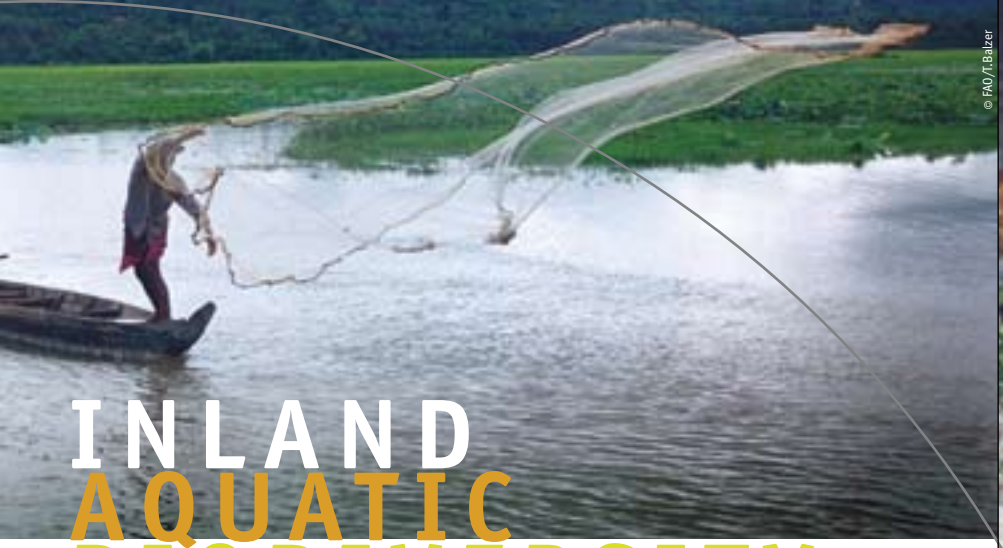

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INLAND AQUATIC BIODIVERSITY

Inland waters contain a vast array of biological diversity that provides livelihood, recreation and spiritual opportunities for people in developing and developed areas of the world. Inland waters are themselves extremely diverse, ranging from natural water bodies, such as swamps, rivers, flood plains and lakes, to modified habitats such as rice fields, reservoirs and aquaculture ponds.

BIOLOGICAL DIVERSITY MORE THAN FISH

The aquatic biodiversity of inland waters useful to humans includes plants, fish, amphibians, reptiles, molluscs, crustaceans and even insects. FAO Fisheries and Aquaculture Department information contributed by member countries in 2005 officially indicates that about 9.5 million tonnes were harvested from inland capture fisheries and 29.3 million tonnes from inland aquaculture. However, accurate information on small-scale inland capture fisheries and rural aquaculture is extremely difficult to obtain because of the informal and diffuse nature of these subsectors. Additionally, much of what is caught or produced by small-scale fishers/farmers is consumed by them or bartered locally, and therefore does not enter the formal economy and accounting of national governments. In-depth work has revealed that real production from inland waters is several times higher than that officially reported. It is clear that inland aquatic biodiversity is an important resource for rural communities and often provides a "safety net" to rely on in the face of other crop and food shortages.

MULTIPLE USE OF INLAND WATERS MULTIPLE THREATS TO BIODIVERSITY

Inland waters are used for a number of activities other than fisheries, including power generation, agriculture, navigation, tourism, urban and industrial water supply and waste disposal. These compete with fisheries by modifying the structure of the environment and the quality and quantity of water. Many of these alternative demands on water are judged by powerful sections of society to be of greater value than fisheries and therefore are assigned a higher priority in reaching decisions as to the allocation of water.

Inland waters are often the sink in which chemicals, agricultural runoff, sedimentation and other forms of pollution accumulate. Fish farming may also contribute pollution in the form of uneaten food, therapeutic drugs and pathogens to lakes and reservoirs where improper culture practices are used. As a result, aquatic ecosystems are being threatened, as are their fisheries and many of the people that depend on them. Freshwater vertebrates, e.g. amphibians and fish, are the most threatened group of organisms used by people.

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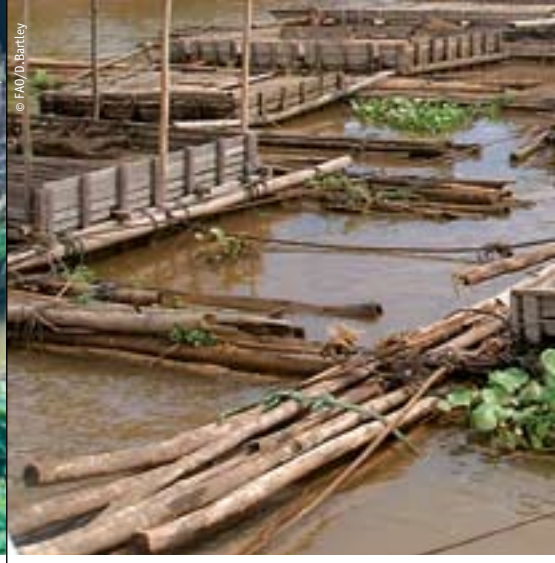
Alien species have been used to generate economic opportunities through use in fisheries and aquaculture. However, they also pose threats to native biodiversity through competition, predation, genetic contamination and habitat modification. FAO maintains a registry of alien species that reveals that over 379 species have been moved across international borders and that there have been more positive socioeconomic benefits than adverse environmental impacts. Nonetheless, alien species pose a serious threat to inland biodiversity.



INTEGRATION

Because of the multiple use of inland waters, integration of such use becomes important and constitutes other hierarchies of biodiversity at the ecosystem and landscape levels. Thereby it is important to apply an integrated basin management approach where the requirements of fish and fisheries are duly taken into consideration in planning and management. Where watersheds have been modified by hydro-electric development, mitigation measures need to be implemented, e.g. habitat rehabilitation, specific water management programmes and fish-passage systems, to protect species that depend on longitudinal and lateral movements to complete their lifecycle successfully. Particular attention needs to be given to sensitive and specialized species, e.g. sturgeon or salmon. Although rural people in developing countries may refer to themselves as farmers or labourers the use of inland resources is often an integrated part of their livelihoods. The frequency and the ways in which they use living aquatic resources vary seasonally and with the cultural and geographic setting. Fishing or aquaculture may for example take place in rice paddies which typically contain several hundreds of species other than rice, many of which are directly useable by rural communities. Fish, insects, shellfish and other animals in the paddies not only provide needed nutrition that rice alone does not, but also provide motivation to reduce pesticides because the animals serve as natural predators and grazers. Animals in rice paddies can either be natural components of biodiversity that are "trapped" in the paddies, or they can be purposefully stocked, such as many tilapia, barb and carp species.

AQUACULTURE

The farming of inland aquatic species has a much shorter history than farming of crops or livestock. Except for the common carp that was domesticated approximately 2000 years ago, breeding of aquatic species for food is relatively recent. However, the sector is increasing rapidly and represents the fastest growing food producing sector: in 1985 only 73 freshwater species were farmed, in 2000 there were over 150. Traditional animal breeding, chromosome-set manipulation and hybridization have used the genetic diversity of aquatic species such as tilapia, catfish, rainbow trout, and common carp to create characteristic breeds of fish to suit environmental and consumer demands. Agriculture and aquaculture can form integrated farming systems where nutrients are cycled between production components, where fish ponds can provide a source of water for irrigation, and where irrigation systems can be fished. Aquaculture is further used to support culture-based fisheries. There is also a trend for inland water biodiversity to be supplemented or even constructed to maximize benefits from the modified systems.

Learn more!:
www.fao.org/fishery

Further information about the work of FAO on biodiversity is available at:
www.fao.org/biodiversity