IDRC FEATURE ARCSER

A monthly features service about science, technology, and development

Approx. 1000 words IDRC-F237e

WORMS FOR FOOD AND PROFIT

by Rhonda Birenbaum

Mention worms to most people and you'll get a reaction akin to disgust. But dare to raise the same subject with a worm grower and you'll find yourself receiving a lesson on castings, cultures and composting -- all underscored by profit margins. The earthworm, which once had only the capacity to turn stomachs, is gaining a reputation for being able to turn waste land into cash.

Now a number of Asian researchers have begun to investigate the possibility of bringing the benefits of earthworm raising -- vermiculture -- to their own countries. Researcher Domingo D. Tapiador, FAO regional fisheries officer for Asia and the Pacific and secretary to the Indo-Pacific Fishery Commission in Thailand, says: "There is a vast but yet untapped potential for vermiculture development in Thailand and other countries of Asia. The lowly and much misunderstood earthworm may (one day) be called the wonder or miracle food of Asia." Tapiador, himself, is a recently initiated worm grower.

Convinced by both statistics and experience, Tapiador believes the earthworm is a promising source of everything from animal and fish protein to organic fertilizer, medicine and possibly human food. "The uses of earthworms are many and varied and the market seems to be unlimited," he said.

Consequently Tapiador now views vermiculture as an activity that could produce income for the rural poor in Asia, and as a low-cost method of improving the soil on small rural farms. At the second national convention of Philippine earthworm growers in Manila he made his thoughts public.

"To improve the socio-economic condition of small farmers, they must be

encouraged to undertake additional or sideline income-generating activities," Tapiador said. "Vermiculture, which utilizes agricultural wastes, is a promising potential activity for small farmers."

Charles Darwin, famous 19th century naturalist called the earthworm "Nature's plow." Soils lacking earthworms usually become dense and compact, discouraging plant growth. Soils rich in earthworms remain loose and with a greater capacity to retain air and water. The worm excretions, or "castings," are rich in organic nitrates, phosphates and potassium.

When introduced into agricultural land, earthworms improve the yield of wheat, grass, clover, millet, lima beans, soybeans and hay. In forest soil, earthworms have been reported to increase the growth of oak seedlings by 26 per cent and of green ash seedlings by 37 per cent. For small farmers, the use of worms and worm castings as fertilizers could mean a reduction in dependence on manufactured fertilizers.

Earthworms could also benefit the livestock and aquaculture industry in Asia, according to Tapiador, by augmenting or even replacing traditional feeds. Dried worms contain 64 per cent crude protein. In fish, meat and bone, or soybean meals the protein content rarely exceeds 50 per cent.

In the poultry industry one study showed broilers fed with earthworm meal ate 13 per cent less feed for the same weight gain than when fed with ordinary poultry feed. And ducks given supplementary feed of live worms matured 15 days earlier than those without the earthworm supplement.

What remains the most controversial use for earthworms is their incorporation into human food. Yet, in certain countries, some people consider worms a delicacy. A report in the Asia Magazine stated gourmets had paid as high as US $40.00 for a plate of worms, served either fried or in soup. In experiments, ground worms have been added as a protein supplement to various dishes with no noticeable difference in either appearance or taste.

In all these applications, however, the demand for earthworms exceeds the current supply. The key now is to develop a local vermiculture industry, said

Tapiador, who sees no problem to this kind of venture.

"The raising of earthworms is very simple and can be undertaken by practically anybody, young or old and on small or big (commercial) scale, he says. "Vermiculture can also be done indoors or out, in urban as well as rural areas."

Essentially, vermiculture consists of using organic wastes -- which are abundant, easily available and unused -- to breed worms. In return, worm farmers generate a number of marketable products.

The simplest method of raising worms is to establish a compost pile. This heap can be made up of yard clippings, garden plants, weeds, table scraps and soil. If the compost pile is kept moist and foodstuffs added to it at regular intervals, a supply of worms will establish itself. A bed of compost measuring 2.4 m x 1.2 m x .6 m can support a population of more than 50,000 earthworms.

A more commercialized method of growing worms is to prepare containers for large-scale production. These should be filled with soil and wastes, kept moist and in the shade, and stocked with breeding worms. The containers need drainage holes, but can be made of anything from wooden boxes to wash tubs or concrete tanks.

Vermiculture need not be a complex operation, according to Tapiador. Production rates and profitability vary with the number of culture boxes and of breeder worms, and the temperature, food and moisture conditions of the culture medium. The earthworm species used can also be important. Quick breeders, such as Lumbricus rubellus, can produce from 1,000 to one million worms in a year.

Culture medium is another factor influencing worm growth. The Philippine Earthworm Centre recommends using a fermented combination of sawdust, rice husk and rice bran. Tapiador found these components easy to acquire, and either free or inexpensive, in Bangkok. He has based his own worm breeding on this medium with good results.

The economic success of vermiculture, however, ultimately depends on maintaining the worms on an inexpensive diet. The use of kitchen or restaurant

scraps, vegetable wastes or discards from public markets and wastes from food processing keeps costs down. To fatten worms before marketing, a three-to-four week diet of soybean dregs or rice and corn bran mixed with water will suffice.

Vermiculture requires no energy, no special skills, feed, materials or area of operation. And Tapiador says an international market already exists whereby supply lags far behind demand. It could become an increasingly important source of revenue for sectors of the public in developing countries which suffer from lack of regular employment.