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Source: Mountain Research and Development, 24(2) : 174-175

Published By: International Mountain Society

URL: https://doi.org/10.1659/0276-4741(2004)024[0174:MATIYO]2.0.CO;2

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The Role of the UNU in Advancing Research and Capacity Development

Mountains and the International Year of Rice

On 16 December 2002, the United Nations General Assembly declared 2004 the International Year of Rice, recognizing that rice feeds more than half of the world's population. Observance of the International Year of Rice is important to raise awareness of the role of rice in alleviating poverty and in providing food security and environmental conservation.

Over 90% of the world's rice is produced in Asia. Maintenance and improvement of rice-based systems in productive lowland river deltas and plains areas are vital for food security on this most populous continent. According to the FAO, in 2000 nearly half of all mountain people in developing countries and the Commonwealth of Independent States lived in the mountains of southern China, the Indo Chinese Peninsula, and the larger Pacific islands. Poverty and food insecurity are widespread in these areas. Vulnerability to food insecurity is very high, probably affecting 170 to 220 million people. Sustainable development of rice-based systems in these mountainous areas is important to achieve food security, alleviate poverty, and preserve diversity of global importance.

The United Nations University (UNU) has been involved in advancing research and capacity development on natural resource management in mountain regions, in collaboration with national and international partners, through 2 principal projects: People, Land Management and Environmental Change (PLEC), and Sustainable Mountain Development. Upland farmers have rich knowledge and much practice in sustainable natural resource management. Their farming systems are diverse and dynamic, and do not necessarily reduce biodiversity or lead to land degradation. Development and conservation programs need to build on the best of local knowledge and practices that readily incorporate new technology. UNU will continue to be involved in research and capacity development for conservation of agricultural biodiversity and sustainable development in the region, with contributions to observe the International Year of Rice.

Agricultural biodiversity

As PLEC has demonstrated globally over the past few years, biodiversity conservation in agricultural landscapes can be built on the many and dynamic ways in which farmers use the natural diversity of the environment for livelihoods. PLEC is planning a regional training program on Biodiversity Conservation and Local Livelihood at Chiang Mai University, Thailand, to contribute to national and regional efforts for biodiversity conservation and rural livelihood improvement, especially in the mountainous regions of Southeast Asia. In situ conservation of upland rice diversity and management of wild rice will be important parts of the training program. Biodiversity-based pest control has received



FIGURE 1 Fish farming (see fish at foot of rice plants) in rice fields helps to eliminate mosquito larvae, while also providing a source of nutrients for rice. (Photo courtesy of UNU)

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increasing attention in recent research, and has good potential for reducing use of pesticides and promoting biodiversity in agricultural ecosystems. There is a need to examine and explore the potential of cropping and landscaping practices that disrupt biophysical conditions for pest life cycles and infection processes. Intercalary cultivation of low-stalk hybrid rice and the high-stalk traditional variety has now been greatly extended to control rice blast in Southwest China. Later this year, UNU will co-organize with other partners an international workshop on Pest Control through Diversity at Yunnan Agricultural University, Kunming, China.

Agricultural heritage

Rice is cultivated mainly in paddy and dry fields in the mountainous region of East and Southeast Asia. The paddy fields, either irrigated or rainfed, are scattered in the limited river valleys and lake basins between the mountain ridges, and in slowly built terrace systems on undulating and sloping lands.

In shifting cultivation, natural forest fallows, active management, and planting of beneficial trees are employed to regenerate soil fertility in dry fields for production of upland rice and other crops. Forest fallows and tree plantations also provide timber, firewood, wild food, medicines, and various non-timber forest products. In addition, upland farmers also conserve a diversity of upland rice varieties to cope with spatial and temporal variation in soil fertility and microclimate (temperature).

Farmers recognize the benefits of the fast-growing alder tree for restoration of soil fertility and suppression of weeds. The upland rice–alder system generates a wide range of environmental services. Alder forests also serve as habitats for native flora and fauna. The rotation system promotes soil and water conservation and restoration by nitrogen fixation, litter compost, weed suppression, and avoiding dependence on chemical inputs. It improves microclimate for production of tea and other crops. But this traditional system is also undergoing transition in response to social change.

In valleys and basins, farmers have developed other innovative rice-based systems that embrace synergy between rice and fish in the paddy field. Fish culture in rice fields (Figure 1) helps to eliminate mosquito larvae and reduce the incidence of malaria, which remains a threat to public health in tropical Asia. Fish excrement is rich in nitrogen and phosphorus and increases the fertility of rice fields. Rice absorbs fertilizers and purifies water; as a result, the water in rice fields is continuously fresh and clear. Pathogenic bacteria are much less frequent in rice fields than in pond water. Clear water may help to reduce fish diseases.

Fish are a major source of farmers' livelihoods. Many households have a fish pond near their houses or rice fields. Fish farming starts in the rice fields a few days after transplanting of rice seedlings. Fish are harvested after water is drained before rice harvesting. Some of the fish from rice fields are used for home consumption and sale, and the rest returned to fish ponds to mature further. The rice–fish culture system incorporates ecological integrity in the wetlands and is also embedded in social organizations that support water management and cooperation among households.

The UN Food and Agriculture Organization has initiated a global program entitled Globally Important Ingenious Agricultural Heritage Systems (GIAHS). These systems are defined as remarkable land use systems and landscapes rich in biological diversity, evolving from the ingenious and dynamic adaptation of a community or population to its environment and its needs and aspirations for sustainable development. In response to the program's call for nominations of GIAHS candidates, UNU has collaborated with national partners in developing proposals for listing the upland rice–alder tree system and the lowland rice–fish system as GIAHS candidates, and building on ingenious rice-based systems for sustainable development in the region.

UNU became a founding member of the International Network for Water and Ecosystem in Paddy Fields (INWEPF), with a secretariat in Tokyo, as a response to the International Year of Rice 2004. Recognizing the diversity of rice-based systems, INWEPF in the initial stage will identify common and context-specific issues that will result in better understanding of water and paddy ecosystems, and their services and impacts on surrounding environments in various contexts, to promote new management approaches. It will also offer an opportunity for UNU to link its current work to relevant INWEPF activities.

The theme of the International Year of Rice—"Rice is Life"—is not only essential to highly productive lowland and river delta areas, but is also important to mountain regions, especially the heartland of rice domestication in the mountains of East and Southeast Asia, for conservation of rice diversity, food security, and rural livelihoods. UNU will continue to collaborate with national and international partners to foster research and capacity development that embrace and build on local knowledge as well as practices that promote sustainable development in the region.

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