Fitting iguanas and forests into Central American farms

Reptiles are a source of protein in many parts of the world. Promoting iguana management for local food and sales can encourage the protection and planting of farm forests where the iguanas can live. Dagmar Werner describes how the Smithsonian Tropical Research Institute, the Pro Iguana Verde Foundation and rural communities have been investigating the potentials of this underexploited resource.

Dagmar Werner

Agricultural practices are one of the main causes of deforestation and consequent reduction in the quality of life for rural Latin Americans. Farmers slash and burn untouched forest to grow basic crops such as corn, rice or beans. Three years later the clay soil is largely depleted of its nutrients and the farmers move on to cut new forest. The used land is sold to cattle ranchers, and the soil is further degraded (Gradwohl and Greenberg, 1988). If agricultural production can be enhanced by incorporating forest "shelter-belts" into existing agricultural systems, farmers will protect their forest rather than cutting it. The green iguana has been hunted to extinction in many areas of its range (Mexico to Paraguay) because it is highly prized by native people as a food source (Fitch et al., 1982). Iguanas depend on trees for habitat and food.

Studying the iguana

Basic research, initiated in 1983, focused on the reproductive behaviour of the green iguana. This research led to development of new management procedures and technology associated with egg laying, incubation and dietary supplements. As a result the reproductive potential of the green iguana is greatly enhanced; survival of large numbers of hatchlings is assured. Young iguanas reared, in captivity, are released at seven months. Because of the loss of forest in agricultural areas, trees must be planted to provide habitat and food for the iguanas. Selected tree species must be useful to the farmer and planted in a way that does not interfere with ongoing agricultural activities (Stoney, 1987). Recent research indicates that meat production from iguana may be up to three times that of cattle per hectare.

Iguana management

Based on this research, a basic iguana management model was developed to permit sustainable use of this resource. Sites receive genetic brood stock with enhanced production capabilities from the centre. Reproductive colonies are established near farmhouses. Specially designed feeding stations are set up to provide the supplementary feed that permits maintenance of iguana densities ten times higher than would occur naturally. Egg-laying sites are installed with specially designed nests from which eggs can be easily collected for incubation (Werner and Miller, 1984). Simple incubation chambers and rearing cages are installed to permit optimal hatching rates and numbers of young available for release into forest patches. The survival rate of iguanas is thus multiplied 45-fold compared to natural survival, resulting in an equally accelerated rate of rebuilding the iguana population (Werner, in press). Two years after release of the first generation of iguanas, they can be harvested. The cycle can be repeated in subsequent years.

Farmers welcome back the iguana

Implementation of iguana management was initiated by the Pro Iguana Verde Foundation in 1985 in rural communities in the Peninsula de Azuero, the most deforested area of Panama. Farmers are enthusiastic about the return of the iguana and are planting mainly native multipurpose trees to provide additional habitat for the reptile. The trees are selected on the basis of their usefulness to the farmers in the region and are planted as shelter-belts. In Chupampa and Llano Grande, 15 tree species were selected, including five species of live-fencepost trees (Bursera simaruba, Diphysa rabinoides, Erythrina poeppigiana, Gliricidia sepium and Spondias mombin), five species of fruit trees (Anacardium occidentale, Grescentia sp., Inga sp., Psidium guayaba, Tamarindus indicus) and five species of timber trees (Acacia mangium, Bombacopsis guinatum, Gordia alliadora, Cedrela odorata, Leucaena leucocephala). The trees are planted along water ways or along existing fencepost lines in 20 m wide strips. As iguana management is further investigated in collaboration with the farmers, its environmental and economic feasibility becomes ever more evident. The low energy requirements of iguanas result in very low consumption of purchased feed while they are in captivity. After release they eat their natural diet: leaves, fruits and flowers from the trees. This is a resource for which no domestic animal competes. If feeding stations are set up in the management areas, feed consumption will still be less than half of that required to raise a chicken or rabbit to the same size, as the iguanas supplement their natural diet with the purchased food. Although it is not a necessary component of iguana management, the supplementary feed permits a ten-fold increase in the carrying capacity compared with natural iguana densities, resulting in 400 harvestable adults per year and hectare. In view of the present sparsity of trees in the agricultural areas, the production of minimum to maximum numbers of harvestable iguanas can be planned by altering levels of feed supplementation. This may be crucial to supply local markets with a desired quantity of the reptile.

Still much research to be done

Research on iguana management must continue before it can be implemented on a large scale. This is because crucial risk factors, such as the possibility of epidemics, have not yet been addressed. There is also need for long-term research on the type of trees to be proposed for reforestation. The use of tree species varies from country to country and also within a country. The trees must offer the iguanas a balanced diet if supplementary feeding is not planned. The food requirements of iguanas need to be assessed and the nutritive value of the tree products identified in order to select appropriate combinations of tree species. If, for economic reasons, trees are selected that do not offer a balanced diet, feed supplements can be formulated which contain only those elements which iguanas do not find in the reforested areas. To adapt iguana management to varying socio-economic and environmental situations, the Pro Iguana Verde Foundation works closely together with the Regional Program of the International Union for Conservation of Nature and Natural Resources (ORCA, IUCN). Presently, iguana management is being implemented in Panama and Costa Rica. Implementation and adaptive research in new countries and at new sites will be co-ordinated with the ongoing activities of IUCN and other organisations concerned with the sustainable use of natural resources.

Multiple benefits

Iguana management has the potential to provide a number of social, environmental and economic benefits. The species is conserved while at the same time a protein source is provided to local farmers. Iguana products, such as meat, eggs and skin can be sold on local or international markets. The re-establishment of forest in agricultural areas provides tree products to the farmers (fuel, wood, fruits, timber) and simultaneously protects soil and water

resources. The reforestation efforts do not aim at creating virgin forest, but rather at providing those resources upon which the farmers' well-being depends. Reforestation with a diversity of trees will also attract other animals and thus create diversity rather than monocultures. Implementation of iguana management in buffer zones of protected areas may become an effective tool to conserve biodiversity, as farmers will be able to satisfy their basic needs on the land they where live, rather than destroying new areas of untouched forest. The idea of wildlife management and conservation through sustainable use of natural resources is growing. In Costa Rica, scientists and students of the Wildlife Management Master's Program of the National University at Heredia are jointly addressing the environmental problems by training and research into new possibilities of sustainable use of natural resources as exemplified by iguana management.

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