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Parks is published to strengthen international collaboration among protected area professionals and to enhance their role, status and activities by:

- maintaining and improving an effective network of protected area managers throughout the world, building on the established network of WCPA;
- serving as a leading global forum for the exchange of information on issues relating to protected area establishment and management;
- ensuring that protected areas are placed at the forefront of contemporary environmental issues such as biodiversity conservation and ecologically sustainable development.

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Editorial

PETER BRIDGEWATER



Biosphere Reserves: the network beyond the islands

A decade ago, Biosphere Reserves were Category IX of the CNPPA Categories, Objectives and Criteria for Protected Areas, while natural World Heritage Sites were Category X. As the 1994 IUCN Guidelines for protected area management categories state: “Categories IX and X were not discrete management categories but international designations generally overlain on other categories”. A detailed paper on this matter can be found at: www.unesco.org

This issue of *Parks* is devoted to Biosphere Reserves, established under the UNESCO Man and the Biosphere (MAB) Programme. Biosphere Reserves are defined as “special places for people and nature”. Many readers of *Parks* will be familiar with these reserves, recognised areas of representative environments which have been internationally designated to promote solutions to reconcile the conservation of biodiversity and its sustainable use. They are nominated by national governments through the focal points for the MAB Programme and UNESCO in their respective countries.

The added value of Biosphere Reserve designation lies essentially in the official recognition by a UN agency, linking with countries’ own efforts to meet their obligations under the conventions dealing with biodiversity. In particular, Biosphere Reserves can be considered as reflecting the “ecosystem approach” adopted by the Convention on Biological Diversity. Increasing interest in transboundary Biosphere Reserves is a sign of their relevance and the wish for international recognition of countries’ joint efforts to conserve and manage shared ecosystems. In addition, the formal existence of the World Network, constituted by active regional sub-networks and national networks, helps countries to share information and experience within a neutral, culturally adapted setting.

Since 1995, the World Network has been established under a *Statutory Framework* that sets the ‘rules of the game’ and makes provision for a periodic review of Biosphere Reserves every ten years to encourage them to meet the current criteria and objectives. General activities of the World Network are governed by the *Seville Strategy for Biosphere Reserves*. As of January 2001, there are 391 Biosphere Reserves in 94 countries. For full details, visit our site at www.unesco.org/mab

Although Biosphere Reserves originated some 25 years ago, long before we used terms such as ‘biodiversity’, ‘sustainable development’ and ‘globalisation’, we are finding that they are *pre-adapted* to help countries address the many issues those terms raise.

Countries are using Biosphere Reserves increasingly as land-use planning and management tools, in effect creating a large-scale mosaic of areas with nested hierarchies of management regimes. Indeed, the Albany Conference in 1997, designed as a midway assessment between the 1992 and 2003 World Parks Conferences, pointed to the need to rethink protected areas in their broader economic and human context (wcpa.iucn.org/pubs/pdfs/AlbanyConfReport.pdf). It emphasised the “bioregional approach” to forming a conservation matrix using a range of protected area types. The new generation of Biosphere Reserves is a precursor of the types of flexible, large-scale co-management systems, seen by WCPA as an imperative for viable protected areas in the future.

This new generation of Biosphere Reserves is an outcome of the 1995 Seville Strategy. In October 2000, a “Seville + 5” exercise was conducted to take stock of its implementation. Both these meetings were designed to obtain a maximum of input from the World Network,

involving Biosphere Reserve coordinators, specialists working in Biosphere Reserves, representatives of MAB National Committees and several IGOs and NGOs. The “Seville + 5” meeting was aimed specifically at:

- Identifying priorities for attention in the overall Seville Strategy;
- Identifying obstacles to implementation at the international, national and site levels, and means to get around these and;
- Identifying emerging issues of importance for the future of the World Network of Biosphere Reserves.

This issue of *Parks* presents a selection of the presentations as illustrations of some of the questions raised. A series of boxes summarises different aspects of work in specific Biosphere Reserves. One box is devoted to the World Network and its component regional Biosphere Reserve networks. The Epilogue presents the main results and thoughts from this “Seville + 5” exercise.

The article, by Michel Batisse, stems from a meeting on Alpine cooperation in the field of conservation, and spells out the complementarity between Biosphere Reserves and natural World Heritage Sites. It is included to meet the request voiced frequently at meetings of MAB and World Heritage to explain the similarities – and the critical differences – between these two old CNPPA categories!

For the future, the World Network of Biosphere Reserves can help further the aims of IUCN’s World Commission on Protected Areas by exploring and demonstrating how to ensure “benefits beyond borders” – the slogan of the 2003 World Parks Congress. The MAB community, and certainly our small Secretariat, look forward to working with IUCN and its members in preparing for this most critical of all World Parks Congresses.

The Albany Conference, midway to Africa in 2003, adopted the slogan: “From island to networks”. Biosphere Reserves, as the following pages eloquently demonstrate, are indeed the *network beyond the islands!*

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Tonle Sap Biosphere Reserve, Cambodia: management and zonation challenges

NEOU BONHEUR

Tonle Sap Lake is one of the largest freshwater lakes in South East Asia, located in the central floodplain of Cambodia. The lake is divided into three zones, namely three core areas, a buffer zone, and a transition area. The three core areas form an unique ecosystem of high conservation value. The buffer zone is covered by flooded forest, where fishery activities are dominant. The transition area is farmland, where rain-fed rice and floating rice are cultivated. Management of Tonle Sap Biosphere Reserve is a great challenge for the Cambodian government, because the success of its management depends not only on national capacity and institutions, but also on the international cooperation of Mekong riparian countries. Cambodia needs to improve the legal and institutional framework, to strengthen law enforcement, to build consensus in integrated management among responsible agencies, to empower communities in resource development, and to build up knowledge of Tonle Sap ecology. In the international context, cooperation and political consensus over water development in the Mekong basin are crucial to ensure the minimal impact on the lake's integrity.

TONLE SAP LAKE is one of the largest freshwater lakes in South East Asia, located in the central floodplain of Cambodia. The unique hydrological regime of Tonle Sap Lake is characterised by the annual flow of the Mekong waters into the lake basin during the wet season, which increases the lake's water level by 1 m to 8–9 m. Consequently, the lake's area increases from 2,500 km² to about 10,000 km², with the water volume varying from 1.3 thousand million m³ to 70 thousand million m³ respectively. This hydrological cycle supports and maintains a high biodiversity, particularly fish, plant communities, and wildlife, which are the resource bases for the national economy. Nearly half of the population of Cambodia depends on the lake's resources: about one million people live in fish-dependent communities. Tonle Sap Lake plays a vital role in Khmer cultural identity, which is reflected in traditions, livelihoods, and festivals. It is believed that the Khmer Angkor civilisation and many temples could not have prospered without the rich natural resources of Tonle Sap Lake as a source of wealth. Evidence of the lake's cultural influence can be found in the bas-relief of the Bayon temple.

Recognising the ecological, economical, and socio-cultural value of the lake, the Royal Government of Cambodia decided to designate the whole Tonle Sap Lake as a Biosphere Reserve under the Man and the Biosphere Programme of UNESCO in October 1997.

Tonle Sap Biosphere Reserve zoning

Based on present land-use, vegetation cover and biological hotspots, Tonle Sap Lake is divided into three core areas, a buffer zone and a transition area.

The core areas are located in Prek Toal, Boeng Tonle Chhmar, and Stoeng Sen. The three core areas are characterised by preserved flooded forests, a rich river system and high biodiversity. Nearly 100 waterbird species are found in the areas, a dozen of which are considered of international significance. Besides rich fish stocks, the areas are known for wildlife species such as crocodile, turtle, macaque, capped langur, otter, water snakes (including python and king cobra). The areas are currently used mainly for fish production, wildlife hunting, and firewood collection. The total population living inside the three core areas is about 2,000, mainly in Boeng Chhmar core area.

The buffer zone is covered largely by flooded forest with high biological productivity, especially fish. The area is divided into fishing concessions, which are auctioned every two years

to private businessmen. Competing land-use practices are agriculture, human settlement, navigation, firewood production and aquaculture. The population is about 100,000.

The transition area is the agricultural belt surrounding the lake, where rice farming is practised. Rapid urban and agricultural development, with increased use of pesticides and fertilizers in the area, pose a threat to the flooded forest and water quality.

The management challenge for Tonle Sap Biosphere Reserve

Core areas

In the Biosphere Reserve context, the core area usually corresponds to a national park or wildlife sanctuary, where conservation and protection are the priority. However, the core areas of Tonle Sap Biosphere Reserve are demarcated within the concession areas (called fishing lots), which are auctioned to the private sector. This is no doubt contradictory to the conservation policy for the core areas. However, the present Cambodian economic and institutional conditions do not allow translation of the policy into immediate practice. In the case of the core areas of Tonle Sap Biosphere Reserve, conservation programmes would have to be introduced step by step along with fishing lot practices without causing feelings of rivalry with and among the stakeholders concerned. The first step will be to elaborate a legal and institutional arrangement which enables relevant government agencies to work together in a coordinated and cooperative manner. Meanwhile more research and monitoring activities will be conducted to build knowledge for proper decision-making. The following risks have been identified:

- When the fishing lot system is allowed within the core area as stated above, there is a fear of disputes or of an uneasy working relationship between the fishery department and the conservation department. The fishing lot owners may be reluctant to cooperate with the conservation team because of short-term economic interest.
- The research and monitoring activities may be hindered by limited access to the core area during the fishing operation. The results of research or monitoring efforts produced by the conservation team may not be accepted by the fishing lot owners or the fishery department.

*Tonle Sap Lake in Cambodia has a remarkable hydrological regime. In September, at the height of the monsoon, the lake swells to five times its size, covering an area of 12,000 km² with a maximum depth of 8–10 m.
Photo: Worm Sorensen.*





The fisheries of Tonle Sap Biosphere Reserve are some of the most productive in the world, providing Cambodian people with more than 60% of their protein intake. Photo: Han Qunli, UNESCO.

- It may take a long time before consensus is reached between the government agencies involved and before an integrated management plan incorporating conservation regulations and fishery law is adopted.

Buffer zone

The buffer zone is divided into two: the flooded forest and the open lake. Fishing concessions are the major form of 'land-use' in the buffer zone. Because of the seasonal flooding, some parts of the buffer zone are also used for farming dry season rice, lotus plantation, mung bean, vegetables and other crops. Conflicts between stakeholders over land-use often occur, because of the lack of adequate land-use policy or integrated management.

Fishery law is the dominant legal instrument for natural resource management in the buffer zone. The current fishery law has not been changed for nearly a century and is now too outdated to address the emerging problems such as environmental change, population increase, and development and conservation needs.

Uncontrolled trade with neighbours and a poor market system increase the pressure on Tonle Sap Lake's natural resources, especially fish and wildlife.

Furthermore, inequitable sharing of resources is causing conflicts among stakeholders. Most of the rich fishing grounds are granted to concessionaires for exclusive fishing rights (fishing lots), leaving only small areas with poor fish productivity for local communities to earn a livelihood. The fishing lot boundaries are demarcated without regard to the traditional rights of local communities. To fulfil their basic needs, people exploit other resources including wildlife and forests, and practice farming, all of which contributes to the reduction of fish stocks. Some fishermen illegally fish in the fishing lots, which result in conflicts with fishing lot owners. With the general population increase, the diminishing fishing stock for the local population threatens a further worsening of the standard of living, leading to social unrest and instability.

Unclear land tenure arrangements are another issue within the buffer zone. Because of the seasonal flooding, the same area is subject to different land-use, namely fishing in the wet season and rice or upland crop farming in the dry season. The alternate use-cum-ownership with

no sense of responsibility can easily have disastrous consequences. Indeed, during their short period of use-cum-ownership people try to maximise benefits by over-exploiting resources, knowing that the resources will soon be transferred to another owner.

The low education level and poor social organisation of local communities are the main obstacles for promoting community-based management of resources. No committee or association has been established to represent the interests of stakeholders. The reason is not only the lack of capacity of the community itself, but also the lack of support from the government. Capacity-building and appropriate technical support are required if community-based management is to function in the long run. The community should have the skills to plan resource development, equitable resource sharing, financial accountability, conflict resolution, resource control and monitoring. At the same time efforts should be made to empower communities in decision-making.

Transition area

Land encroachment for agricultural purposes from the transition area into the buffer zone poses serious threats to flooded forest and the fish stock of the lake. Moreover, intensive agricultural production would lead to an increase in fertilizer and pesticide use, reducing water quality.

The majority of people living in this zone are subsistence farmers with an average land holding of about one to two hectares. These farmers also rely on the lake's resources and traditionally migrate to the buffer zone during the dry season for firewood collection, wildlife hunting, and fishing to meet their own needs after the rice has been harvested.

Lack of environmental consideration and poor coordination among government agencies and provincial authorities may lead to uncontrolled development such as logging, irrigation, dam construction, agriculture, navigation facilities, infrastructure, factories, and oil and gas exploitation around Tonle Sap region, which would have adverse effects on the lake's ecology.

Ongoing efforts

Legal issues

A draft royal decree for Tonle Sap Biosphere Reserve has been developed as a legal basis for the implementation of the Biosphere Reserve concept. The critical elements of the draft decree are the formulation of directions and a management framework for each zone, an inter-ministerial coordination body, and institutional arrangements for implementation. The draft decree is still under discussion by an inter-ministerial working group. The major points of the draft decree are as follows:

- The core areas are defined to conform to a national park or wildlife sanctuary, which is devoted to long-term protection and conservation of natural resources and the ecosystem, in order to preserve flooded forest, fish, wildlife, the hydrological system, and natural beauty. Scientific research, monitoring and ecotourism are allowed in the core areas. Activities that would cause degradation and destruction of biodiversity are not permitted.
- Fishing lots within the core areas of Tonle Sap Biosphere Reserve will continue to function in accordance with the Fishery Law, while the fishing lot owner must be committed to the long-term conservation objectives as defined above. These fishing lots are then subject to a periodic review every four years in order to develop a viable management plan that allows them to function in a compatible manner with the protection and conservation objectives of the core areas.
- The buffer zone surrounding the core areas is covered by flooded forest comprising a variety of species. Activities are managed so as to be consistent with the protection and conservation plan for the core areas. Fishery activities and other development plans will be managed on the basis of existing law and regulations in a coordinated and cooperative manner. The buffer zone is also subject to experimental research on methods for the

management of flooded forest, fishery, agriculture, housing settlement, land-use, and navigation to ensure sustainability and increased production, while preserving environmental quality.

- The flexible transition area is the integrated economic zone, which is managed for sustainable agriculture, human settlement and land-uses, without having adverse effects on the flooded forest, water quality and soils of the region around Tonle Sap Lake.

Institutional arrangement

The most difficult aspect of the Tonle Sap Biosphere Reserve concerns the allocation of responsibility among different agencies, especially between the Ministry of Agriculture and Fishery and the Ministry of the Environment. According to the last version of the draft royal decree, the Ministry of the Environment should be the lead agency in the preparation of the protection and conservation plan for the core areas, while the buffer and transition zones are managed through line-agencies.

Inter-ministerial coordination

The Technical Coordination Unit for the Tonle Sap (TCU) has been working since its establishment in 1996 to promote and develop the Tonle Sap Biosphere Reserve. Based on this coordination mechanism, it has been proposed under the draft royal decree to create a secretariat (or subcommittee) for Tonle Sap Biosphere Reserve under the Cambodian National Mekong Committee (CNMC), which would further promote coordination at the decision-making level. The major task of this secretariat would be to coordinate all stakeholders involved in the management of Tonle Sap Biosphere Reserve, to assist the adoption of a strategic policy towards sustainable development, and to play a facilitating role in conflict resolution. The secretariat, through CNMC, would also help build partnerships with regional bodies such as MRC for the incorporation of Tonle Sap Biosphere Reserve into regional planning.

The Cambodian Government is using an adaptive ecosystem management approach to Tonle Sap Lake, seeking to develop long-term planning and goals at the same time as addressing immediate and critical needs such as hunger, poverty and shelter. Photo: Han Qunli, UNESCO.



Incentives for conservation and sustainable use

Some initial activities, including identification of community natural resources use, participatory workshops, and conservation of critical resources have been undertaken at the provincial and local level. In one of the communities living adjacent to the Prek Toal, core area alternative economic activities have been developed – with the help of credit schemes – in aquaculture, stock rearing and ecotourism. The aim is to encourage local communities to embark upon alternative options (although there are not many) and opportunities that are more environmentally friendly and economically viable than harmful activities such as forest cutting and waterbird hunting. Successes have been achieved, for example waterbird hunting and forest felling have been significantly reduced in Prek Toal Core Area. According to a three year census, the number of important bird species increased significantly. This in turn offers an opportunity for ecotourism promotion. Ecotourism has been initiated by the TCU and a local NGO since 1999, and has already brought additional income to the local population. The potential of ecotourism could in the future challenge the traditional fishing practices, once services, infrastructure and a management plan are in place.

Conclusion

The Tonle Sap Biosphere Reserve nomination is endorsed by almost all government agencies, but obstacles still exist. Preparation of legal and institutional frameworks is the first priority to guarantee long-term promotion and development of the reserve. Although difficulties are being encountered at this stage, the establishment of the inter-ministerial working group signifies the interest of the concerned agencies in consensus building and further cooperation. Meanwhile, successes have been achieved at the local level in the involvement of a community in the conservation, research, and wise management of a selected area – Prek Toal Core Area. The success of Tonle Sap Biosphere Reserve also depends on the ability to build partnerships with key stakeholders, particularly in fishery and agriculture, and on devising management regimes which incorporate key sustainability factors, including social, cultural, economic, and environmental considerations. If the royal decree is passed, the next stage would concentrate on the development of an integrated management plan for the core areas, incorporating biodiversity conservation and improved management of fishing lots, in combination with the exploration of opportunities for ecotourism. In addition, research and monitoring programmes, environmental awareness programmes, community empowerment and the promotion of wise stewardship will continue.

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Clayoquot Sound, Canada – new economic opportunities for different social groups – Jim Birtch

Clayoquot Sound is another example of where the establishment of a Biosphere Reserve has led to improving economic opportunities and providing concrete benefits for the local communities.

Clayoquot Sound, declared as a terrestrial and marine Biosphere Reserve in 2000, covers approximately 350,000 ha on the west coast of Vancouver Island, British Columbia. Over 50% of the 5,000 residents of the area are First Nations (aboriginal), with about 3,000 living in two modern villages and the rest in aboriginal communities.

The traditional economy of forestry and wild fishing has been significantly curtailed by closures because of environmental protests and by resource depletion. New employment, however, has come in the form of tourism (1 million visitors) and aquaculture, though most of this benefits only one community (Tofino). Unemployment is high and reaches 80% or more in traditional aboriginal communities. Cultural differences exist between those communities and others in the region; social differences exist, as well, between highly educated newer arrivals from urban areas and longer-term residents who depend on resource extraction for work.

The Biosphere Reserve proposal grew out of government attempts to end protests and blockades over the cutting of old-growth forests, and to address serious economic problems. The provincial government and Nuu-Chah-Nulth First Nation formed a board to review development plans and forest practices, and which led to the Biosphere Reserve proposal.

The Biosphere Reserve provides a focus for cooperative initiatives in the area. A joint venture corporation, with 51% aboriginal ownership, carries out sustainable forestry, while a wholly-owned aboriginal company explores new work opportunities. Another venture employs former loggers to rehabilitate salmon streams. The federal government provided \$12 million for a trust fund to support Biosphere Reserve activities of research, education and development, while encouraging cooperation.

The Biosphere Reserve – an experiment in conservation, sustainable development and capacity building – thus addresses the needs of Clayoquot Sound's varied social and cultural groups.

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Biosphere Reserves for developing quality economies: the Fitzgerald River Biosphere Reserve, Australia

GILES WEST

This article describes the quest to develop quality economies in the Fitzgerald River Biosphere Reserve. The 2,500 people living in this Biosphere Reserve depend mainly on primary agricultural production. Today their livelihoods are threatened due to declining terms of trade and increased debt burdens associated with large-scale cropping. The Biosphere Reserve concept may provide opportunities to revive the local economy. Along with diversifying production, the image of the reserve offers possibilities for branding agricultural products. Furthermore, it offers opportunities for developing tourism as an alternative source of income.

THE FITZGERALD RIVER Biosphere Reserve lies on the southern coast of Australia, some 450 km south of Perth and 200 km east of Albany. It consists of an area of 1,354,630 ha of which 48% is National Park. With the exception of some areas of Shire and Crown owned land, the remainder is privately owned.

Both the park and the Biosphere Reserve owe their existence to an inspired, concerned and responsible community who over the years have fought long and hard to protect the unique gene resources from the exploitation of tempting mineral resources. It would be incorrect to disregard the role of Government agencies in this process, but community input has been and continues to be significant.

Approximately 2,500 people live in the Biosphere Reserve. Their livelihoods are almost all directly or indirectly connected to primary agricultural production. Today these livelihoods are threatened. The Biosphere Reserve concept, however, may provide opportunities to revive the local economy. One of the tasks of the Biosphere Reserve management is to promote the significant value of the reserve, particularly its terrestrial and marine diversity, image, and its role as a place for recreation and as an important source of livelihood in the future.

Biodiversity in the Fitzgerald River Biosphere Reserve

The soils of the Biosphere Reserve are an ancient and fragile mix mainly duplex in nature. Sand, clay and gravels form the topsoils. Areas of ancient granite protrude and bands of rock dykes give rise to complex drainage systems and water tables. Much of the landscape has huge natural accumulations of saline groundwater at depth, and a curious and complex mix of fresh and saline areas, creeks and rivers.

Rainfall has for some considerable time been low and erratic. A wonderful range of plants and animals has adapted to these relatively demanding conditions. Diversity abounds within the core area but has also survived to varying degrees in the remaining natural and introduced vegetation of the buffer zone and “zone of cooperation”.

The Fitzgerald National Park, which constitutes the core area of the Biosphere Reserve, carries some 1,784 species of plants, 75 unique to the area. Sharing this area are 22 mammals, 41 reptiles and 184 bird species. Spring brings a profusion of flowers and right and humpback whales regularly visit the bays between July and October. Access to the park is by well-graded tracks and some four-wheel drive tracks. No road runs through the entire length of the park, although this has been proposed. The Department of Conservation and Land Management (CALM), which manages the park, provides basic camping facilities, walking trails and whale viewing platforms. The park also has a concerned community group, The Friends of the

Fitzgerald, who maintain a field studies centre and alert CALM to issues related to the management and development of the park.

The terrestrial diversity has been mapped and a CALM-sponsored marine study indicated a rich diversity under water. The community is currently engaged in a marine monitoring and mapping exercise of the Bremer Bay area with a local dive operator.

Diversity is being protected and enhanced in a number of ways by both Government agencies and the community. Fox baiting and feral cat control has led to a significant increase in marsupials and indigenous birds such as the mallee fowl.

Community-led fencing of remnant vegetation and replanting have assisted in water table management and wind erosion control, and have provided sanctuary for wildlife. Rabbit baiting has greatly reduced crop losses and has also reduced damage to areas of regeneration.

The 'Gondwana Link' is an exciting new proposal that aims to revegetate two significant corridors linking the Stirling Ranges further to the west with the Fitzgerald River Biosphere Reserve. Once linked there will be virtually continuous habitat from Cape Leeuwin to Cape York. This will significantly contribute to the value and image of the Fitzgerald River Biosphere Reserve.

The community and the economy

Community attitudes towards the Biosphere Reserve concept are mixed these days. There is a not unusual division between the 'green' and the 'production' sections of the community. In reality they are not as far apart as they would like to think. An environmentally concerned minority of the community, labelled as 'green', has been instrumental in the development of the Biosphere Reserve. The 'green' perception has not always been constructive in promoting the sustainable use issue, but both sides now realise that a practical compromise has to and can be reached.

Farmers and other primary producers are the main source of the social and economic health of the Biosphere Reserve. The emphasis of production and production systems has changed

In the Fitzgerald River Biosphere Reserve, increased soil salinity and wind erosion result in deterioration of water quality in the Fitzgerald River and the adjacent marine systems, thus calling for a holistic approach to the care of land and water resources. Photo: Steve Janicke.



significantly over the years, though these changes have often been 'just in time' and driven by impending crisis.

The current production areas were cleared in a number of stages but the two principal clearances occurred in the early 1950s and again in the early 1960s. Clearing was a fairly indiscriminate process characteristic of the period and, after an initial rush, continued sporadically until the late 1980s. Further clearing is strongly discouraged these days and the remaining and frequently fragile natural remnants provide important wildlife corridors. The adoption of 'no till cropping' has greatly reduced wind erosion.

The decline in wool prices led to the adoption of extensive cropping systems and reduction in pasture. While farmers made significant strides forward in productivity, any gains have been more than cancelled out by declining terms of trade and significantly increased debt burdens associated with large-scale cropping. Once again, in the face of impending crisis farmers are adopting a more diversified production base, reducing exposure to risk both financially and environmentally.

Though agriculture remains the dominant economic activity, a number of alternative sources of income have been developed over time. A small but expanding industry harvesting inland crayfish and coastal abalone is developing along with the production of seed potatoes and vegetables. These are minor contributions to the local economy but have the potential to expand and, being high in added value, will be labour-intensive.

Plantation forestry (blue gums) has been established in a small section of the 600 mm rainfall area of the Biosphere Reserve, and is the subject of much controversy within the community. Maritime pine suits some of the drier areas and has been planted in a very limited way.

Indigenous plants such as mallee eucalyptus show potential for biomass production and carbon fixing credits. Oil, gums, sandalwood and a variety of 'bush' foods also show potential for development but in all cases these options have to be developed and promoted further.

There is a small but growing sector of the population in the two coastal towns. They often bring new ideas and enterprises, but expansion of these initiatives is often hampered by initial lack of customers, distance to markets, local scepticism and regulation. Investors are increasingly interested in land for development and this is reflected in coastal land prices.

The Landcare movement

The Landcare movement¹ was born out of the need to address wind erosion and other environmental issues facing the community. It enjoys considerable power at the local and State level with the respective Minister responsible for addressing issues raised by the Land Conservation District Committees (LCDCs) that were established by the movement.

The Jerramungup LCDC was formed in 1983 and has been instrumental in encouraging farmers to address wind and water erosion, implementing initiatives for managing ground water and salinity, protecting remnant vegetation, encouraging farm and catchment group planning, and feral pest and weed control.

Farming groups have been encouraged to organise themselves in natural catchment areas and to follow through a "focus catchment planning process". This process assesses the state of the resources, the potential for production and management options. This is a community-led and managed process with assistance from Agriculture Western Australia, Water and Rivers and other agencies which provide specialist technical support for the groups in catchment assessment and planning, and guidance in fund-raising.

1. Landcare Australia is a non-profit company, set up 'at arms length' from the Government with two main aims: 1) raising awareness of, and participation in, landcare and landcare issues; 2) raising funds and resources for landcare projects. (www.landcareaustralia.com.au)

In times of poor financial returns, it is difficult to demonstrate direct benefits from Landcare particularly when planning and budgets rarely go beyond a season. Recent years have seen an increasing reluctance by farmers to continue to adopt Landcare and responsible production techniques, and this is particularly evident as farmers reach retirement age and the younger generation sees little reason to work so hard for so little.

Challenges for the future

The Biosphere Reserve economy is currently almost entirely dependent on agriculture, which is in gradual decline. The next generation of farmers needs to see a significant increase in return on investment if they are to remain in the industry. Branding was seen as a way to assist in improving product differentiation with the potential to maintain at least market share and possibly also prices.

Another challenge ahead will be to reduce dependence on primary production, and develop tourism and other industries so as to diversify and expand the local economy. The potential is there; the challenge is to change community perception and encourage investment in these new livelihoods.

Tourism and ecotourism

Bremer and Hopetoun are popular local (and increasingly state-wide) tourist destinations offering a range of activities including fishing and scuba diving. The Fitzgerald National Park appeals to those keen on natural history, wilderness and fishing. Accommodation exists in various forms but is in short supply, and it is generally considered that there is potential for growth. Realisation of that potential will depend upon convincing the local community that it is a serious service industry, and also on promotion work to encourage potential tourists to visit the area.

Diversification of livelihoods

This will be essential for the economic and environmental future of the Biosphere Reserve. New crops and cropping systems, new primary and value-adding industries need to be adapted and adopted. Necessity has always been a key impetus to change, and the current low returns on primary production are sending clear messages to the community of the need to diversify. It will be important to encourage people to try to remain in the Biosphere Reserve rather than to move away. An essential ingredient will be a sense of belonging and pride in the area and the Biosphere Reserve image will be important here.

Branding

Consumers have become more discerning, less price-conscious and more aware of global issues in recent years. Increasingly products are marketed with an image or brand. This is particularly useful where there is currently little product differentiation, a characteristic of many agricultural primary products. The role of branding in assisting the marketing process is clear but has to be promoted to the community.

There are a number of important issues currently facing primary producers. State-controlled bulk product marketing systems are likely to be deregulated in the near future. As consumers become more discerning, the demand increases for product quality assurance. This is an ideal opportunity to promote branding as a tool for marketing. Essentially branding is all about quality assurance and can take into account not only quality but also the social and environmental commitment of the producing community. The Biosphere Reserve image has great potential to enhance this process.

The Fitzgerald producers and community have been discussing brand development for almost a year and after several false starts have made some progress. The main constraint has

been scepticism and confusion about the differences between selling, markets, marketing and branding and labelling.

A core group of community champions recently formed and established a vision: "To have a recognised image that inspires our community to responsibly produce market-edge products". Following the funding of a pre-feasibility study, an unsuccessful attempt was made to obtain funds to launch the development of the image and brand. Despite this setback, the group decided to take a less ambitious approach and is currently:

- promoting the concept locally;
- establishing contacts and linkages with similar branding initiatives and;
- working on a funding submission for product identification and promotion.

There may be advantages to this long-term approach which is encouraging greater community participation.

Cultural issues and revival

Related to the issue of branding is the cultural history of the Biosphere Reserve. The area has two distinct cultural histories: that of indigenous land-users and that of the very recent settlers and landowners. It would be difficult to find two cultures with such differing characteristics and approaches to resource use. These differences have been graphically demonstrated by the changes in the landscape and long-term economic and ecological viability in the last 50 years. Revitalisation of local indigenous culture and an appreciation of settler history can both contribute to a positive local identity and image.

The history of the indigenous land-users is poorly documented and evidence is difficult to find. Some information was recorded by early settlers but there is an urgent need to trace indigenous history and to understand the approaches to resource use which appeared to be sustainable.

By contrast the history of farmer settlers has been relatively well recorded, though in a rather fragmented fashion. Various local oral history recordings have been made and others are being proposed before some of the older members of the community pass away.

Education and awareness

It is possible that awareness of the Biosphere Reserve is least developed locally. Education and awareness-raising amongst all age groups in the community is essential along with maintenance

Primary schoolchildren monitoring river biodiversity as part of an environmental education project sponsored by Agriculture Western Australia Water and Rivers Commission and the Education Department. Photo: Elspeth Anne West.





Schoolchildren's field trip to enhance awareness of soil quality. In the Fitzgerald River Biosphere Reserve, soils have been degraded due to the removal of native vegetation and the introduction of shallow-rooting cereal crops. Photo: Elspeth Anne West.

of local identity and image. Youth not only has a vested interest in ensuring the conservation of resources for the future but is also a potential source of guardians and ambassadors for the Biosphere Reserve. Pride in being part of a Biosphere Reserve will hopefully be an important ingredient in the future.

Currently schools are targeted to increase awareness of Landcare and farming systems issues, as well as of the need to maintain and enhance diversity in the Biosphere Reserve. Agriculture WA and Natural Heritage Trust funds currently support Landcare education officers to work with and assist teachers and students in understanding sustainability issues and future implications.

Awareness among the adult population also requires development particularly during a period of economic decline.

Conclusion

A concerned core of the community has seen the value and potential of the Biosphere Reserve and the status it brings to an area. The task for the immediate future is to convince the wider community locally of the potential positive impact on many aspects of life.

Related to the above, promotion, education and general awareness-raising in all sections of the local and wider community of the Biosphere Reserve is essential. The value, potential and importance of helping to create a sustainable future need to be demonstrated to all, but particularly to the younger generations who have a vested interest in the future.

Primary production has been the mainstay of the local economy. This sector now faces both financial and longer-term environmental problems requiring an integrated and diversified approach consistent with a responsible social and environmental image. Support agencies have responded to this but further work is required. Diversification of the local economy is essential in primary production; value-adding and service industries including tourism and ecotourism need to be promoted.

Where communities have lost cohesion the Biosphere Reserve concept and branding can play an important role in developing ownership, local identity and an image to have pride in. The history of the area also becomes more important to the community and the values of local indigenous culture more relevant than ever. A Biosphere Reserve label has the potential to attract investment into the community provided investors can see that theory is reasonably well reflected in reality. The community needs to be aware of this potential.

A thriving Biosphere Reserve is a thriving community.

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Biosphere Reserves for developing quality economies: examples from the Rhön Biosphere Reserve, Germany – Doris Pokorny

The main concern of the Rhön Biosphere Reserve is the maintenance of cultural landscapes through traditional agriculture systems, currently threatened by a constant decrease in the number of farms and the income of the farmers. The natural conditions of agricultural production are too unfavourable to face international or even national competition.

The development of quality economies plays an important role in this context and can be characterised by different phases:

Phase 2

CREATING A PLATFORM FOR BUSINESS PARTNERSHIP

Instead of looking for product labels first (the discussion about this had been going on for years and was eventually abandoned) the Biosphere Reserve has been looking for business partners which contribute to the Biosphere Reserve idea in terms of innovative and environmentally friendly products and help create or safeguard jobs in our rural area.

The “Biosphere Reserve Business Partners” project was initiated by the Hessian administration of the Rhön Biosphere Reserve in 1998 and has a transboundary approach. It involves all types of businesses, e.g. farms, restaurants, hotels, grocery stores, crafts, tourist agencies and riding stables.

What are the criteria?

“Biosphere Reserve Business Partners” in agriculture must meet the EU Council Regulation (EC) for organic production of agricultural products, including livestock production (No 1804/99, formerly No 2092/93). Biosphere Reserve Business Partners found it fairly easy to adapt to this (already existing) criterion in catering activities, which were set up with local and external experts – a process which took about two years. Criteria for regional grocery stores are being developed.

Restaurants and grocery stores must offer a minimum number of products which come from Biosphere Reserve Business Partners. Thus links between the different business types are strengthened.

Biosphere Reserve Business Partners do not necessarily need to be situated inside the Biosphere Reserve as long as they contribute to the Biosphere Reserve idea. This aspect is important as it creates links between the Biosphere Reserve and the adjacent regions.

If necessary, all the criteria for Biosphere Reserve Business Partners will be adjusted as the project develops.

Phase 3

FUTURE PERSPECTIVES: INTRODUCING A GENERAL RHÖN BIOSPHERE RESERVE LABEL

As a further step the Rhön Biosphere Reserve is trying to combine the Biosphere Reserve Business Partners scheme with an overall concept of Biosphere Reserve labelling, which should:

- be product/service related rather than simply focused on businesses;
- enable the marketing of a variety of regional products in regional supermarkets, which is an important aspect as most customers do their shopping in supermarkets;
- enable the integration of non-food products or services.

In order to meet the financial needs of setting up management structures and advertising campaigns, the Rhön Biosphere Reserve is planning to apply to the EU for funding for a project in the framework of LEADER+.

Phase 1

DISCOVERING THE AREA'S POTENTIAL AND INITIATING MODEL PROJECTS

We have been looking for a range of agricultural products which could become important in terms of regional marketing. Projects concerning the Rhön sheep or the Rhön apple are good examples. Processing and marketing of these products both to the private consumer and local restaurants has been successful.

However, most of these initiatives are just pilot projects depending on a few local actors, and most of the projects concern mainly agricultural businesses. Furthermore, consumers do not necessarily notice that the products are linked with the Biosphere Reserve.

How are Biosphere Reserve Business Partners organised?

All businesses wishing to become Biosphere Reserve Business Partners apply to the Private Biosphere Reserve Association (Hessen). If they meet the criteria they are authorised to use the partnership sign; first however, they have to join the Biosphere Reserve Association. Biosphere Reserve Business Partners are controlled by an independent agency. Where possible already existing control systems (e.g. the EU control system for organic farming, the EU eco-management and audit scheme) will be applied.

So far 20 farms and one brewery have become Biosphere Reserve Business Partners, and ten restaurants have applied for this status.

Problems

Biosphere Reserve Business Partners pay membership and control fees. In turn they are expecting support from the Biosphere Reserve Association for advertisement campaigns. Those costs, however, can only partly be covered by membership fees. This means that additional funding will be necessary.

Only a small percentage (less than 1%) of all farms in the Biosphere Reserve are organic farms and meet the criteria for Biosphere Reserve Business Partners in agriculture. Critics blame the criteria as being too strict and inappropriate since they exclude the majority of farms in the Biosphere Reserve, although these contribute substantially to maintaining the landscape.

Lessons learned

The Rhön Biosphere Reserve is still experimenting, but at this stage it seems advisable to:

- create labels (and criteria) for both products/services and businesses;
- discuss criteria sufficiently but not forever. Criteria should refer to the major Biosphere Reserve goals and not be too strict or exclusive. External consultants play an important role in this process;
- apply criteria which are simple but precise enough to be controlled. The adoption of already existing criteria (e.g. the EU Council Regulation for organic production, the EU eco-management and audit scheme [EMAS]), which can again be linked to defined control mechanisms, seems to be the most efficient approach.

Conclusions

Dealing with three (independent) Länder in the Rhön Biosphere Reserve, it is very difficult to agree upon a common label, criteria or evaluation procedures. In this respect the Rhön Biosphere Reserve is faced with the same difficulties as any transboundary Biosphere Reserve.

The Rhön Biosphere Reserve is grateful for any ideas, suggestions or examples. Please contact: Doris Pokorny, Rhön Biosphere Reserve, Oberwaldbehringer Strasse 4, 97656 Oberelsbach, Germany. Tel: 49 9 774 910 212. Fax: 49 9 774 910 221. E-mail: doris.pokorny@brrhoenbayern.de

Education, awareness-building and training in support of Biosphere Reserves: experience from Nigeria

B.A. OLA-ADAMS

In this article, the author discusses the multitude of education and awareness-building activities that have been organised in the Omo Biosphere Reserve in Nigeria. The audiences addressed range from primary school children to university students, managers and policy-makers. The author stresses the need for an integral treatment of biodiversity conservation in education curricula. He furthermore argues that in the Omo Biosphere Reserve the success of awareness-building campaigns resulted from integrating local, traditional knowledge of the environment with income generating projects based on the sustainable use of Omo's natural resources.

BIOSPHERE RESERVES provide a broad array of environments – both natural and anthropogenic, ranging from biologically diverse natural areas to extremely artificial ecosystems – that may be utilised as field laboratories for environmental education and educational research.

Through the development of pilot projects focusing on problems of local and national importance but also of regional and international relevance, MAB has met the demands of various countries with different socio-economic and cultural conditions for adequate research support to plan the sustainable use of natural resources. It was in pursuance of this objective that UNESCO-MAB initiated the UNESCO project “Biosphere Reserves for Biodiversity Conservation and Sustainable Development in Anglophone Africa (BRAAF)”, financed through funds-in-trust from the Federal Ministry of Economic Cooperation and Development (BMZ) of the Federal Republic of Germany and contributions in kind from the Governments of Ghana, Kenya, Nigeria, Tanzania and Uganda. The first phase of this project was implemented between June 1995 and December 1998.

Common environmental problems and sustainable management of natural resources are best addressed by information sharing. This is supported by the establishment of an international network of Biosphere Reserves in the five countries – Bia (Ghana), Amboseli (Kenya), Omo (Nigeria), Lake Manyara (Tanzania) and Queen Elizabeth (Uganda).

This paper reports on education, awareness building and training with respect to the BRAAF Project, specifically in the Omo Biosphere Reserve in Nigeria.

Omo Biosphere Reserve is located between 6°35' to 7°05'N and 4°19' to 4°40'E in the south-west of Nigeria, about 135 km north-east of Lagos, 129 km east of Abeokuta and 80 km east of Ijebu-Ode, and covers 130,500 ha. The Omo Strict Nature Reserve was established in 1948 and in 1977 the area was designated as a Biosphere Reserve.

Environmental education

Environmental education aims, through a systematic approach and interdisciplinary methods, to train people to show greater respect for natural balances, and to awaken their awareness of their relations with the environment.

The objectives of environmental education in respect of the human environment should be:

- (1) to promote knowledge of the structure, functioning and limitations of the human environmental systems;
- (2) to make a critical assessment of humanity's relations with nature.

Environmental education should be aimed to promote and/or reinforce attitudes and behaviour which are compatible with sound environmental resource management.

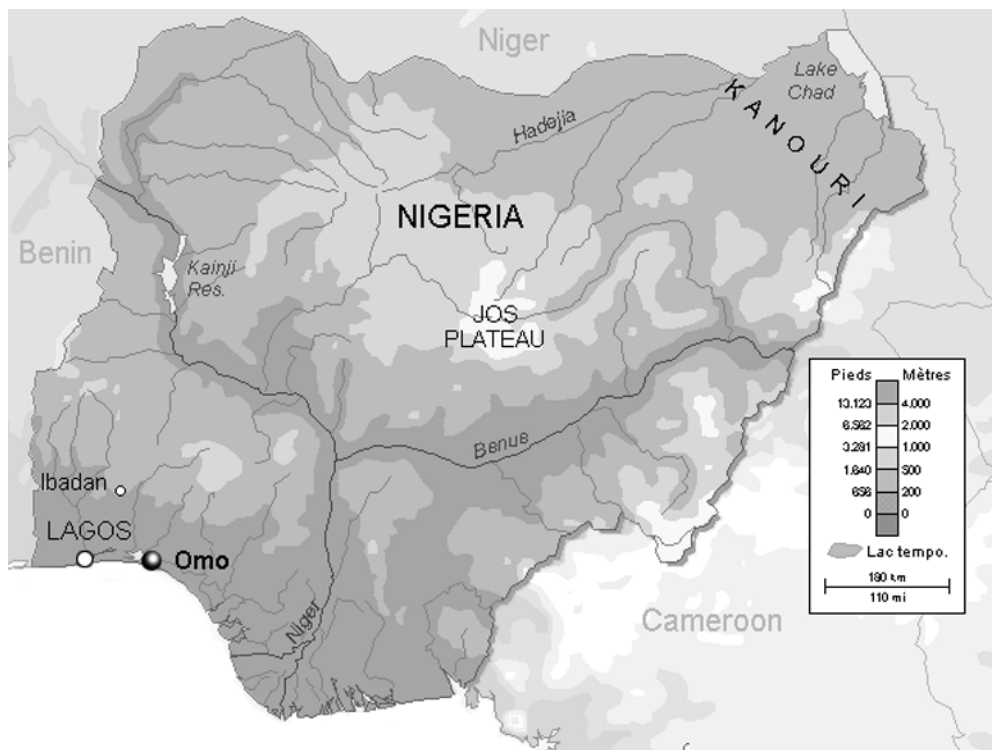
The use of Biosphere Reserves for ecological education and training purposes is facilitated by the fact that a great deal of practical experience and research into the ecosystem, flora and fauna has been accumulated over the years.

Experience in the Omo Biosphere Reserve

Environmental education in Biosphere Reserves involves the exchange of professional knowledge at seminars, colloquiums and meetings devoted to particular problems of biodiversity conservation and sustainable utilisation. The BRAAF Project was based on a multi-disciplinary approach involving natural and social scientists and shared staff in several national institutions in each participating country, including national environmental agencies, conservation authorities, university departments, extension officers, Biosphere Reserve managers, national parks managers and technical staff. This cooperative effort involved the participation of local people, planners and policy makers. It drew on the expertise and resources of various donors and technical assistance programmes and agencies in several countries (Gilbert 1983). Four international seminars/meetings were held in Kenya, Ghana, Tanzania and Uganda involving participating national BRAAF team leaders, Biosphere Reserve managers, environmental scientists and representatives of UNESCO. These seminars afforded the participants first-hand experience of the management of a Biosphere Reserve in a different country and situation, and allowed for the sharing of environmental conservation management experiences among African countries and interactions with the inhabitants of the Biosphere Reserves during field visits.

Environmental education in the Omo Biosphere Reserve addresses many different audiences. Awareness-building among schoolchildren through their involvement in practical activities in nature conservation was one of the environmental education objectives (Ola-Adams and Ijalana 1994). This encompassed included field trips to nature trails, wildlife domestication, growing of

Map of Nigeria showing the Omo Biosphere Reserve.



tree seedlings in school nurseries and tree planting in and around school compounds. An NGO, the Forest Elephant and Wildlife Survey and Protection Group (NFWSG), started a conservation programme in primary schools. The programme operates within a formal education setting, under the control of the State Primary Education Commission. The Group employed staff who went around the schools teaching courses in conservation and organising field trips for staff and students. The group also established a snailery project and tree nursery in the schools. Four primary schools and one secondary school participated in the project. Each school was allocated snail cages, snails, feeding and drinking troughs, snail feeds, hatching boxes and tree seedlings. In most schools fruit trees were planted around the school farms.

Omo Biosphere Reserve furthermore serves as an excellent training ground for students during their Students' Industrial Work Experience Scheme (SIWES) which covers between six months and one year depending on the institution. Students from technical colleges (Colleges of Forestry and Wildlife) undergo practical training in tree identification, forest surveying, ecological surveying, timber harvesting, sawmilling and woodworking. Students from various universities also carry out their industrial attachment assignments in the reserve. Practicals are organised in forest pathology, forest entomology, ecological surveying, wildlife surveying, taxonomy, utilisation of forest products and the socio-economic aspects of the Biosphere Reserve.

A group of university students receives training on natural resource management in the Bia Biosphere Reserve, Ghana, one of the Biosphere Reserves participating in the BRAAF project. Photo: Thomas Schaaf, UNESCO.





Biosphere Reserves constitute excellent field laboratories for research and environmental education.
Photo: Thomas Schaaf, UNESCO.

Undergraduate and postgraduate students carry out their research projects on various topics to fulfil their study requirements. Scientists and specialists also carry out scientific studies on the Omo Biosphere Reserve as one of the main sites for research into the dynamics of the Nigerian forest ecosystem.

Several national training and scientific workshops were held in Nigeria in connection with the BRAAF Project. A training workshop on “Biodiversity Inventory and Monitoring” was organised which included participants from local communities, schools in the reserve, research institutes, parastatals and private industries operating within the reserve (Ola-Adams and Ojo 1996). A training seminar/workshop on “Wildlife Domestication” was held in 1997 to train some hunters and interested inhabitants of selected hunting camps/villages in the domestication of snails and grasscutters.

A workshop on “Biosphere Reserves Integrated Monitoring (BRIM)” was held in 1998. This included instructions on modern techniques in biodiversity data collection and analysis, computer applications and field trips. The participants at the workshop included park managers from all six National Parks, scientists from research institutes and universities and staff of state and federal forestry services.

Like Nigeria, other BRAAF participating countries held a number of national scientific seminars and training workshops. These seminars and workshops were used to sensitise local people to the BRAAF Project and to interact with them regarding their specific economic needs and aspirations with a view to linking environmental conservation with income-generating activities.

At the end of the first phase of the project, a consultative seminar/meeting was held in December 1998 with resource persons, local people, NGOs, stakeholders in Omo Biosphere Reserve, and private and Government parastatals operating in the reserves, to deliberate on “Partnership in Sustainable Utilization and Conservation of Biodiversity in Protected Areas” (Ola-Adams 1998).

Lessons learnt from the BRAAF Project

There is a need to promote public awareness and understanding of the values of biodiversity conservation and utilisation. Inadequate publicity and understanding constitute a major obstacle to biodiversity conservation and sustainable use.

Biodiversity conservation is a new technical term for many governments as well as for citizens who lack basic knowledge of it. There is need for both formal and informal public education, and for in-service training for government personnel to convey the existence and importance of biodiversity.

At present biodiversity conservation and environmental education do not form an integral part of the curricula at any level in Nigeria's schools. They are covered in such subject areas as forestry, wildlife management, fisheries, water resources management, at least in those universities which offer these courses. For a proper understanding of ecosystem management there is a need to integrate the natural and social sciences. The insights offered by economics, psychology, taxonomy, history, anthropology, political science and sociology should be harnessed for the benefit of conservation (McNeely 1996). There is an urgent need to develop teaching manuals and materials and to provide specialised training for teachers.

In a reappraisal of the responsibilities of a scientist in the developing world, Odhiambo (1993) suggested the empowerment of the poor to resurrect their will to self-improvement and self-realisation. This empowerment must include a decisive policy for investment in a different kind of education and training. The new education and training envisaged must reintegrate science into local people's own cultural endowment, equipping them to cope with the prevailing stressful geo-economic and geopolitical conditions.

The first phase of the BRAAF Project has completed inventories of the biodiversity and initiated some income-generating projects among local communities in the participating Biosphere Reserves. The income-generating activities have enhanced the living standard and welfare of the local communities and improved the incomes of individuals within these communities.

Through integrating research activities with dialogue with the local communities, the research teams observed that local people had a considerable amount of undocumented information about ecosystem structure and functioning. This cross-fertilization of ideas enhanced research findings to promote local community socio-economic development and conservation within the Biosphere Reserves.

The implementation of the BRAAF Project's activities has helped to remove the mistrust which existed between the local people, government at all levels and other stakeholders through amicable interaction on the same platform, created through focus group discussions and national seminars. This development has significantly paved the way for the fostering of a strong mutual trust and collaboration in the management of the Biosphere Reserves. It was also observed that integrating dialogue on conservation issues with purposeful support for income-generating activities within the communities produced very fruitful results. This approach has not only eliminated mistrust but has promoted the development of a spirit of partnership between the reserves' management staff and local people.

There is still a need, however, to monitor the impact of the project's support for income generation on the socio-economic status of the reserve. Women's participation in the ongoing income-generating activities has been rather low in all the participating Biosphere Reserves. There is thus a need to involve more women in the project's activities by providing training and support for women-oriented activities.

The preparation of communities for post-project operation and maintenance is inadequate within the framework of most donor-funded projects. This raises fears about a lack of sustainability after the project has ended.

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The Arganeraie Biosphere Reserve, Morocco: the tree against the desert

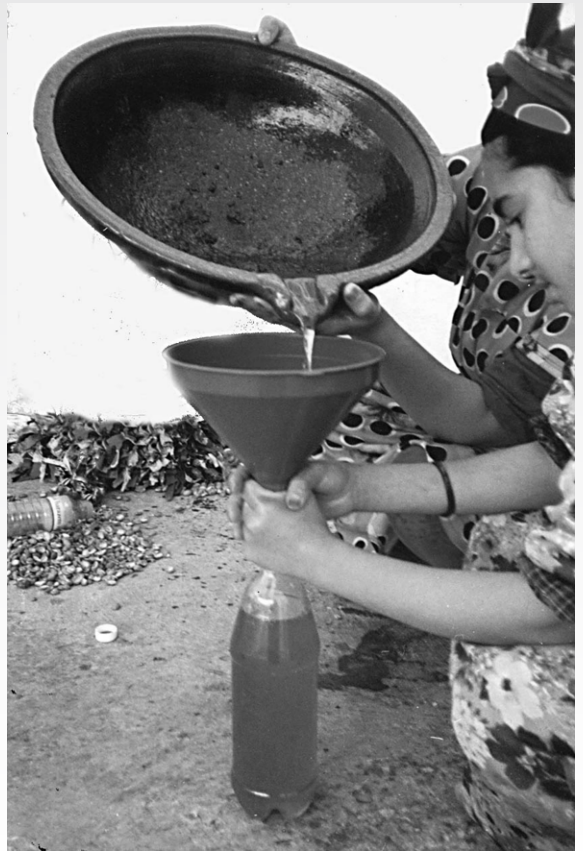
– Mounia Daoudi

The Arganeraie Biosphere Reserve was designated in 1998, covering almost three million hectares east of Agadir in southern Morocco. It is named after the argan tree (*Argania spinosa*), which is endemic to the region and is the pivot of a delicate balance between humans and nature that governs rural life and stops the desert spreading.

Known as the “miracle tree”, the argan supplies almost everything the inhabitants of this harsh terrain require. It is an excellent fuel, whose very heavy wood is good for cooking and keeps people warm on cold winter nights. It gives valuable shade and its leaves make high-quality fodder for goats. The fruit contains a kernel whose oil is highly prized for culinary purposes or can be used as a balm.

Its roots, which go deep down in search of the 100 or so millimetres of water it needs every year, allow it to thrive in dry, barren soil. It even sheds its leaves to reduce its water consumption. However, with the slightest rainfall, it quickly returns to the familiar bushy form that is such a striking feature of this part of Morocco. Argan groves once covered nearly 1.5 million hectares, but in less than 50 years, that area has been reduced by half. Each year about 600 hectares of trees are chopped down, leaving a bare lunar landscape.

The growing poverty of the two million people who depend directly or indirectly on the trees powerfully illustrates the threat of overuse and unregulated land clearance that repeated drought has sharply increased in recent years. Near the towns and in the villages, people no longer respect the old rule that the argan can be used but never chopped down.



Argan oil is extracted and processed by hand by women and can be sold for five times as much as olive oil. Photo: © Projet Conservation et Développement de l'Arganeraie (PDCA).

Vast numbers of the trees have been destroyed and replaced by fields of tomatoes, peppers and melons grown for export. Mohamed Benzyane, an engineer with the Ministry of Water and Forests, says people have sacrificed their long-term future for quick profit. He notes that the irrigation these farms need is exhausting the water table and rapidly making the soil too acid for agriculture, thus speeding up the advance of the Sahara Desert.

Many Moroccans have finally woken up to this alarming threat to the argan area. In Agadir, three university research teams have been working on the problem for the last decade but they have very meagre funding. Fouzia Bani-Aameur, Professor in genetics, notes that the way the tree reproduces is still a mystery. Its fruit will germinate in the laboratory, but it cannot be planted out successfully in its natural habitat. The saplings do not stand up well to the heat of the sun and more than 80% die within a year, despite the efforts of the Ministry of Water and Forests, which aims to reintroduce them.

Until the trees can be replanted on a large scale, the authorities are trying to make people aware of the urgency of looking after the argan groves. Women have already been persuaded, with some difficulty, to form themselves into cooperatives to produce and sell the oil from the tree, giving them a new source of income.

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Goats and argan trees are part of the same ecosystem in the south of Morocco. The goats help to disseminate the argan seeds. However, goat foraging must be controlled to avoid overexploitation. © Projet Conservation et Développement de l'Arganeraie (PCDA).

Biosphere Reserve manager or coordinator?

FRÉDÉRIC BIORET

Biosphere Reserve management must take account of the multiple functions of conservation, sustainable development for local communities, and scientific research, education and training. It must also accommodate changes over time. As such, Biosphere Reserves tend to be more complex and dynamic than classic protected areas and require a coordinator or moderator. However, a major problem is the need to enhance the visibility of the Biosphere Reserve coordinator. The coordinator's role is vast, going from the identification of a "common territory project" to which all stakeholders can subscribe, to resolving conflicts, setting up working groups on subjects of common concern, and promoting successful results. The use of a GIS can greatly help in this task.

OVER the last ten years, the Biosphere Reserve concept has evolved and in particular now gives more emphasis to local populations and human activities. This trend has led to the reconsideration of conservation objectives in the light of human uses, and planning management interventions in space and time to take account of these new considerations. Here, 'management' is understood to cover not only action to conserve natural, cultural and historic heritage but also action in the interests of local populations and different stakeholders. In Biosphere Reserves, the main challenge is to design a form of management based on identifying man-nature interactions which correspond to the interrelations between natural resources and various uses. The old conflict between nature conservation and economic development should henceforth be considered as obsolete, superseded by the more ambitious notion that conservation can actively promote development, and *vice versa*, that development can contribute to the conservation of the cultural and natural heritage.

In this paper, we will try to answer the following question: is a Biosphere Reserve run by a manager or by a coordinator?

Seville Strategy recommendations

In 1995, the International Conference on Biosphere Reserves organised by UNESCO in Seville set out the main guidelines for Biosphere Reserves for the next ten years. The need for each Biosphere Reserve to have a management plan or policy and an appropriate, clearly defined management structure was highlighted. Reference should be made to Objective II.2 of the Seville Strategy ("Ensure better harmonization and interaction among the Biosphere Reserve zones"), number 1: "Ensure that each Biosphere Reserve has an effective management policy or plan and an appropriate authority or mechanism to implement it".

EuroMAB Biosphere Reserve managers and coordinators meetings

A series of meetings of Biosphere Reserve managers and coordinators has been organised within the framework of EuroMAB. The first Biosphere Reserve Managers' meeting took place in 1994 at Florac in the Cevennes Biosphere Reserve in France. In 1996, the Second International Seminar for Managers of Biosphere Reserves took place at Stara Lesna (Slovakia), and one of the recommendations emphasised the function of a coordinator of management: "Participants agreed that a Biosphere Reserve manager is above all a coordinator ... Biosphere Reserves should first and foremost serve the different needs and priorities of the various stakeholders of each Biosphere Reserve." In 1998, at the Third EuroMAB Biosphere Reserve Coordinators' Meeting, held at Ilomantsi and Nagu (Finland), the function of a Biosphere Reserve coordinator was confirmed. In 2000, in Cambridge (UK), the first joint meeting of Biosphere Reserve coordinators and MAB National Committees was organised.

| Protected areas | Biosphere Reserves |
|--|--|
| <ul style="list-style-type: none"> ■ One type of land <i>a single category of land, usually relatively small in size and managed for a single purpose (e.g. nature conservation)</i> | <ul style="list-style-type: none"> ■ A mosaic of different types of land <i>several categories of land, generally managed for different purposes (conservation, development, etc)</i> |
| <ul style="list-style-type: none"> ■ One type of objective and function <i>conservation</i> | <ul style="list-style-type: none"> ■ Overlapping of different types of objectives and functions <i>conservation, development, logistical support</i> |
| <ul style="list-style-type: none"> ■ One main category of interests <ul style="list-style-type: none"> – <i>natural</i> – <i>landscape</i> – <i>cultural</i> – <i>historical</i> | <ul style="list-style-type: none"> ■ Multitude of interests <i>often conflicting: farming, forestry, fisheries, tourism, science, local and national government</i> |
| <ul style="list-style-type: none"> ■ One manager <i>well identified, directly in charge of the management of the territory</i> | <ul style="list-style-type: none"> ■ Several managers <i>working more or less independently without consultation</i> |
| <ul style="list-style-type: none"> ■ Simple zonation | <ul style="list-style-type: none"> ■ Complex zonation <i>three zones, transition area without demarcated outer limit</i> |
| <ul style="list-style-type: none"> ■ Protection through regulation | <ul style="list-style-type: none"> ■ Various means of protection <i>Regulation limited to the core areas, existence of management agreements or contracts</i> |
| <ul style="list-style-type: none"> ■ Management plan <i>single planning scenario applied to a well-defined land area</i> | <ul style="list-style-type: none"> ■ Guide to Biosphere Reserve coordination <i>harmonisation of different planning scenarios for different areas in line with Biosphere Reserve concept; emphasis on local participation</i> |
| <ul style="list-style-type: none"> ■ Single ecosystem approach <i>populations, ecosystem functioning</i> | <ul style="list-style-type: none"> ■ Landscape approach <i>complex of ecosystems</i> |
| MANAGER | COORDINATOR |

Table created and supplied by the author.

Characteristics of Biosphere Reserves in relation to other types of protected spaces

The coordinator of the Biosphere Reserve is not the direct manager of the territory concerned: he/she merely coordinates or facilitates. One of the main problems encountered in Biosphere Reserves is the need for visibility of the management structure and adequate recognition of the coordinator.

Role of the Biosphere Reserve coordinator

The role of the Biosphere Reserve coordinator is to moderate and communicate the different aspirations and needs of each partner around a 'common territory project' (a project which balances consideration of the environment, economy and equity of a specific area) with which all stakeholders can identify themselves (resource users, professional groups, local populations, government agencies, elected officials, scientists etc.). Hence a Biosphere Reserve coordinator must ensure:

- Identification of the main conservation and development issues and potentialities, both at the scale of the territory concerned and at the scale of the wider biogeographical region. Certain conservation or development priorities and even sustainable development experiments may be envisaged.
- Identification of the main management issues concerning human interaction with nature using the ecosystem approach. Different types of interaction can be highlighted including
 - negative interactions: divergence of interests;
 - neutral interactions and;
 - positive interactions: convergence of interests.
- Resolving conflicts throughout mediation processes.
- Setting up working groups devoted to the common concerns of the main groups of actors.
- Organisation of thematic workshops and training sessions.
- Promotion of results of successful experiments.
- Carrying out the periodic review of the Biosphere Reserve using a multidisciplinary approach. This approach can be realised by setting up a management guide for the Biosphere Reserve territory. Here, a GIS can prove to be a relevant and efficient tool for the Biosphere Reserve coordinator, since it can be used to set up, structure and continuously update a database for the Biosphere Reserve, and provide an excellent basis for decision-making by facilitating the elaboration of various zoning scenarios. The maps produced using a GIS can also help in discussions and consultations with the local communities and the various stakeholders.

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The work of Biosphere Reserve coordinator in the Mer d'Iroise Biosphere Reserve, France

The Mer d'Iroise Biosphere Reserve covers an area of 21,000 ha in Western France. It is made up of the Île d'Ouessant, the Molène Archipelago and the surrounding marine zone. It is typical of many such small islands of Europe where the economic base has changed radically over the past decades from marginal subsistence farming and small-scale fishing to nature-based tourism and commercial fisheries. In the Mer d'Iroise, this change in land-use meant a reduction of sheep grazing, which in turn allowed shrubs to invade former open areas. The challenge for the Biosphere Reserve coordinator is to ensure that the new markets offered by the tourist industry can be exploited to revive traditional sheep grazing in a balanced way, and thereby to restore the open landscape and its rich biodiversity. Farmers, tourist businesses, tourists and the scientific community all benefit. The two photographs illustrate these efforts.



On Île d'Ouessant, the traditional sheep fair takes place every year on the first Wednesday of February. The sheep, which have been grazing freely on the island since Michaelmas (September), are rounded up in two enclosures where their owners identify them by special ear markings: each family has its own marking registered at the Mayor's office. The sheep are then penned throughout the rest of the year. This type of sheep raising is family-based and is the last type of agricultural activity on Île d'Ouessant. Photo: Frédéric Bioret.



The lack of trees and wood on the Iroise islands meant that the local people had to use other energy sources for cooking. The traditional practice known as 'étrépage' consisted in using a special tool to cut sods of turf – including the root system and some soil – from the coastal grasslands and heathlands. These sods were dried and used as fuel for cooking, giving a special flavour to the food: this method of cooking

is used for the traditional Ouessant dish of lamb stew. The practice declined from the early 20th century, but has been revived since the creation of the Mer d'Iroise Biosphere Reserve in 1988 due to a new interest on the part of restaurant owners and caterers in the possibility of offering traditional lamb stew to visitors. There are only a few localised sites along the coasts where the sods are cut, but these are subject to trampling by tourists, which could impede turf regeneration. A long-term monitoring system has been in place since 1998 on these 'étrépage' sites, and experiments are being undertaken on alternative cutting sites in cooperation with the local inhabitants.

Photo: Frédéric Bioret.

Coordination of the National Networks of Biosphere Reserves – experience in Cuba

MARÍA HERRERA ALVAREZ

There are six Biosphere Reserves in Cuba: the first was designated in 1987 and the most recent two in January 2000. These make up the national network and are representative of the country's principal and secondary ecosystems. In 1999 the Cuban MAB Committee, which comes under the Cuban Ministry for Science, Technology and the Environment, reviewed their conformity with the basic directives of the Seville Strategy and the recommendations are being followed up. The directors of all six Biosphere Reserves are members of the Cuban MAB Committee, which periodically organises national meetings within a Biosphere Reserve. Topics of interest include tourism, labelling of ecological quality, sharing experience in the IberoMAB regional network, and environmental education.

THE NATIONAL COMMITTEE for the Man and the Biosphere (MAB) Programme and its Biosphere Reserves in Cuba works under the auspices of the Cuban Ministry for Science, Technology and the Environment (CITMA) and the Cuban Commission for UNESCO. Both its management and its members work on an honorary basis.

Sierra del Rosario, in the western region of Cuba, was the first Biosphere Reserve to be designated by UNESCO in our country, in 1985. Two years later, in 1987, three new Biosphere Reserves were designated: the Península de Guanahacabibes in the extreme west, and Cuchillas del Toa and Baconao in the eastern region of the country. The central region, which, like the other regions mentioned, presents particularly interesting biological characteristics, was still unrepresented, and it was not until last year that we succeeded in gaining acceptance for two

There are six Biosphere Reserves in Cuba: the first was designated in 1987 and the last two in January 2000. These make up the national network and are representative of the country's principal and secondary ecosystems.



new proposals in the north and south central areas. These were approved in January 2000: Buenavista, in the north central part of the island, is a mixed reserve which includes areas with significant ecosystems such as land and sea caves and island groups. Ciénaga de Zapata, in the south central area, is one of the most important wetlands in Latin America and is a Ramsar site. The six Biosphere Reserves which make up our national network are thus representative of the country's principal and secondary ecosystems, as well as having speleological and architectural value.

Within Cuba's Biosphere Reserves can be found examples of other categories of our national system of protected areas: natural reserves (which constitute core areas), national parks, ecological reserves, wildlife reserves, and so on.

The economic activities of the Cuban Biosphere Reserves include forestry, cattle-breeding, agriculture, beekeeping and tourism. Inhabitants of the communities within the reserves work mainly in these sectors, and participate in local decisions through their leaders or representatives. The socio-economic conditions of human settlements are diverse; nevertheless, free education and health care contribute to the quality of life there in all cases.

We have periodically evaluated the development of our Biosphere Reserves, guided by the concept, functions and Action Plans for Biosphere Reserves approved at the two International Conferences held for that purpose in 1983 and 1995 respectively. In particular, in connection with the Seville Strategy, we consider that four main objectives have been or are in the process of being achieved: reserves are being used for the conservation of natural and cultural biodiversity; they are being used as models of land management and of approaches to sustainable development; sites are being selected for scientific research and monitoring, and finally also for education and training of local inhabitants. Our proposals for new Biosphere Reserves strengthen the World Network as well as applying the concept and functions implicit in the international title of UNESCO's MAB Programme.

An objective analysis of the development of Cuba's Network of Biosphere Reserves shows that it has not been achieved smoothly. Sierra del Rosario, recognised as a pioneer for its gradual, sustained progress, is now in its fifteenth year and has always been considered a model, since

Biosphere Reserves: special places for people and nature. The Baconao Biosphere Reserve offers wonderful opportunities for recreation and tourism, to the benefit of the local population. Photo: Marta Muñoz Campos.



it fulfils most of the characteristic functions of a Biosphere Reserve, i.e. conservation, development and logistical support. The reserve's accomplishments in the field of education for the environment are outstanding, its management and its working group are stable, it has an overall management plan and also a duly constituted coordination committee, although the latter does not yet function as desired. In the past five or six years the three reserves designated in 1987 have also achieved noteworthy successes, especially Cuchillas del Toa and Península de Guanahacabibes. Bacanao also continues to develop its activities. These first four Biosphere Reserves have sent UNESCO's Division of Ecological Sciences a satisfactory periodic review report of their first ten years. The two most recent reserves, Buenavista and Ciénaga de Zapata, were established from the outset with a certain infrastructure in human and material terms that will doubtless contribute to their more rapid development.

In 1999, when we analysed our work in terms of the application of the basic directives of the Seville Strategy in all our Biosphere Reserves, we concluded that, in Cuba, we still needed to stress action on the following points (as considered in the strategy):

- Devote increased attention to the human dimensions of Biosphere Reserves. Emphasize the links between biological and cultural diversity. Take greater account of traditional knowledge and genetic resources for sustained development.
- Foster the collegial management of Biosphere Reserves. Management should be open, evolving and adaptive, so as to enable any undesirable actions to be confronted and resolved.
- Promote Biosphere Reserves among managers and leaders locally and through networks. Ensure that information on Biosphere Reserves is circulated.

The Biosphere Reserves in Cuba are sometimes used as open-air classrooms where children enjoy nature and become aware of the environmental issues that are important for their future. Photo: Marta Muñoz Campos.



- Use Biosphere Reserves to build programmes of environmental education capable of contributing to raising awareness of the inter-generational relationships between humanity and the natural world, in order to achieve a popular culture of the environment.

The legal framework of Biosphere Reserves in Cuba comprises the Law on the Environment and the Decree-Law on Protected Areas, which take account of the fact that land is, for the most part, in the ownership of the State. Land, water and the atmosphere are also covered by legal provisions.

Turning to the functioning of the National Network of Biosphere Reserves, each reserve has a manager or Director and a group of specialists who report to the corresponding territorial authority and to the Agency for the Environment – both of which come under the Ministry for Science, Technology and the Environment (CITMA) – and carry out scientific research in connection with biodiversity, the functioning of ecosystems, environmental impacts, the rehabilitation of damaged ecosystems, environmental education, the monitoring of parameters of global change, etc. This team takes responsibility for the running of the reserve, fostering the development of its management plan and the organisation of its coordination committee. It is in this latter connection that the greatest difficulty is being experienced at present, since the task is not only to constitute the committee but to stabilise its operations, which has not always been successfully achieved. In the absence of such stability, the personal relationships which the Director establishes with local community leaders and the representatives of all local organisations involved in management activities to a great extent supplant the work of the coordinating committee.

Biosphere Reserves and the promotion of sustainable development: beehives belonging to a cooperative in Juragua.
Photo: Marta Muñoz Campos.





Biodiversity and cultural diversity are linked, and Biosphere Reserves also help to revitalise and enhance local and traditional knowledge. Here children are helping in a medicinal plant garden. Photo: Marta Muñoz Campos.

On the other hand, the above-mentioned Directors are members of the MAB National Committee, attend its plenary sessions and in all cases are consulted at the proper time in relation to the Committee activities. Likewise, we periodically organise a national meeting of the Cuban Network of Biosphere Reserves. The latest such meeting took place in July 2000, in the new Buenavista reserve, and was attended by high representatives of the UNESCO Regional Office for Culture for Latin America and the Caribbean and the Cuban Commission for UNESCO. Representatives of sister Biosphere Reserves in Mexico also participated actively, as well as officials of the Mexican Ministry for the Environment, local authorities and delegates from institutions related to our six reserves, the National Centre for Protected Areas and members of the Cuban MAB National Committee. The meeting devoted much attention to the Law on Protected Areas and its application, as well as to the functioning of management plans and the coordination committee of each reserve. Among other matters, it was agreed that these meetings would take place biennially, and Península de Guanahacabibes was proposed as the venue for the next meeting, in February 2002.

One proposal which we must strive to make a reality is the publication of a “Newsletter of the Cuban National Network of Biosphere Reserves”, which would enable us to contribute at regular intervals to the dissemination of the objectives and work of the reserves.

It is also worth recording our participation in the regional networks of Biosphere Reserves, in particular in the various IberoMAB meetings which have taken place, and which were attended by delegates from the majority of Biosphere Reserves in Latin America, the Caribbean, Spain and Portugal. Among these meetings we should make special mention of the Third IberoMAB Meeting which took place at the Sierra del Rosario Biosphere Reserve in Cuba in 1998.

One other aspect that must be mentioned is the increasing importance of tourism, especially ecotourism, rural or natural tourism, in most of our Biosphere Reserves. It is clear that this activity needs to be carefully controlled to avoid it causing serious damage. This requires the establishment of specifications, interpretative pathways and suitably qualified guides, and the preparation of staff in general through training in essential ecological knowledge. Naturally, if this activity is responsibly pursued within a Biosphere Reserve, it will add value to the services which our landscapes are able to provide. However, this opportunity is not sufficiently exploited in the promotion efforts of tourism companies and companies in other sectors.

Neither do we possess any brand of ecological or organic quality for the products obtained from these areas. It is clear that we shall still need to make progress on other fronts before we can aspire to establish one.

The representative qualities of our most interesting ecosystems have by no means been exhausted and we shall certainly be presenting new proposals for future Biosphere Reserves in Cuba.

On the other hand, if we look back over the last 25 years, we can see the valuable results achieved in Cuba in the area of the environment and in particular in our Network of Biosphere Reserves. However, if asked to conclude in a few words, we would say: satisfactory, but not in line with potential. There is a long way to go, although we are progressing with every step we take.

What we lack in Cuba is a real culture of the environment. In our case, it is not enough to get the message across to decision-makers, or to use clean technologies: we must aspire to educate the *entire* population about the environment, in such a way that the concept of Biosphere Reserves can also be grasped by all.

To paraphrase W. Ospina, may we say that, important though human rights are, equally or even more important are the rights of the planet.

Ms Maria Herrera Alvarez is the Chair of the Cuban MAB National Committee. She was an active participant at the First International Biosphere Reserve Congress held in Minsk in 1983. Under her impulse, the Cuban National Network of Biosphere Reserves has been formed – one of the models of its type, with periodic meetings and publications, and exchanges at regional and international levels. Ms Herrera has written several papers on Biosphere Reserves, including South-South Working Paper 10 on the Sierra de Rosario Biosphere Reserve, with co-author Ms Maritza García García in 1995. Ms Maria Herrera Alvarez, Presidente, Comité Cubano MAB, c/o Oficina regional Cultura - Unesco, Calzada 551, C/ C. y D. Velardo, Apartado postal 4158, La Habana 4, Cuba. Fax (UNESCO Havana): 537 33 3144. Tel (home): 537 44 2154. E-mail: uhlha@unesco.org (c/o UNESCO Office Havana).

The World Network of Biosphere Reserves: action through Regional Biosphere Reserve Networks

Biosphere Reserve designation is formal recognition by a United Nations body – UNESCO – of the will of the locality and country concerned to share an agreed vision to improve people's relations with the biosphere. The World Network of Biosphere Reserves was formally established through the Statutory Framework adopted by the UNESCO General Conference in 1995, and as such is the only network of sites set up under an intergovernmental programme. While the World Network of Biosphere Reserves is made up of 391 sites in 94 countries, these sites vary greatly in their ability to implement the Seville Strategy. This situation stimulates countries to seek ideas and information. As there is no one single person or institution on hand to provide appropriate answers, networking becomes inevitable. Since 1995, regional networks of Biosphere Reserves have emerged as practical tools for this information sharing and the goal of improving the quality and coverage of Biosphere Reserves. Such networks have been facilitated by new information and communications technologies. In most cases, the regional Biosphere Reserve networks are linked by a geographical and/or cultural affinity and/or a common language. Most now have their own organisational structures, logos and websites. Currently active regional Biosphere Reserve networks are briefly described in the following paragraphs.

AfriMAB

This network was created by the "Regional Conference for Forging Co-operation on Africa's Biosphere Reserves for Biodiversity Conservation and Sustainable Development" which took place in Dakar (Senegal) in 1996. The network aims at promoting regional cooperation in the fields of biodiversity conservation and sustainable development through transborder projects, which are primarily based in Biosphere Reserves. To increase efficiency, four thematic sub-networks have been created which correspond to:

- a) zoning and improving Biosphere Reserve functioning;
- b) Biosphere Reserves and local communities; stakeholders, social actors, participation and income-sharing;
- c) transboundary Biosphere Reserves;
- d) the logistic support function of Biosphere Reserves.

Two workshops were held in Dakar, Senegal (1999) and in Nairobi, Kenya (2000) to define these themes.

Contact: mab@unesco.org

ArabMAB

This network was officially launched at a regional meeting of the Arab MAB countries in Amman (Jordan) in 1997. The ArabMAB Network has a Bureau and a Secretariat which is currently hosted at the premises of the Egyptian UNESCO National Commission. Within the framework of this network, several meetings and training sessions have taken place for example, in Sudan (1998), in Tunisia (1998) and in Morocco (1999). (www.arabmab.net)

EABRN

East Asian Biosphere Reserve Network

EABRN consists of China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea and the Russian Federation. This network, initiated in 1994, has three subjects as priority for cooperation: ecotourism, conservation policy and transboundary conservation. It also serves as a mechanism to facilitate information exchange, training and site-to-site cooperation. Six meetings have been held so far, the last one in 1999 in the Jiuzhaigou Biosphere Reserve (also a World Heritage Site) in China. The 7th Meeting of EABRN will take place in Vladivostok (Russian Federation) in September 2001. (www.unesco.or.id/prog/science/envir/EABRN/eabrn_index.htm)

EuroMAB

The EuroMAB network, founded in 1987, operates in the 42 European and North American countries. In 1998, the third meeting of the Biosphere Reserve Coordinators took place in Finland. The latest meeting of EuroMAB took place in Cambridge (UK) in April 2000. It was designed to combine a meeting of coordinators of the Biosphere Reserves of the EuroMAB region with a meeting of the MAB National Committees. (www.mabnet.org/euromab/home.html)

IberoMAB

This Latin American Biosphere Reserves Network aims to strengthen the MAB Programme in Latin American countries, Spain and Portugal, notably by consolidating their MAB National Committees and cooperative links, and promoting the creation of new Biosphere Reserves. The 5th Meeting of the IberoMAB regional network will take place in Formosa (Argentina) in April 2001. (www.iberomab.com/htm)

Redbios

Redbios – actually a thematic network, focusing on coastal sites in north-western Africa and the Atlantic Islands – comprises the Canary Islands (Spain), the Cape Verde Islands, Morocco and Senegal. The network fulfils an interregional, thematic mandate in enabling countries from adjacent geopolitical regions, having the same biogeographical context, to cooperate and exchange their experience. The 4th Meeting of the REDBIOS subregional network of Biosphere Reserves will take place in El Hierro (Canary Islands) in May 2001. (www.unesco.org/mab/redbios/index/htm)

World Heritage and Biosphere Reserves: complementary instruments

MICHEL BATISSE

UNESCO has two instruments for conserving biodiversity and ecosystems: the natural sites of the World Heritage Convention and the Biosphere Reserves of the Man and the Biosphere Programme. There is often confusion between the two concepts. Natural World Heritage Sites must be of outstanding universal value in accordance with the criteria of the 1972 World Heritage Convention. Biosphere Reserves are part of the intergovernmental scientific MAB Programme: they have three functions, namely conservation, logistical support for science and education, and sustainable development for local communities. The World Network of Biosphere Reserves is governed by the Statutory Framework, adopted by the UNESCO General Conference in 1995. While some Biosphere Reserves have been designated for all or part of their areas as World Heritage Sites, these are often old Biosphere Reserve designations, which do not meet the 1995 criteria. World Heritage and Biosphere Reserves should be seen as complimentary endeavours, especially in their application, whereby the core area of a Biosphere Reserve with exceptional biodiversity could become a World Heritage Site, such as is the case of the Pantanal in Brazil.

FOR THE CONSERVATION of ecosystems and biological diversity, UNESCO has developed two concepts and implemented two procedures that have substantially enhanced and broadened conventional methods of nature protection. They are the natural sites of the World Heritage convention, and Biosphere Reserves.

The fact that both concepts come under the aegis of UNESCO and deal with the protection of sites sometimes leads to their being confused by the public and the media. This confusion is all the more understandable in that a number of Biosphere Reserves, in full or in part, are indeed also included in the World Heritage List. In fact a clear distinction should be drawn between the two programmes, and this may be effected by recalling their different origins, by underlining their specific objectives and by describing the arrangements for implementing them and their practical consequences.

World Heritage

What is meant here by World Heritage is all the properties – whether cultural or natural – which appear on the “World Heritage List” established under the Convention for the Protection of the World Cultural and Natural Heritage, adopted in 1972 by the General Conference of UNESCO.

The origin of this international convention is twofold. First, in the late 1960s, in the wake of the major safeguarding operations undertaken in Egypt (Abu Simbel), in Indonesia (Borobudur) and elsewhere, UNESCO sought to promote an international legal instrument together with a fund for protecting the most prestigious cultural monuments. Second, during the preparations for the United Nations Conference on the Human Environment held in Stockholm in 1972, IUCN and related circles were keen to see some equivalent arrangements for the most important national parks. In this context, Russell Train, President of the Conservation Foundation, together with Joseph Fisher, President for Resources for the Future, had supported as early as 1965 the establishment of a “World Heritage Trust” that would stimulate international cooperation to protect “the world’s superb natural and scenic areas and historic sites for the present and future benefit of the entire world citizenry”. This combination of nature and culture was in keeping with administrative practice in the United States, where it corresponds to the responsibility of the National Park Service. After lengthy negotiations, and in order to avoid having two overlapping world agreements, the current text of the Convention covering both

nature and culture was adopted with the understanding that natural sites would be given a fair share in the implementation. The Convention came into force in 1978 after a sufficient number of countries had ratified it (Batisse 1992).

Originally, the Convention emerged from an ethical and cultural perception of the exceptional character of the properties to be added to the List, which, as stated in the text, must be of *outstanding interest and universal value*. The List is intended to consist of *unique sites* deemed to be of very special importance, whether they be prestigious monuments, historic urban centres or national parks. Their protection is considered to be a matter of concern to the whole of humanity, present and future, and hence to justify assistance from the international community when the countries in which they are located request it because they are otherwise unable to afford them sufficient protection. This is the *raison d'être* of the *World Heritage Fund* associated with the Convention, to which all States Parties are required to make a contribution according to a scale fixed by the Convention.

Provided that it meets the criteria defined in the Convention, the cultural or natural property proposed by these states is entered on the *World Heritage List* by the *World Heritage Committee* (on which the representatives of 21 Member States sit), after examination by the Committee's Bureau, aided for that purpose by assessments provided by the competent Advisory Bodies to the Convention (ICOMOS for culture and IUCN for nature). The Secretariat of the Convention is entrusted to the World Heritage Centre, which comes under the Cultural Sector of UNESCO. The List currently contains 690 items of which 529 are cultural, 138 natural and 23 "mixed", spread over a total of 122 countries¹. According to the criteria gradually established by the Committee over time and on the basis of experience, certain properties of both cultural and natural value have earned the status of *mixed properties*. Examples are the Tikal National Park in Guatemala, Tassili N'Ajjer in Algeria, Machu Picchu in Peru and Mount Athos in Greece. It should be noted, however, that the Committee makes very limited use of this type of designation: for example Mont Saint-Michel and its Bay in France, and Venice and its Lagoon in Italy, are considered cultural properties only. This is partly because the natural criteria were strictly interpreted by IUCN in their assessments.

Despite the very rapid increase in the number of different kinds of property entered on the World Heritage List, inclusion is seen as a clear mark of prestige by public opinion. It highlights the aesthetic, historical and ethical value of sites, most of which are truly authentic and illustrate the world's different cultures or its main geographical formations. This greatly enhances their media and photographic appeal, turning them into tourist attractions with potentially significant economic benefits, prompting many countries to press for their designation without always appreciating the commitment to their proper management required from them under the Convention. Given the great diversity of the cultural and natural properties entered on the List, the Convention and the implementation guidelines laid down by the intergovernmental Committee do not spell out the principles and management procedures to be applied, other than of course insisting on the host country's obligations under the Convention to protect any property entered on the List and to maintain the characteristics which justified its designation in the first place.

Similarly, the conditions for designating transboundary sites have not yet been explicitly specified. However, this kind of designation is of course possible and seems to be increasingly encouraged. Examples include the mixed Pyrenées-Mont Perdu site, on the border between France and Spain, the Bialowieza Forest on the border of Belarus and Poland, two parks on the Canada-United States border, the parks of La Amistad in Costa Rica and Panama, and contiguous parks in Zimbabwe and Zambia. This is even the case for a discrete group of cultural

1. The text of the Convention and other information documents on World Heritage are available from the World Heritage Centre, UNESCO, Paris (and from the website: www.unesco.org/whc).

properties, the Jesuit Missions in Argentina and Brazil (whereas the same countries have not reached agreement on a transboundary site for the Ignazu/Iguaçu Falls, which they have in common but which still constitute two separate World Heritage Sites).

Biosphere Reserves

Biosphere Reserves have a quite different origin. They go back to the “Biosphere Conference” organised by UNESCO in 1968, the first intergovernmental conference to seek to reconcile the conservation and use of natural resources, thereby foreshadowing the present-day notion of sustainable development. The early foundations of the Biosphere Reserve concept derived from this conference. The aim was to establish terrestrial and coastal areas representing the main ecosystems of the planet in which genetic resources would be protected, and where research on ecosystems as well as monitoring and training work could be carried out for an intergovernmental programme called for by the Conference. This “Man and the Biosphere” (MAB) programme was officially launched by UNESCO in 1970 and formally endorsed by the United Nations Conference on the Human Environment in Stockholm in 1972. One of the MAB projects consisted in establishing a *coordinated world network* of new protected areas, to be designated as “Biosphere Reserves”, in reference to the programme itself.

From the outset, then, the primary concern of this MAB project was essentially a *scientific* one, with the designated areas consisting of *representative ecosystems* and the aim being to achieve the fullest possible *biogeographical cover* of the world, ensuring more systematic *conservation of biodiversity* than before. At the same time, the Biosphere Reserves are more than just protected areas. Their conservation objective is all the better achieved in that it is supported by research, monitoring and training activities, on the one hand, and is pursued by involving systematically the cooperation and interests of the *local populations* concerned, on the other hand. The Biosphere Reserve concept accordingly combines with its *conservation* function, a *logistical support* function for the MAB programme and a *sustainable development* function benefiting those inhabiting or traditionally using the adjoining territory.

Achieving the threefold objective of the Biosphere Reserves depends upon a *participatory management approach* and a distinctive *geographical zoning scheme*. The latter comprises a clearly delineated and legally protected *core area or areas*, devoted to the conservation of the biodiversity contained therein. Each core area is surrounded by a well-defined *buffer zone* where only activities compatible with the conservation objectives may take place. These in turn are surrounded by a *transition area* where sustainable resource management initiatives and practices are encouraged, with the cooperation of the population. The management of this zoning system, covering areas which may be owned by various private and public entities, is organised according to local customs and regulations; this usually entails setting up a *consultation and cooperative management committee*, in which the authority responsible for the core area or areas may constitute a driving force (Batisse 1997).

Biosphere Reserves are not covered by an international convention but must simply meet a set of criteria allowing them to fulfil properly their three functions of conservation, development and logistical support. These criteria were specified in the “*Seville Strategy*” adopted by UNESCO in 1995. At the same time, all designated Biosphere Reserves together form a *World Network*, designed to encourage exchanges of scientific information and managerial experience, regionally and internationally, to improve the sites that are part of the network and to offer them any support they may need. This World Network of Biosphere Reserves is governed by a *Statutory Framework*, formally adopted by the General Conference of UNESCO in 1995. The Framework stipulates the criteria to be applied and defines the procedure for designating new sites, including consideration of nominations by the *Advisory Committee for Biosphere Reserves* established by UNESCO, before formal adoption by the intergovernmental *Bureau* of the MAB programme. It also calls for a *periodic review* of the

reserves every 10 years to prompt improvements in the way in which they function and, where necessary, for a delisting procedure to be opened to remove sites that cannot meet the basic criteria from the network. At present the World Network comprises 391 Biosphere Reserves in 94 countries. The Secretariat of the World Network rests with the MAB Secretariat in the Science Sector of UNESCO. This Secretariat naturally cooperates with the World Heritage Centre for the designation of natural sites on the World Heritage List².

The designation of a site as a Biosphere Reserve is not principally designed to give it prestige or a quality label. Rather, it aims to foster land-use planning in the territory in question so as to conserve effectively elements of its biodiversity and ecosystems of any kind that seem important, to maintain the territory's authentic rural character while allowing for sustainable use of its resources, and to provide the national and international scientific community with a set of research stations and experimental sites covering a very wide range of fields (ecology, hydrology, renewable energy sources, agronomy, rural rehabilitation, sociology, etc.) in addition to biodiversity science and conservation. This makes it an extremely flexible and pragmatic mechanism for land-use management which does not necessarily imply new major constraints. For example, an already protected area (such as a national park) could constitute the core and be given a scientific and socio-economic dimension to form a Biosphere Reserve; a regional nature park could have its biodiversity protection or its research and experimentation facilities reinforced, so as to make sure that the three basic functions are adequately met.

The flexibility of this mechanism also enables transboundary Biosphere Reserves to be created. An interesting and highly symbolic example is that of the Vosges du Nord/Pfälzerwald Reserve, in France and Germany, covering an area which has seen many military confrontations over time. The current political opening in eastern Europe has also led to the establishment of transboundary Biosphere Reserves such as the Tatra Mountains in Poland and Slovakia, the East Carpathians in Poland, Slovakia and Ukraine, the Danube Delta in Romania and Ukraine, Krkonoše/Karkonosze in Poland and the Czech Republic, and so on. Several possible sites also exist in Africa, such as the W region between Benin, Burkina Faso and Niger.

Convergence and complementarity

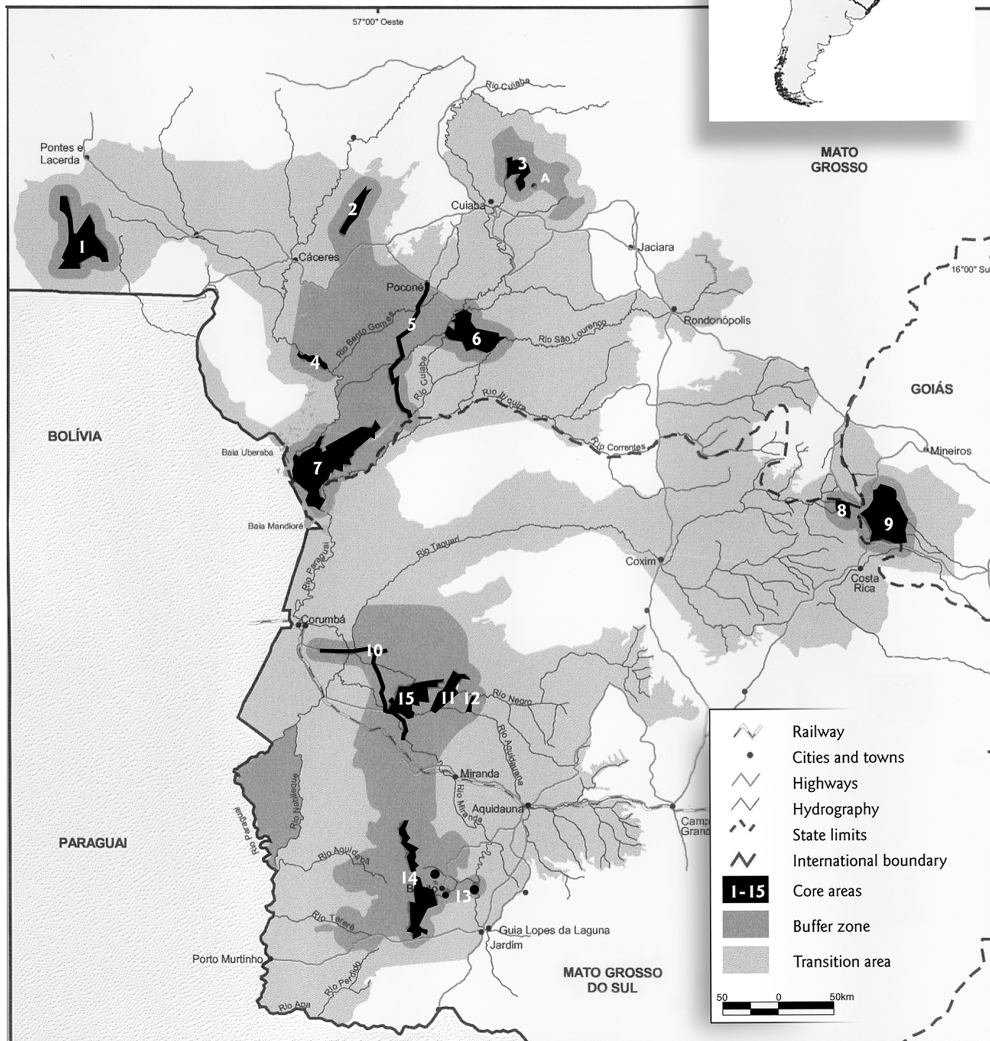
What the above shows is that natural heritage sites and Biosphere Reserves have fundamentally different purposes, objectives, legal status and management principles, and should not therefore be confused. Nonetheless, as has been stated, some Biosphere Reserves have also been designated, for all or part of their area, as World Heritage Sites. However, in most cases these are old designations, generally involving conventional national parks which do not really fulfil the other functions of Biosphere Reserves. The aforementioned ongoing periodic review should lead either to their delisting as Biosphere Reserves or, preferably, to a revision of their zoning schemes, extending them beyond their core areas and strengthening their development and logistic support functions. This process has already been completed successfully in certain cases, such as in Guatemala where the Maya Biosphere Reserve now encompasses the Tikal World Heritage Site. It also applies in Romania where the Danube Delta Biosphere Reserve includes the World Heritage Site as a core area, and in the United States of America where the Southern Appalachian Biosphere Reserve now takes in the Great Smoky Mountains National Park.

Any confusion between the two types of designation should be carefully avoided. It may unfortunately arise again with the addition of the concepts of cultural landscapes and of

2. The text of the "Seville Strategy for Biosphere Reserves" and of the "Statutory Framework of the World Network of Biosphere Reserves" are available from the MAB Secretariat, Science Sector, UNESCO, Paris (and from the website: www.unesco.org/mab).

biodiversity to the criteria for inclusion in the World Heritage List, although few sites have so far been included on the basis of these criteria alone. The first of the two concepts, *cultural landscapes*, refers to “combined works of nature and humankind”, which must also of course be sites of outstanding interest and universal value. Two recent examples are the designation of terraced paddy fields in the Philippines and the Saint-Emilion vineyards in France, neither of which could lead to confusion. At the same time, the possible designation under the “cultural landscapes” designation criterion alone of sites that are clearly of great natural

Pantanal Biosphere Reserve, Brazil – a case of the complementarity between World Heritage Sites and Biosphere Reserves (scale 1:3,500,000). This is the zonation map of the Pantanal Biosphere Reserve, designated in November 2000 and covering some 25 million ha. There are 15 core areas consisting of national parks and nature reserves. One of these (no. 7 on the map) was entered in the same year on the World Heritage List as the “Pantanal Conservation Complex”: it was selected for World Heritage status due to its critical importance in protecting the headwater basins of the main waterways of the Pantanal and in disseminating nutrients to the whole Pantanal region. The larger Pantanal Biosphere Reserve will be managed through a consortium system of the different stakeholders. In time, it is envisaged that the Biosphere Reserve will encompass the whole Pantanal ecosystem. Map: Ministério do Meio Ambiente, Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA, UNESCO Brasilia Office and Greentec.



value might leave the door open to a rather unfortunate mixing of genres. As far as the criterion of *biodiversity* is concerned, it is actually alluded to in the text of the World Heritage Convention in respect of the protection of areas of outstanding universal value, such as those containing very remarkable animal or plant species, and it is obviously in this spirit that it should be applied, rather than attempting to add most existing protected areas the World Heritage List, which would inevitably devalue the very meaning of designation. Every national park has its value for biodiversity but does not necessarily deserve World Heritage status. Yet it could provide the core area of a Biosphere Reserve that would have to be established around it, in cooperation with all stakeholders.

It emerges from this brief analysis there may be significant convergence between properties entered on the World Heritage List as natural and even cultural sites, and sites designated as Biosphere Reserves. Rather than worrying about such convergence, we should emphasise the remarkable complementarity that exists in the spirit and, increasingly, in the application of the two concepts. The most important point is that this complementarity will assist in the effective long-term conservation of biodiversity, in the form of ecosystems, species or genetic varieties. If it is to be effective, the conservation of biodiversity calls for legally established and rigorously managed protected areas, such as national parks or biological reserves, which may well meet the World Heritage Convention's criteria. But it also means securing the consent of local communities and serving their material or moral interests, ensuring that the protected area is an integral part of regional development and mobilising the international scientific support that Biosphere Reserves may attract. In this respect, it is interesting to note that the new Convention on Biological Diversity has recently adopted twelve principles for the "*ecosystem approach*" to its implementation. Many existing Biosphere Reserves already exhibit this ecosystem approach (UNESCO 2000). In fact, there is a tendency to designate new, larger-scale Biosphere Reserves, such as the Pantanal in Brazil or the Cape West Coast in South Africa, which correspond to what is sometimes called "bioregional planning" or what is known in French as "aménagement du territoire". This brings us back to the simple scenario of World Heritage Sites meeting all required criteria and being incorporated as core areas of Biosphere Reserves belonging to the World Network, a few examples of which have already been given, with the Pantanal offering another good illustration.

In other words, this combination of designations confers symbolic value upon all the sites thus protected, and affords them greater protection and world recognition of unquestionable prestige within the United Nations system and the international community.

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The Pantanal Biosphere Reserve, Brazil: trees and water under siege

– Thierry Ogier

In a large country like Brazil, the question of balancing the use of natural wetlands and meeting the needs of expanding human populations takes on gigantic proportions. In early November, UNESCO's MAB International Coordinating Council approved a new Biosphere Reserve in the Pantanal region, covering some 24 million hectares in the centre west of the country. It is one of the largest inland wetland areas of the world, noted for its exceptionally high biodiversity. The area was used for extensive cattle grazing into the 1970s, with relatively little impact on the wildlife. However, since then, large-scale mechanised agriculture, deforestation on the plateaux and artificial pastures have caused huge environmental damage and are providing new riches to a minority of people.

Fabio Feldmann, responsible for the Brazilian Forum on Climate Change, notes that the ecological balance in the Pantanal is very delicate and very complex and that much work needs to be done to understand it fully. Eighty per cent of the region is under water for much of the year, which creates ideal conditions for migratory birds and jacares (crocodiles). Although it is not certain that global warming would increase the rainfall, most scientists agree that any small change would upset the delicate hydrological and ecological balance.

The industrial farming of soyabeans north of the Pantanal is also creating problems. Logging to create the soya fields is causing erosion, thus increasing siltation of rivers feeding the area. However, the most immediate danger is from a project to build a waterway to transport the soya from the north. This would radically change the water system.

Meanwhile, efforts to protect the area have suffered from lack of coordination. Small cattle ranchers are turning to ecotourism and sport fishing to increase their economic gains. Scientists are undertaking inventories of the flora and fauna so that nature reserves and 'biological corridors' can be created to protect the most biologically rich sites. Some direction and coordination of all these changes and interests thus became imperative. The new Biosphere Reserve intends to take on this challenge. Until it was created, only 3% of the region was protected. Fabio Feldman notes that now, with this new Biosphere Reserve, conservation can be envisaged on a large scale and threats that originate outside the Pantanal region can be addressed, thus applying the "ecosystem approach" of the Convention on Biological Diversity.

Thierry Ogier is a journalist based in Brasilia. This paper is adapted from an article originally appearing in the UNESCO Sources magazine No. 129, December 2000. C/o Sources, UNESCO, 31 Rue François Bonvin, Paris 75732 Cedex 15, France. Tel. (33) 01 45 68 45 37 www.unescosources.org



The new Pantanal Biosphere Reserve has a huge challenge to reconcile respect for biodiversity and economic development.
Photo: © Yann Arthus-Bertrand, 'Earth from Above'.

Epilogue: main results and thoughts for the future of Biosphere Reserves

PETER BRIDGEWATER

These comments are adapted from the final conclusions of the meeting, called "Seville +5" for obvious reasons, held in Pamplona, Spain, November 2000, with the assistance of the Governments of Spain and Navarra, and the personal support of the then Chair of the MAB Council, Dr Javier Castroviejo. The full recommendations of the "Seville + 5" meeting, as amended by the MAB International Co-ordinating Council in November this year, are available on the MAB website (www.unesco.org/mab/Pamplona.htm) or from the MAB Secretariat.

IMPORTANTLY, the meeting agreed that science is the basis for a satisfactory Biosphere Reserve network, which itself is a unique global platform for research and monitoring. However, the World Network is not merely a scientific and monitoring tool – the network is vitally concerned with the conservation of biodiversity and *must* be linked with sustainable human development. In that respect, local people are the key to success (or failure) in any Biosphere Reserve. Biosphere Reserves can help develop bioregional plans for biodiversity conservation, use and sharing.

The World Network of Biosphere Reserves needs to communicate its success at all levels and in many languages. To this end, the network needs to use more modern tools, but not neglect tried and trusted techniques of management or communication.

It is also true that Biosphere Reserves are as much about economics as ecology!

To be vital and viable, the World Network must not only *grow*, but *develop*. This implies a review process, which is essential to measure the success or failure of individual reserves, and so to maintain a healthy network. A periodic review process exists, but it needs strengthening.

The World Network of Biosphere Reserves also needs to link with processes under multilateral environmental agreements. Similarly, to be effective, national structures dealing with Biosphere Reserves need to link with other national structures for environmental agreements.

We realise that Biosphere Reserves are not perfect. Aware of this, the meeting produced a long and detailed list of conclusions and suggestions, available on the MAB website (www.unesco.org/mab/Pamplona.htm), which were then examined in detail by the meeting of the MAB International Coordinating Council in November 2000. The Council decided on a number of key tasks, as follows:

- The MAB Secretariat should coordinate with the secretariats of the relevant multilateral environmental agreements (e.g. the Convention on Biological Diversity) to promote Biosphere Reserves as instruments for their implementation at the national level, where possible through MAB National Committees. Guidelines should be prepared to harmonize research initiatives concerning the different conventions, for implementation at the national level.
- The implementation of the Biosphere Reserve Integrated Monitoring (BRIM) programme should be accelerated, including explicit recognition of the need to integrate the social sciences into its activities.
- The Secretariat should advise and act as a broker for member states and groups of member states, and especially the regional networks, to help them to identify and submit proposals to potential donors/financing agencies and investors.
- On the theme of linking ecology and economics, the MAB Secretariat should facilitate the establishment of a task force, including Biosphere Reserve managers and local specialists, to

help develop *quality economies* at site level. Issues which such a task force should consider include:

- defining 'quality';
 - development of criteria (social, environmental and economic);
 - branding and the criteria behind the image or the meaning of brand;
 - critical analysis of branding, labelling, marketing, and associated mechanisms structures (including successes and failures);
 - formulating communication and marketing strategies for Biosphere Reserves which address all sectors, with specific follow-up actions and;
 - use of the media.
-
- The MAB Secretariat should develop a concise, user-friendly, practical guide to the Seville Strategy and the Statutory Framework to be translated into as many languages as possible with the assistance of the National Committees. The guide should highlight the importance of sustainable development and cross-link the different goals and objectives both within and between the Seville Strategy and the Statutory Framework. It should also clarify the added values of Biosphere Reserves and their products to social development and provide national decision-makers with a clearer definition of MAB services, products and tools for sustainable development.
 - The Secretariat should help member states and/or regional networks to devise their own guidelines for identifying the stakeholders concerned with the three zones and the three functions of Biosphere Reserves. Such guidelines should be aimed at facilitating stakeholder participation in the practical management of Biosphere Reserves.
 - The MAB Secretariat should, in cooperation with Biosphere Reserve coordinators and MAB national committees, develop on-line and hardcopy tutorials on the concept of Biosphere Reserves and the Seville Strategy, and disseminate these through appropriate processes such as workshops, favouring a participatory approach and integrating indigenous knowledge and appropriate communication technologies. The MAB Secretariat should also help MAB National Committees to develop and implement integrated courses in biodiversity conservation and resource management particularly in Biosphere Reserves with emphasis on the ecosystem approach.
 - The MAB Secretariat should provide support for the compilation, dissemination and critical analysis of national experiences of the review process, possibly through workshops. The MAB Secretariat, including UNESCO's regional offices, should also provide support, when requested, for the preparation of reviews and implementation of recommendations.
 - The MAB Secretariat should use existing overviews of the different conventions relevant to the MAB programme to prepare guidelines on their implementation in the framework of MAB. These should be translated into as many different languages as possible, with assistance from the MAB National Committees.

All of these actions will be developed and implemented to improve the functioning of the World Network of Biosphere Reserves. If the World Network builds on past successes while learning from past failures, then it will continue to make a positive contribution to a safer, more sustainable world.

Support at the site, national and international levels will be critical to ensure ongoing success. We look forward to continuing to work with the WCPA, on the 'road to Durban'!

Résumés

La Réserve de Biosphère Tonlé Sap, Cambodge: les défis de la gestion et de la zonation

NEOU BONHEUR

Le Lac Tonlé Sap, situé dans la plaine inondable du centre du Cambodge, compte parmi les lacs d'eau douce les plus grands de l'Asie du Sud-Est. Le lac se divise en trois zones, à savoir trois aires centrales, une zone tampon, et une zone de transition. Les trois aires centrales constituent un écosystème unique et de grande valeur pour la conservation. La zone tampon est recouverte de forêt inondée où prédomine la pêche. La zone de transition est composée de terres arables où sont cultivés le riz arrosé par la pluie et le riz flottant. La gestion de la Réserve de Biosphère Tonlé Sap présente au gouvernement cambodgien une grande épreuve, car le succès de cette gestion dépend non seulement de la capacité et des organismes nationaux, mais aussi de la coopération internationale des pays riverains du Mékong. Le Cambodge doit améliorer le cadre juridique et institutionnel, renforcer l'application de sa législation, bâtir un consensus sur la gestion intégrée parmi les agences responsables, donner aux communautés le pouvoir de développer leurs ressources, et consolider les connaissances sur l'écologie du Tonlé Sap. Sur le plan international, la coopération et l'accord politique au sujet du développement aquatique dans le bassin du Mékong sont indispensables pour assurer un impact minimal sur l'intégrité du lac.

Les Réserves de Biosphère pour développer des économies de qualité: la Réserve de Biosphère Fitzgerald River, Australie

GILES WEST

Cet article décrit les tentatives de développement d'économies de qualité dans la Réserve de Biosphère Fitzgerald River. Les 2,500 habitants de cette réserve de biosphère dépendent pour le plupart de la production agricole. Leurs moyens d'existence se trouvent actuellement menacés par un baisse des prix et une augmentation du fardeau de la dette. Le concept de la Réserve de Biosphère pourra bien leur offrir des occasions de réviser l'économie locale. À côté d'une diversification de la production, l'image de la réserve donne la possibilité de développer, non seulement des marques pour les produits agricoles, mais aussi le tourisme en tant que source alternative de revenus.

L'éducation, la sensibilisation et la formation à l'appui des Réserves de Biosphère: l'expérience de Nigéria

BUNYAMIN OLA-ADAMS

Dans cet article l'auteur discute les multiples activités d'éducation et de sensibilisation qui ont été organisées dans la Réserve de Biosphère Omo au Nigéria. Ces activités sont destinées aux écoliers, aux étudiants d'université, aux administrateurs et aux décideurs. L'auteur souligne le besoin, dans les programmes scolaires, d'une approche intégrale de la conservation de la biodiversité. Il affirme d'ailleurs que le succès des programmes de sensibilisation dans la Réserve de Biosphère Omo résulte du fait d'avoir intégré la connaissance locale et traditionnelle de l'environnement aux projets de revenu fondés sur l'utilisation durable des ressources naturelles d'Omo.

Directeur ou coordinateur de Réserve de Biosphère? La conclusion de l'EuroMAB

FREDERIC BIORET

La gestion des Réserves de Biosphère doit tenir compte d'une multiplicité de fonctions, à savoir la conservation, le développement durable des communautés concernés, et les recherches, l'enseignement et la formation scientifiques. Il lui faut également s'adapter aux changements qui surviennent. En tant que telles, les Réserves de Biosphère sont pour la plupart plus complexes et plus dynamiques que les aires protégées classiques, et elles ont donc besoin d'un coordinateur ou d'un animateur. Le besoin d'augmenter la visibilité du coordinateur de la Réserve de Biosphère constitue pourtant un grand problème. Le rôle du coordinateur est très large, allant de l'identification d'un 'projet commun du territoire' avec lequel tous les partenaires peuvent s'identifier, jusqu'à la résolution des disputes, l'établissement de commissions d'enquête sur des sujets d'intérêt commun, et la promotion des réussites. L'utilisation d'un SIG peut beaucoup faciliter cette tâche.

La coordination des réseaux nationaux de Réserves de Biosphère: l'expérience de Cuba

MARIA HERRERA ALVAREZ

Il existe à Cuba six Réserves de Biosphère, dont la première a été désignée en 1987 et les deux dernières en janvier 2000. Elles constituent le réseau national et représentent les écosystèmes principaux et secondaires de la région. En 1999, la Comité cubaine MAB, qui relève du Ministère cubain pour les sciences, la technologie et l'environnement, a passé en revue leur conformité aux directives de base de la Stratégie de Séville; on est en train de donner suite aux recommandations qui en ont résulté. Les directeurs des six Réserves de Biosphère appartiennent tous à la Comité cubaine MAB, qui convoque de temps en temps des réunions nationales au sein d'une d'entre les réserves. Les sujets de discussion comprennent le tourisme, l'étiquetage de la qualité écologique, le partage des expériences avec le réseau régional IberoMAB, et l'éducation environnementale.

Le Patrimoine mondial et les Réserves de Biosphère – des instruments complémentaires

MICHEL BATISSE

L'UNESCO dispose de deux instruments pour la conservation de la biodiversité et des écosystèmes : les sites naturels de la Convention pour la protection du patrimoine mondial, et les Réserves de Biosphère du programme 'L'Homme et la biosphère' (MAB). On confond fréquemment les deux concepts. Les sites naturels du Patrimoine mondial doivent être d'une valeur exceptionnelle et universelle, conformément aux critères de la Convention pour la protection du patrimoine mondial de 1972. Les Réserves de Biosphère font partie du programme international scientifique MAB et possèdent trois fonctions: la conservation, le soutien logistique de la science et de l'éducation, et le développement durable des communautés locales. Le Réseau mondial de réserves de biosphère est géré par le Cadre statutaire adopté en 1995 par la Conférence générale de l'UNESCO. Bien que plusieurs Réserves de Biosphère aient été inscrites sur la Liste du patrimoine mondial pour une partie ou pour la totalité de leur territoire, il s'agit souvent de vieilles désignations de Réserve de Biosphère non conformes aux critères de 1995. Il convient de considérer le Patrimoine mondial et les Réserves de Biosphère comme des entreprises complémentaires, surtout en ce qui concerne leur application, par laquelle l'aire centrale d'une Réserve de Biosphère d'une biodiversité exceptionnelle peut éventuellement devenir un site du Patrimoine mondial, comme par exemple le Pantanal au Brésil.

Resúmenes

La Reserva de la Biosfera de Tonle Sap, Cambodia: el manejo y los desafíos de la zonificación

NEOU BONHEUR

El lago Tonle Sap es uno de los lagos de agua fresca más grandes del Sudeste de Asia, situado en el centro de la llanura inundada del territorio de Cambodia. El lago está dividido en tres zonas: la zona núcleo formada por tres áreas, la zona amortiguadora y el área de transición. Las tres áreas de la zona núcleo forman un ecosistema único de alto valor de conservación. La zona amortiguadora está cubierta por un bosque inundado donde las actividades pesqueras son predominantes. El área de transición es agrícola, y en ella se cultivan el arroz alimentado por la lluvia y el arroz flotante. La administración de la Reserva de la Biosfera de Tonle Sap es un reto para el gobierno de Cambodia, debido a que el éxito de su manejo no sólo depende de la capacidad nacional y de las instituciones, sino también de la cooperación internacional de los países ribereños del Mekong. Cambodia necesita mejorar la infraestructura legal e institucional, a fines de reforzar el cumplimiento de la ley, establecer el consenso entre las agencias responsables del manejo integrado, dar poder a las comunidades para el desarrollo de recursos e incrementar el conocimiento de la ecología de Tonle Sap. La cooperación y el consenso político sobre el desarrollo del agua de la cuenca del Mekong, son cruciales para asegurar un impacto mínimo en la integridad del Lago.

Las Reservas de la Biosfera para el desarrollo de economías de calidad: la Reserva de la Biosfera del río Fitzgerald, Australia

GILES WEST

Este artículo describe la búsqueda de un desarrollo de economías de calidad en la Reserva de la Biosfera del Río Fitzgerald. Las 2.500 personas que viven en esta Reserva de la Biosfera dependen mayormente de la producción agrícola primaria. Hoy en día sus fuentes de recursos están amenazadas debido a la disminución de los términos comerciales y el aumento del agobio de las deudas asociadas con el cultivo en gran escala. El concepto de la Reserva de Biosfera podría proveer oportunidades para revivir la economía local. En conjunto con la diversidad de producción, la imagen de la reserva ofrece posibilidades para aplicar la marca de calidad a los productos agrícolas. Más aún, ofrece posibilidades para el desarrollo del turismo como una fuente alternativa de ingresos.

Educación, conocimiento y entrenamiento en apoyo de las Reservas de la Biosfera: experiencia de Nigeria

BUNYAMIN A. OLA-ADAMS

En este artículo, el autor expone la multitud de actividades educacionales y de desarrollo de conocimiento que se han organizado dentro y alrededor de la Reserva de la Biosfera en Omo, Nigeria. Las audiencias a quienes estas actividades están dirigidas varían desde los niños de las escuelas primarias hasta los estudiantes universitarios y desde los pastores hasta los ejecutivos políticos. El autor enfatiza la necesidad de un tratamiento integral de la conservación de la biodiversidad en el currículum educativo. Más aún, él sostiene que en la Reserva de la Biosfera en Omo, el suceso de las campañas de desarrollo de conocimiento es el resultado de la integración de conocimientos locales y tradicionales del entorno y la combinación de las campañas con proyectos que generan ingresos basados en el uso sostenible de los recursos naturales de Omo.

¿Coordinador o administrador de la Reserva de la Biosfera?

FRÉDÉRIC BIOMET

El manejo de la Reserva de la Biosfera debe tomar en cuenta las múltiples funciones de la conservación, el desarrollo sostenible de las comunidades locales, la investigación científica, la educación y el entrenamiento. También debe acomodar los cambios que se producen a través del tiempo. Como tales, las reservas de la biosfera tienden a ser más complejas y dinámicas que las áreas protegidas clásicas y requieren un coordinador o moderador. Sin embargo, el mayor problema es la necesidad de realzar la forma de ver al coordinador de la Reserva de la Biosfera. El papel del coordinador es enorme, y abarca desde la identificación del "territorio común del proyecto" al que todos los participantes pueden inscribirse, hasta la resolución de conflictos, el establecimiento de grupos de trabajo para

resolver asuntos que causan preocupación general y la promoción de sucesos. El uso de GIS puede ayudar mucho en esta tarea.

La coordinación de las redes nacionales de las Reservas de la Biosfera

MARÍA HERRERA ALVAREZ

En Cuba hay seis Reservas de la Biosfera: la primera fue designada en 1987 y las dos últimas en junio del año 2000. Estas constituyen la red nacional y son representativas de los sistemas naturales y secundarios de las principales regiones del país. El Comité MAB cubano que está bajo el tutelaje del Ministerio de Ciencia, Tecnología y Medio Ambiente de Cuba, revisó en 1999 su conformidad con las directivas básicas de la Estrategia de Sevilla y está siguiendo sus recomendaciones. Los directores de las seis Reservas de la Biosfera son miembros del Comité MAB Cubano que periódicamente organiza reuniones nacionales dentro de las reservas de la biosfera. Los tópicos de interés que incluye son: el turismo, la denominación de la cualidad ecológica, la participación en las experiencias de la red regional del MAB Ibero y la educación ambiental.

El patrimonio mundial y las Reservas de la Biosfera: instrumentos complementarios

MICHEL BATISSE

La UNESCO tiene dos instrumentos para la conservación de la biodiversidad y los ecosistemas : Los sitios naturales de la Convención del Patrimonio Mundial y las Reservas de la Biosfera del programa "El Hombre y la Biosfera". A menudo hay confusión entre los dos conceptos. De acuerdo con el criterio de la Convención del Patrimonio Mundial de 1972, los sitios del Patrimonio Natural Mundial tienen que ser de un valor universal sobresaliente. Las Reservas de la Biosfera son parte del Programa Científico Intergubernamental MAB: tienen tres funciones: la conservación, el apoyo logístico de la ciencia y la educación y un desarrollo sostenible para las comunidades locales. La Red Mundial de Reservas de la Biosfera está gobernada por el Marco Estatutario adoptada por la Conferencia General de la UNESCO en 1995. Mientras algunas Reservas de la Biosfera han sido designadas en su totalidad o en parte como sitios de Patrimonio Mundial, éstas son, a menudo, denominaciones viejas que hoy en día no cumplen con el criterio de 1995. El Patrimonio Mundial y las Reservas de la Biosfera tienen que ser vistos como esfuerzos complementarios, especialmente en su aplicación, donde el área fundamental de una Reserva de la Biosfera con diversidad excepcional podría convertirse en un sitio de Patrimonio Mundial, tal como en el caso del Pantanal de Brasil.

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Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organisations in a unique world partnership: over 950 members in all, spread across some 139 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

The World Conservation Union builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

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WCPA is the largest worldwide network of protected area managers and specialists. It comprises over 1,300 members in 140 countries. WCPA is one of the six voluntary Commissions of IUCN – The World Conservation Union, and is serviced by the Protected Areas Programme at the IUCN Headquarters in Gland, Switzerland. WCPA can be contacted at the IUCN address above.

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Fondée en 1948, l'Union mondiale pour la nature rassemble des Etats, des organismes publics et un large éventail d'organisations non gouvernementales au sein d'une alliance mondiale unique: plus de 950 membres dans 139 pays.

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Afin de sauvegarder les ressources naturelles aux plans local, régional et mondial, l'Union mondiale pour la nature s'appuie sur ses membres, réseaux et partenaires, en renforçant leurs capacités et en soutenant les alliances mondiales.

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La Unión Mundial para la Naturaleza fortalece el trabajo de sus miembros, redes y asociados, con el propósito de realzar sus capacidades y apoyar el establecimiento de alianzas globales para salvaguardar los recursos naturales a nivel local, regional y global.

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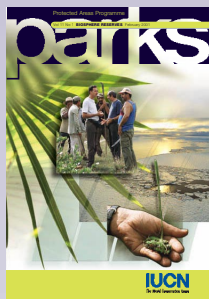
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