

SMALL LIVESTOCK IN THE CITY

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Nelson Aguilar, a citizen of Cuba's capital Havana, known locally as "the rabbit breeder", is one of many people who have managed to set up a small-scale animal production unit in an urban setting, making use of locally available resources. Defying the belief that people in cities are only consumers, Nelson Aguilar wanted to demonstrate that it is feasible to produce food in urban areas. At the end of 2002, Nelson's old dream of keeping rabbits on the roof of his house became a reality. Supported by the German NGO Bread for the World he attended a series of training courses on the principles of **permaculture**, organized by the Antonio Núñez Jiménez Foundation for Nature and Humanity (FANJ) and the Cuban Association for Animal Production (ACPA). He learnt about diversified and integrated systems and recycling organic residues and waste, and this helped him start his production system. The experience obtained from daily practice, his dedication and persistence have enabled him to develop the system further.

Farming on a roof

Nelson developed his production system on the roof of his house, an area of 136 m². The system consists of an animal and a plant component. Rabbits, guinea pigs and chickens constitute the animal component. Rabbits are the most economically important component. More than one hundred rabbits, including two bucks, 23 does and their offspring are kept in cages that cover a total surface area of 68 m². Underneath the rabbit cages there is another confined area, with 40 guinea pigs, and in a nearby 2 m² area Nelson keeps 15 chickens of a local breed. The plant component occupies the other part of the roof. Nelson produces mainly condiments such as red pepper, basil, garlic, small onion and oregano, but he also grows medicinal plants like aloe, linden tree or noni (*Morinda citrifolia*) and some ornamental plants to make the place attractive and provide shade to the animals. In the winter season cabbage, tomato and other vegetables are grown.

Cages, drinking containers, nesting boxes, and tools were designed and constructed by Nelson using locally available materials. This saved him the expenses, and it enabled him to make specific adaptations to the classic designs so that they would suit his situation and ideas.

Feeds and nutrient flows

The design of the system allows all residues that are produced to be recycled within the system. In this way, the limited feed resources are used as efficiently as possible. The diet of the rabbits consists of fresh grass cut from gardens and green areas in the city as well as fresh vegetable wastes. This part of the rabbits' diet can be difficult to obtain in certain zones of the city. The fresh feed is complemented with dry feed prepared at home, using a self-made chopping device, a gas or electricity operated dryer and a "hammer mill". This equipment improves the quality of the feed and the efficiency with which it is used. It is simple to handle and guarantees appropriate storage in the hot and humid conditions of Cuba. The homemade feed is made from organic residues from the kitchen, a nearby canteen, vegetable markets and food stores. The ingredients are first ground separately, then mixed by hand and dried. In this way a reserve stock of animal feed can be built up during periods when organic residues are abundantly available. These reserves can be stored for up to six months without losing their quality. Laboratory analyses indicate that this feed contains 11 - 16 percent protein and 12 - 15 percent fibre.

The leftovers from rabbits' feed are consumed in their totality by the guinea pigs. The rabbit and guinea pig manure is collected and part of it is dried. This then makes up 70 - 80 percent of the chickens' diet (with the homemade dried feed accounting for the remainder). The

remaining manure is used as a fertilizer for the plants cultivated on the roof, and any excess manure is given to other vegetable growers in the neighbourhood.

Benefits and challenges

The system offers interesting economic benefits to the Aguilar family. The sale of rabbits constitutes the main source of income. The chickens produce 4 - 7 eggs each day, sufficient to cover family needs and to sell or give to neighbours. Guinea pigs are occasionally sold as pets or for breeding, and on occasion some homemade feed is also sold. The net income generated through the system is 1.4 times the average per capita salary in the city. At the same time, the system provides the household with eggs, meat, condiments and medicines, which constitutes a significant monetary saving.

Of equal importance are the social benefits of the system. Nelson has strengthened his relations with his neighbours and the surrounding community, who support his production system by providing him with a range of inputs. The people who provide these inputs also benefit, because they get rid of organic residues that would normally require time and effort to dispose of. People in the neighbourhood also obtain easier access to healthy products that can be bought cheaply or bartered. Local vegetable growers also benefit by receiving free manure. The local environment is improved as waste products are being reused and recycled, avoiding nutrient losses and the contamination of the surroundings.

One of the problems Nelson faces is the fluctuation in the availability and quality of the raw material for feeding the animals. Food shortages will inhibit the growth rates of the animals. Nelson deals with this problem by building up a stock of dried homemade feeds. High temperatures during summer can also cause problems, having a negative effect on reproduction. Nelson is trying to keep the temperature low by letting creepers grow along trellises to supply shade. Diseases are usually not a problem as long as breeders observe stringent hygiene practices.

Conclusion

Nelson's experience shows that urban areas can provide spaces for livestock production. It is estimated that presently there are more than one thousand rabbit breeders in Havana and many other people are keeping chickens. Nelson's experience is special because he is one of the very few who managed to integrate several animal species into one system, providing benefits to his family and community. The promotion of small projects that stimulate these initiatives, offer training and allow for the conversion of small animal production units aimed at self-sufficiency into profitable activities should be a priority in the both urban and rural planning.

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