

# Mini-livestock breeding with indigenous species in the tropics

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## Abstract

Mini-livestock encompasses sma

ll indigenous vertebrates and invertebrates which can be produced on a sustainable basis for food, animal feed and as a source of income. It includes bush rodents, guinea-pigs, frogs, giant snails, manure worms, insects and many other small species. Mini-livestock production is suitable for backyard family production and can contribute to increased food security. Extension and research are still lacking in many countries due to a traditional emphasis on large domestic animals and a lack of related training and education. However, whilst promoting mini-livestock it should be noted that some of these small animals can represent a serious threat as crop pests. Any zoonotic implications also need to be identified. Mini-livestock development is associated with the

desirable long-term preservation of biodiversity. Given the need, awareness and increasing information now available on mini-livestock species it is time for increased investment in this form of sustainable production.

*Key words: Mini-livestock, pests, rodents, sustainable, zoonotic*

## Introduction

Over the years many large-scale/intensive government and donor-sponsored animal production projects in the tropics have proved to be unsustainable. Around 1985 in part response to this situation a new approach, 'mini-livestock', was initiated. Instead of species such as cattle, sheep, pigs, etc., 'mini-livestock' involves a wide range of small, indigenous, land animals that have been used for centuries in the tropics through gathering, hunting and sometimes poaching (Hardouin 1995).

'Mini-livestock' has also been referred to as 'micro-livestock' or 'unconventional livestock'. Following exchanges of views, especially with colleagues from developing countries, the interested scientific community decided in 1992 that only the term 'Mini-livestock' ('mini-élevage', in French) should be used when speaking of animals such as edible rodents, guinea-pigs for meat, giant snails, frogs, manure worms, insects, and similar animals when used for food, as animal feed or as a source of income (Hardouin and Stiévenart 1993). FAO Animal Production and Health Division has now included mini-livestock amongst the animal systems that fall within its remit, thus showing the validity of this approach (Branckaert et al 1992; Branckaert 1995).

The objectives of this paper are to explain the concept of mini-livestock, to describe the advantages and limitations of mini-livestock and to indicate the action required to progress this new emphasis in livestock development in the tropics.

## Mini-livestock animals and systems

Any species living permanently or temporarily on the ground can be considered as mini-livestock provided that:

- it has potential benefits for humans, nutritional and/or economic,
- it is well known in its area of natural dispersion,
- it is not usually obtained by controlled breeding, although this may be possible.

Amongst the vertebrates an important actual and potential source of meat is the edible bush rodents: in Africa *Thryonomys* (cane rat), *Cricetomys* (giant rat), *Atherurus* (brush-tailed porcupine); in the Mascareignes *Tenrec* (tangue); in Latin America *Hydrochoerus*

(capybara), *Dasyprocta* (agoutis), *Myocastor* (coyup), *Agouti* (pacas) and *Cavia porcellus* (guinea-pig) which is widely bred and eaten in South America. Other mini-livestock include edible frogs, which are found in almost every humid tropical climate. Reptiles, snakes and birds have more recently been considered as eligible for mini-livestock status. Some invertebrates can also be considered as mini-livestock. Giant snails like *Archachatina* and *Achatina* are certainly in high demand in Africa and many snail farms exist. Manure worms like *Eudrilus*, *Perionyx* and *Dendrobaena* can be fed alive to birds and fish. Their faeces provide vermicompost, an excellent organic fertiliser. Maggots represent an excellent source of protein for monogastric species. Caterpillars are produced for food in some countries with the best quality caterpillars being exported all over the world.

Most mini-livestock breeding normally takes place in the area of endemicity, which means that appropriate feed is available, or can be produced locally. Materials for housing or enclosures are usually readily available or can be manufactured by the breeder, which means that backyard production is appropriate for mini-livestock. However, in Latin America there are guinea-pig ranches with more than 20,000 animals. Selection for increased growth rate has led to increases in adult live weight from 800g to 2000g in some populations. Such progress reflects the increased selection intensities and shorter generation interval s that can be exploited in small species.

The small size of mini-livestock animals means a small amount of input per unit, which in turn means more flexible production. The small size of the breeding unit normally results in greater productivity in terms of the live weight produced per reproductive female per year. On this basis the productivity index is 6-10 for guinea-pigs, 6 for the sow, 2 for the ewe and 0.4 for the beef cow (Cicogna 2000).

## Education and extension

Over ten years ago, Hardouin and Stiévenart (1993), at an international seminar on mini-livestock farming, made the recommendation "to integrate mini-livestock into the curricula of the education system ...(and)...to provide appropriate mini-livestock training for lecturers and trainers in mainstream animal production in order to disseminate information on mini-livestock". At the same time, the international association Bureau for Exchange and Distribution of Information on mini-livestock (BEDIM) was created and initiated the publication of a biannual bulletin with the support of FAO. (Issue no. 2 of volume 10 was recently published).

The time is now ripe for systematic courses on the planned production of rodents, guinea-pigs, frogs, snails, worms, insects etc. These courses should be organised with integrated rural development as the overall objective and should avoid purely disciplinary approaches as might be taken by academic zoologists. People in the field are calling for

support and assistance in mini-livestock production and are asking for effective extension and training into the rearing of these edible local species, which sadly are frequently ignored and neglected in traditional curricula and rural development programmes. Being aware that technical data on unusual species are very difficult to obtain in remote places in the tropics, one of the objectives of BEDIM is the dissemination of new and available information on mini-livestock. Thus, some Technical Breeding Guides (8 pages recto/verso DIN A5) have already been produced.

The European Commission decided in the late eighties to encourage research, development and promotion of mini-livestock production. A video, "mini-livestock in the Tropical Forest Habitat" (52 min) has been produced with the aim of showing that controlled production of most of the mini-livestock species is already underway in several countries. It argues that, provided there is the same ecosystem, what has been done in one country can be done in other countries. The video is also an important means of communicating with high ranking civil servants, political authorities, deans and directors of institutions, academic and scientific personnel, as well as technicians, extensionists, journalists, national TV and radio producers, teachers in villages and many other influential people. However, the video also stresses that mini-livestock is not the answer to everything! (Video available from BEDIM at the above address, Euros 15.50 including post and packing.)

## **Advantages of investing in mini-livestock**

Backyard food production such as mini-livestock can be a major contributor to a more balanced diet for both rural and urban people. It also offers the prospect of a regular income source once the volume of production exceeds what the producer wishes to consume. Farmed 'bush-meat' is still highly ranked in terms of taste and preference, and there is no doubt that a market exists if the necessary intensive management techniques, including domestication, can be developed. Juste et al (1995) for example, pointed to the demand for bush meat, including many mini-livestock, in Equatorial Guinea. There is also clear evidence of an international demand for bush meat to supply ethnic restaurants around the world, not always legally (Leake 2000), which may have positive implications for the long-term profitability of some mini-livestock species.

Increased mini-livestock production can have foreign exchange benefits. There is the possibility of savings on the imports of meat and also the prospect of export earnings through meeting the international demand for 'bush meat'. Producing a substitute, such as manure worms, for an expensive imported raw component irregularly shipped, like fish meal, for commercial pig and poultry feeds, not only offers the prospect of better fed poultry and pigs, but the saving of foreign currency.

Mini-livestock can make an important contribution to increased food security because of

its small scale, indigenous and flexible nature and because women are likely to be very much involved in the routine management of the animals. Mini-livestock production is also appropriate for the involvement of children and its characteristics make it ideal for use as a teaching aid in both primary and secondary schools.

Mini-livestock can also be easily raised in an urban setting and represent a possible option for urban farming which is a system gathering momentum in many countries and which can provide food and revenue for poor people. Mini-livestock does not have the undesirable side-effects of rearing the larger species such as cattle, goats and sheep in urban areas (i.e. traffic accidents, noise and odours).

However, it should never be forgotten that many of the mini-livestock rodents are serious pests of food crops cultivated on the edges of forests. Trapping them is understandable, when hunting in protected forests is not allowed. Hence the recent concept of “garden hunting” i.e. pest control in and around gardens and backyards by humane means (catching rather than use of traps which injure the animals) and possibly short-term fattening of the caught animals before consumption (Dounias 2000).

Another important issue is that of mini-livestock as a source of zoonotic diseases, and research into this area is required. Rodents are often hosts of diseases such as leptospirosis and salmonellosis which affect humans (Hardouin 1995). More specifically, the South American rodent, *Agouti paca*, can harbour leishmaniasis and trypanosomiasis, the latter known locally as ‘Chaga’s’ disease (NRC 1991).

Probably the most important benefit of advocating mini-livestock development is the intellectual support it provides for the international community of young local scientists, still hindered too often in many countries by traditional thinking and lacking an official mini-livestock policy to form the basis for new research and teaching initiatives.

## **Biodiversity**

Listening and observation in villages and rural markets, together with the monitoring of the national and sometimes international trade in mini-livestock indicates that many mini-livestock species in the tropics are overexploited. Everybody knows that the distance one has to travel outside towns to buy mini-livestock animals caught in the wild has increased tremendously in recent years (Hardouin and Thys 1997). Although few species are yet threatened by actual extinction, some have already disappeared from particular areas where they were previously well known.

Mini-livestock production, by helping to reduce hunting and poaching, can play some role

in preserving biodiversity. Leaving a wild population intact is important, as controlled breeding will inevitably change the genetic make-up of a species to such an extent that it may not be returnable to the wild once it has been fully domesticated. As controlled breeding of mini-livestock develops the animals will become more like domestic animals and share some of their health and behavioural problems. They will need the support of Animal Production Departments and Veterinary Services, and will leave the sphere of the Forestry Departments where they are currently usually found. This will have two main consequences: the perception of these animals will have to be modified through education, and the technicians taking charge of these animals will have to be trained accordingly (Thys 1995).

## Conclusion

Mini-livestock is a sustainable form of animal production that has significant potential for further development. It should now be considered as a normal component of tropical livestock and rural development. It is very much associated with increased food security as it lends itself to small scale family production. There is now sufficient information on mini-livestock production to intensify extension, training and education programmes in order to promote it more widely. At the same time there is an urgent need to invest in further technical and systems research on mini-livestock production. Small may indeed be beautiful!

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