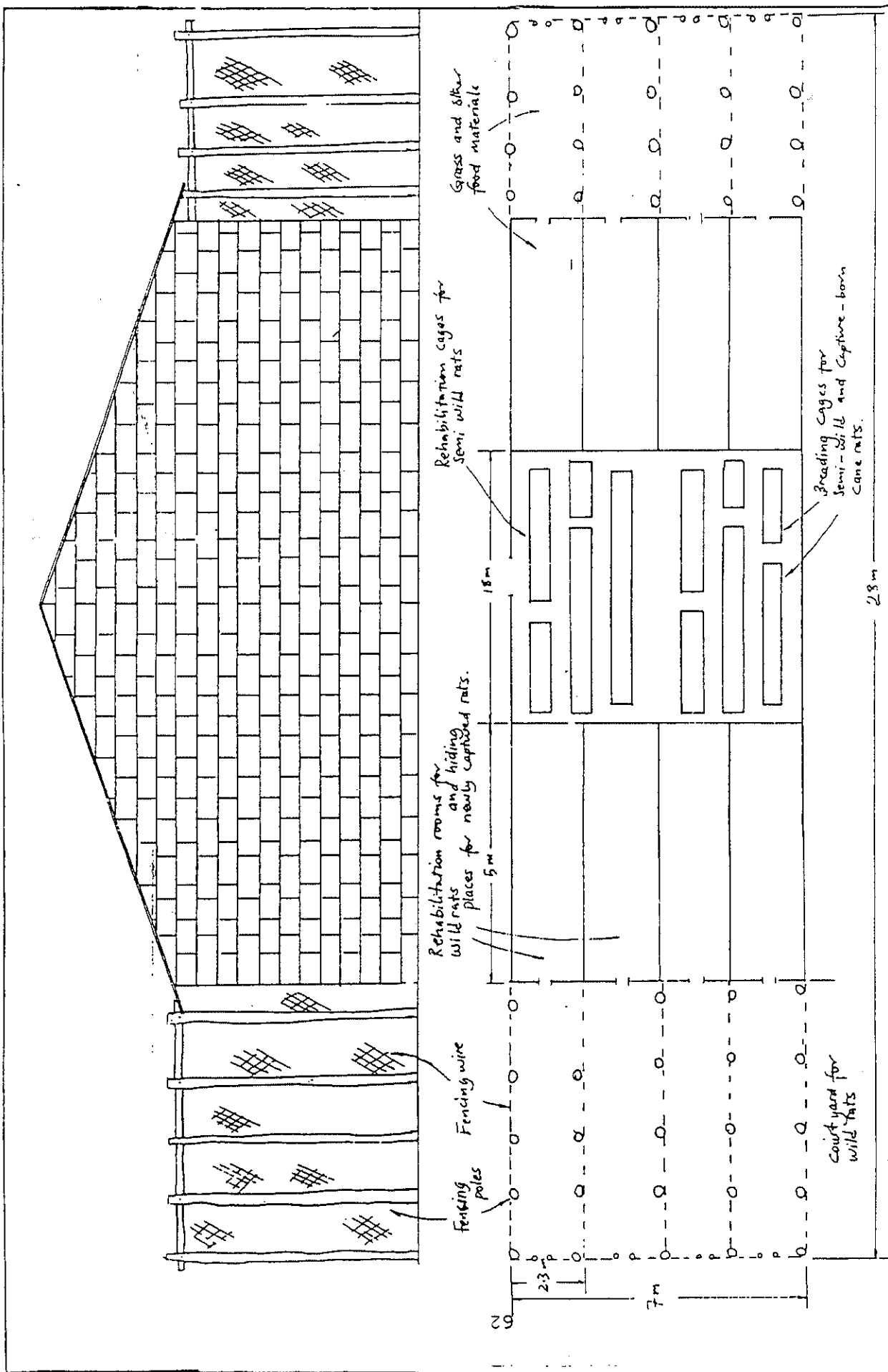


Plate 2: CANE RAT FARM HOUSE

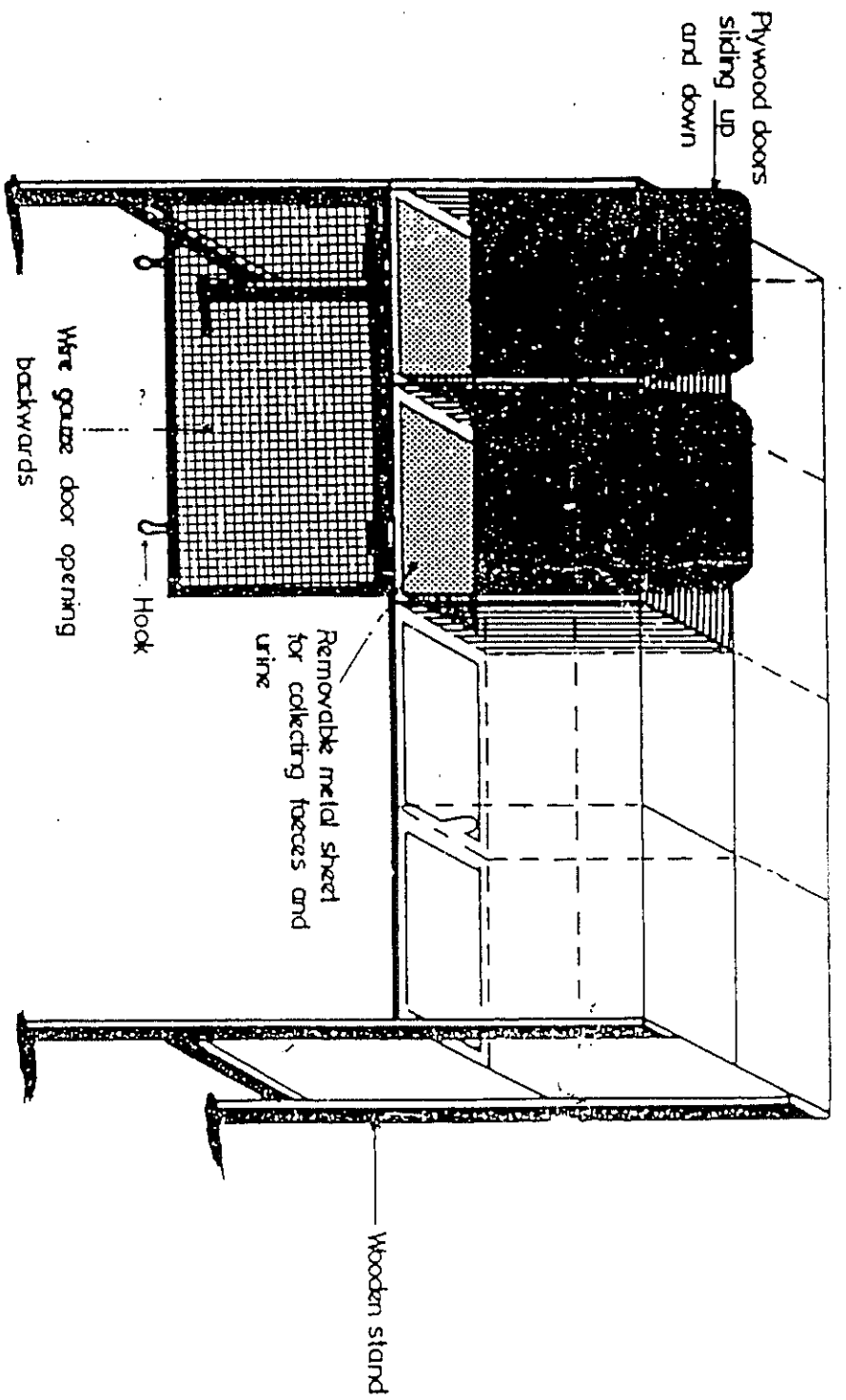


Plate 3a: Design of a "rehabilitation" cage for wild canerats. (Ajayi 1974)



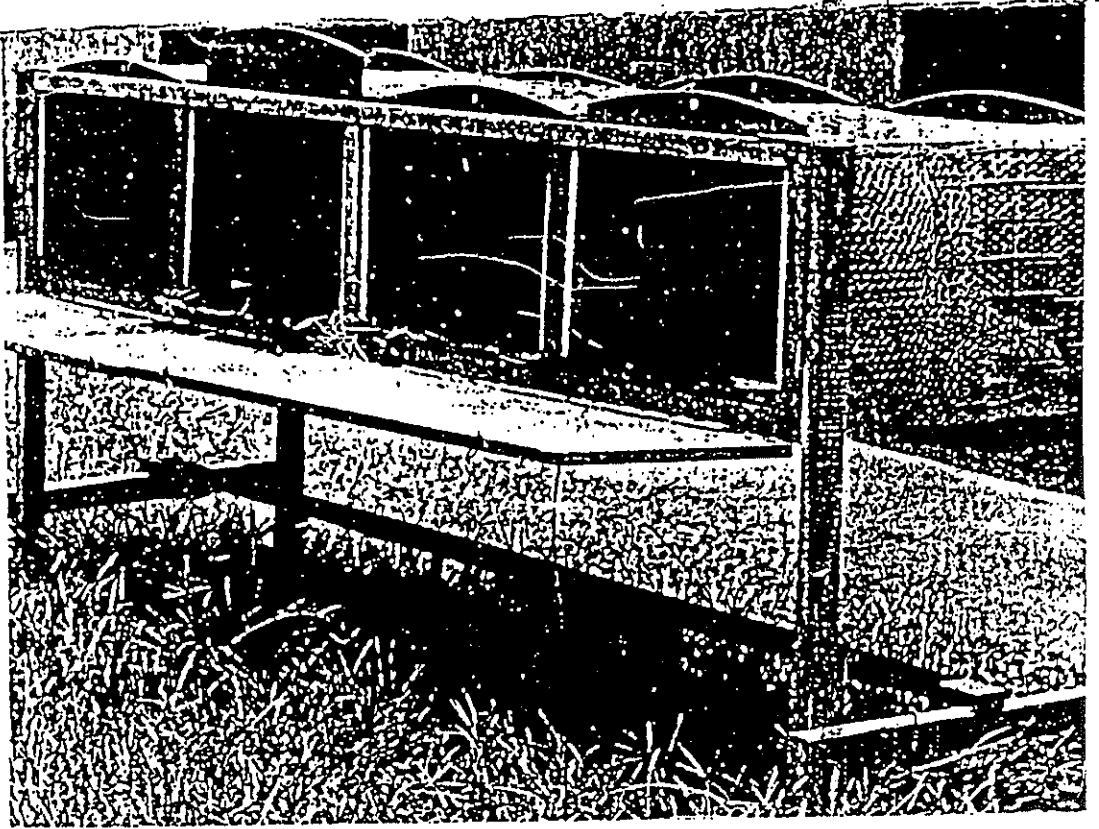


Plate 3b: A rehabilitation cage with wire gauze doors opened to show the plywood state (Ajayi 1974)

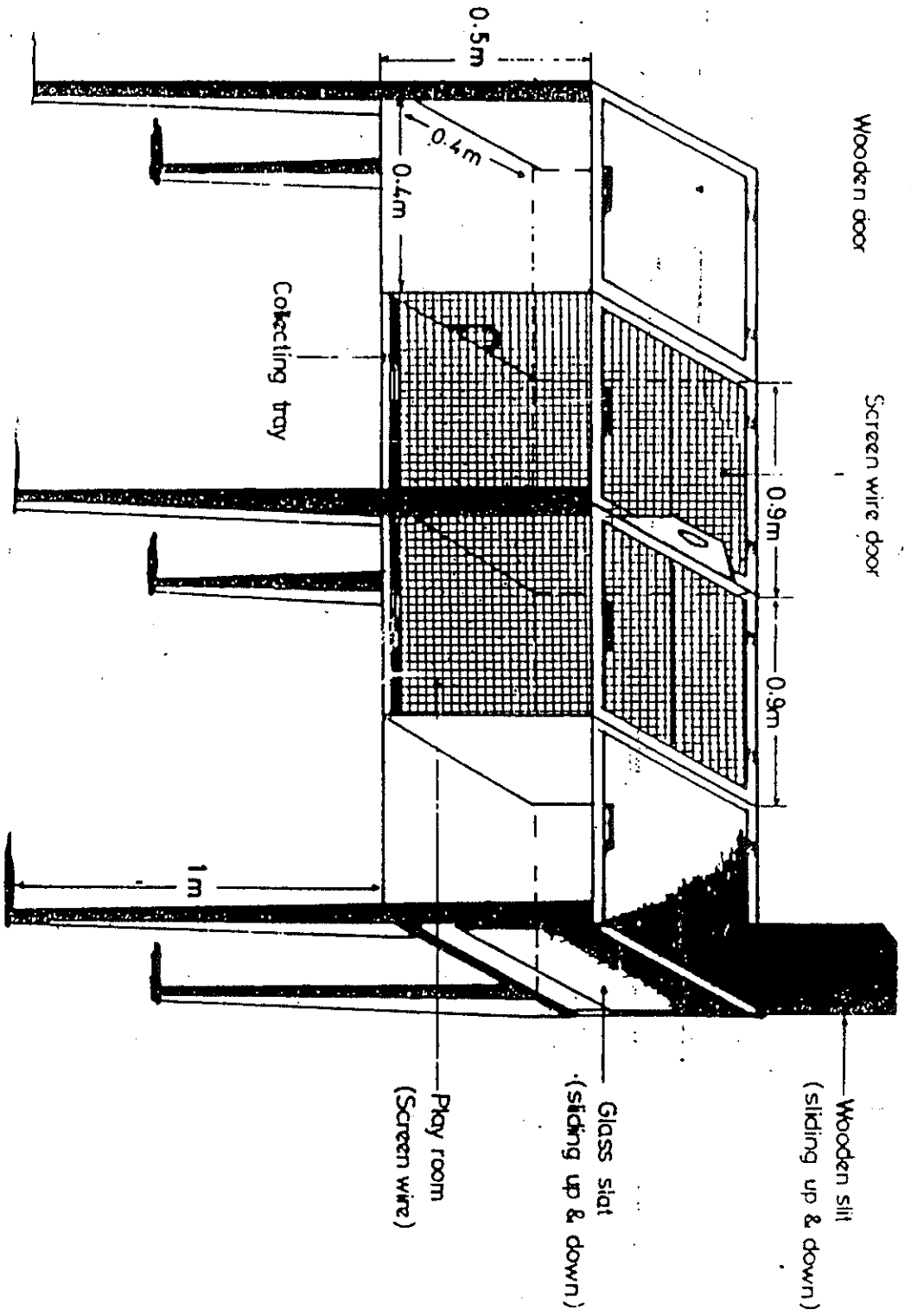


Plate 4a: Design of a breeding cage for wild canerats (Ajayi 1974)

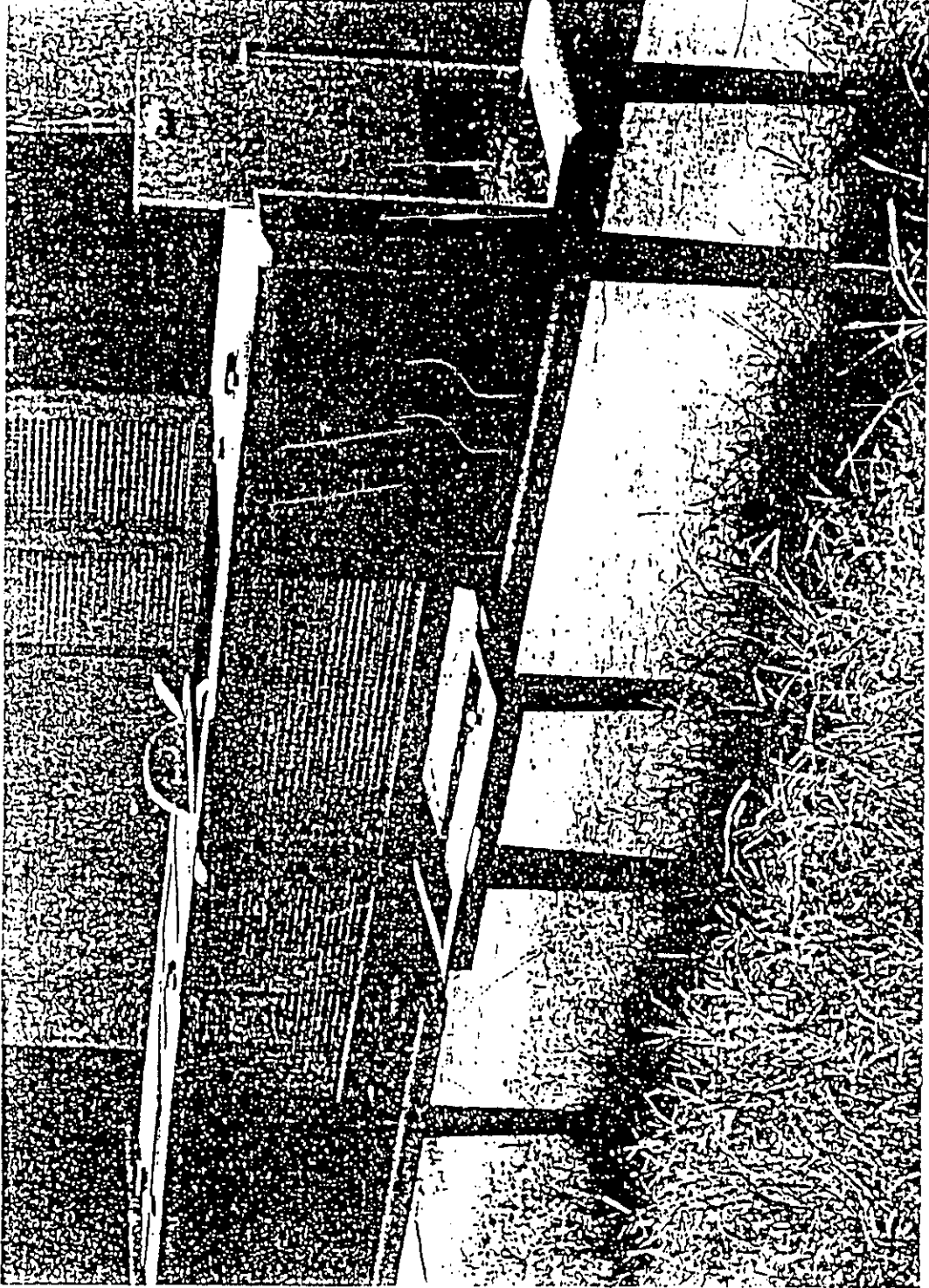


Plate 4b: A breeding cage for wild canerats (Ajayi 1974)

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