Management of hunting in the Amazon: Learning from the experiences of fishing management by local communities in Mamirauá and Amanã Reserves

Helder L. Queiroz, Mamirauá Institute for Sustainable Development, Brazil

Mamirauá and Amanã Sustainable Development Reserves are contiguous with each other, and are located in Amazonas State, Brazil. Amazonas State is at the heart of the Amazon Region. It has the lowest rate of deforestation and is in the best state of preservation of the region.

Mamirauá Sustainable Development Reserve:

- covers a total area of 1,124,000 hectares;
- is an IUCN Category VI protected area;
- was gazetted in 1990;
- entirely comprises flooded forests, with hundreds of small lakes;
- is characterized by very high levels of biodiversity and biological richness;
- contains many rare, vulnerable or threatened species;
- conservation activities are mainly concentrated in one Focal Area.

Amanã Sustainable Development Reserve:

- covers a total area of 2,350,000 hectares;Is an IUCN Category VI protected area;
- was gazetted in 1998;
- mainly comprises non-flooded, tall forests, and its main feature is Amanã Lake;
- is characterised by very high levels of biodiversity and biological richness;
- contains many rare, vulnerable or threatened species;
- conservation activities are mainly concentrated in one Focal Area.

All of the information presented below comes from the focal areas of the reserves. Between them, these cover a total area of 550,000 hectares. The number of inhabitants in the Mamirauá and Amanã focal areas are 6,500 and 2,500 respectively.

The information presented here is drawn from many years of studies by different researchers working at Mamirauá and Amanã Reserves, most notably:

- research on hunting patterns in three sites in Mamirauá Reserve, conducted by Pedro Santos from 1994-1996;
- research on hunting patterns in one site at Amanã Reserve, conducted by Leonardo Fleck from 2001-2002;
- research on the patterns of use of faunal resources in 10 sites at Mamirauá and Amanã Reserves, conducted by João Valsecchi from 2002 to the present time.

Results: Different strategies and adaptations

Hunters in the flooded forests of Mamirauá maintain a relatively high catch per unit effort of 0.84 kg/man hour, and hunt a wide diversity of animals – 55 species. Hunting pressure is not uniform, however, with strong pressure on the preferred animals: more than 71% of the hunted biomass comprises five species.

The catch per unit effort in the non-flooded forests of Amanã is lower, at 0.74 kg/man hour, and the diversity of animals hunted is less, at 27 species. Hunting pressure on the preferred animals is even greater, however, with 87% of the hunted biomass coming from only five species. Living in the flooded forest, about 90% of the protein intake of Mamirauá's inhabitants comes from fish, while more than 65% of the protein of Amanã's inhabitants, being in a non-flooded environment, comes from wildlife.

In the flooded forests of Mamirauá, more than 50% of the hunts are opportunistic, carried out during fishing expeditions or during work days in the gardens. At Amanã, more than 70% of the kills are made during expeditions organized specifically to hunt for meat.

The fact that hunting pressure is focused on just a few species is a possible source of concern. The species which are the main targets of hunters are:

- mammals: ungulates, large rodents and primates, and in the flooded forest also manatees and capybaras;
- reptiles: caimans, river turtles and tortoises;
- birds: cracids.

Despite the fact that the local settlements have been there for a long time, most of the hunting is apparently stable through time, and there are few cases of species displacement or substitution. This might indicate that hunting can be sustainable under certain conditions. This might be due to the combination of:

- the large seasonal variation in water levels in rivers and lakes throughout the year, which results in hunting seasons; and
- the large areas of continuous undisturbed habitats, which might provide allow for high replacement or recruitment rates, either by births or by immigration from neighbouring zones.

A positive local experience: fisheries management

Management of hunting in Mamirauá and Amanã has not yet been done systematically. But fisheries management has been done very successfully, and can teach us some lessons which might be applied to hunting management.

Fisheries management programmes were initiated in four villages in 1998, and today the programme is scattered across much of both reserves. The most important species exploited is the pirarucu (Osteoglossidae), which is officially protected in Brazil and is legally caught only in this part of the Brazilian Amazon.

Under an agreement between the managers and the local fishermen's associations, local fishermen offer their traditional knowledge and agree to conform with the management regulations, in exchange for technical support, scientific knowledge and investment for infrastructure and operations from the management authorities.

The core rules are that fishermen must respect:

- a minimum capture size of 1.5 meters;
- a six month closed season; and
- a zoning system.

A monitoring programme by both local fishermen and scientists involves counting fish when they came to the surface to breathe, and mark-recapture experiments. These have recorded a consistent decrease in the number of fish caught, but an increase of more than 350% of local stock size over a four year period, hence a major increase in total biomass caught. Hence, the income generated in the three months of the pirarucu fishing season has increased by more than 300% over the four year period.

Possible goals for a hunting management programme

Scientific knowledge gathered so far allows researchers and technical staff to formulate management proposals for some hunted wildlife species, either through sustainable use, or total protection. Further research has to be conducted to refine current proposals, and to establish monitoring techniques. In addition, a clear legal framework has to be developed to support such management.

Species for which data indicate that sustainable use might be feasible are:

- caimans. After five years of total protection, the local population of caimans recovered quickly from previously-depressed levels, suggesting that removal experiments may be performed under supervision;
- peccaries. The age structure of the population, as indicated by tooth-wear analysis, indicates that certain age and sex groups could be exploited under supervision;
- river turtles. The population recovery of the three most important species in the last six years suggests that the supervised removal can be developed in the river beaches and lake shores.

By contrast, between 1994 and 2003, a decrease in the catch of manatees has been recorded. This combined with the lack of information on the species means that no harvesting of these animals should be allowed at present. The population structure is still poorly known; hence, protection and environmental education are more important now than the sustainable use of the species.

Before any active management and sustainable use of local fauna can be implemented, new legislation is required since Brazilian law protects wildlife against any form of human use. In more recent years, the possibility of faunal management in areas protected areas for sustainable use (IUCN Category VI) has been recognized, but regulatory legislation has yet to be enacted, and is urgently needed.