Stakeholder Role Analysis for Integrated Management in Protected Areas (Case Study: Urmia Lake, Iran)

Massoud Bagherzadeh Karimi[1*], Ramiz Mammedov[2] and Fariba Fathi Saghezchi[3]

[1] *Department of Environment, Tehran, Iran*

[2] *National Academy of Science, Baku, Azerbaijan*

[3] *Former Master Student, Environment Planning and Management, University of Tehran , Iran*

Abstract Urmia Lake and its surroundng wetlands have been severely affected by recent droughts (1998–2003) and a considerable decrease in inflow has affected lake ecosystem components. Integrated ecosystem-based management is a useful managing tool for the wise use and biodiversity conservation of wetlands. In the process of developing an integrated ecosystem-based management model for Urmia Lake, the identification of key stakeholders is of primary importance. In this research, stakeholder analysis is used as an effective tool for establishing collaborative management in the Urmia Lake catchment in terms of the following parameters and objectives: almost all stakeholders receive multiple benefits from Urmia Lake, either directly or indirectly; almost all stakeholders also cause impacts on the lake ecosystem, many of which result from activities that take place in areas located within in the Urmia catchment but far from the lake. In general, the stakeholders who receive the most benefits seem to cause the lowest impact (for example, Environmental groups), while those who receive fewer benefits may have larger impacts (for example, water resource managers). Recognizing that all stakeholders affect the lake in one way or another is an important concept that promotes the ethic that future management of the Lake should regarded as a shared responsibility between all stakeholders.

Key words: *Integrated management, Stakeholder analysis, UNESCO Biosphere Reserves, Urmia Lake*

1 INTRODUCTION

Traditionally, water resources planning and management efforts have been partially or totally separated, at the community level, from ecosystem protection and land use management. As human populations grow there is an increased demand for water supply, flood control, drought management, water pollution control, and intensive management of water resources. Integrated ecosystem management is a suitable approach for solving multilateral problems (Balvanera, 2005; Simonovic, 1998; Barbier, 1997).

In this study we examine the above-mentioned issues in relation to Urmia Lake (Figs. 1 and 2), the largest inland lake in Iran (in this paper also referred to as 'the Lake'). Because of its unique natural surrondings it has been proposed and ratified as a national park and has been a protected area since 1963 (Scott,

* *Corresponding Author: Department of Environment, Tehran, Iran. Tel: +98 21 88260577. Fax: +98 21 88244584. E-mail: mbkarimi@yahoo.com*

1995). Furthermore, the Lake was designated as both a Ramsar Site (wetland of international importance) in 1975 (Ramsar Convention, 1975) and, on 17 January 1977, as a UNESCO Biosphere Reserve.

As the 21st Century begins, communities in Iran are faced with unparalleled challenges in terms of water resources management, land use management, and the protection and restoration of wetlands and related aquatic ecosystems, which are threatened by of the activities of various stakeholders. Adopting an integrative approch to ecosystem management, can result in a situation where stakeholders become a forgotten aspect of environmental planning. Stakeholder analysis is an inexpensive and easy way to attain effective environmental planning for the sustainable use of wetlands. The expectancies of stakeholders regarding values and benefits obtained from wetlands is closely related to their socio-economic and cultural situations, which may not be in accordance with the natural capacities of wetland resources (Gregory and Wellman, 2001). In this study, stakeholder analysis is used as an effective tool for establishing collaborative management of the Urmia Lake basin.

The Urima Lake catchment is one of six major hydrological baisins in Iran, as shown in Fig. 1. It is an inland catchment in the northwest of Iran covering an area of 51,876 km^2 (Hashemi Mukhtar, 2008; Ghaheri, 1997) (Fig. 2).

The basin is a typical example of a closed internal drainage basin: all surface water and groundwater drains into the Urmia Lake, which has a high rate of evaporation and the input of saline water leads to hypersaline conditions (Akhani *et al.,* 2008; Bagherzadeh Karimi and Rouhani, 2007).

According to a report of the Iranian statistic center, during a 20-year period (1987–2007) the annual average growth rate of the rural population was 0.55%, while the urban population growth rate reached 4.14%. The relative percentage of the urban population has grown from 45.9% in 1987 to 63.1% in 2007, partly as a result of immigration from rural areas (National Iran Statistic Center, 2007).

Several studies conducted during the last decade indicate that when water levels in the lake fluctuate above 1274 m, the Lake continues to maintain normal ecological functioning, particularly with respect to supporting biodiversity and maintaining *Artemia* reproduction. If the water level declines to below 1274 m this can have serious negative impacts on ecosystem functioning (Jihad-e-Keshavarzi, 2002). The Lake has been affected by recent droughts (1998–2003) and several water resources development projects have been implemented within the basin. During recent decades, abstraction of water for agricultural purposes has increased significantly, resulting in lower water inflows into the Lake (Hashemi Mukhtar, 2008).

The most important and unique attributes of Urmia Lake are its vast size, nature, and unusual ecological characteristics associated with hyper-saline conditions.

2   MATERIALS AND METHODS

In the process of developing an integrated management model for Urmia Lake, the identification of the key stakeholders associated with the ecosystem is of primary importance. In this study, stakeholders are defined as organizations and individuals who either use, benefit from, or have an impact upon, Urmia Lake. This paper defines the stakeholder groups and determines both the benefits that each derives from the Lake and the threats that they pose to the ecosystem.

A major contribution to the identification of the stakeholders and their different roles was achieved during a Workshop, held on 2–4 July 2001 in the city of Urmia, that addressed the following topic: "Applying the Ecosystem Approach to the Management of Urmia Lake".

About 200 representatives of different stakeholder groups participated in the workshop. The relative participation levels of representatives from different stakeholder groups were as follows:

- Provincial offices (East and West Azerbaijan provinces): 50%;

- Ministries and governmental organizations: 20%;

- Universities, education and research centers: 20%;

- NGOs: 10%.
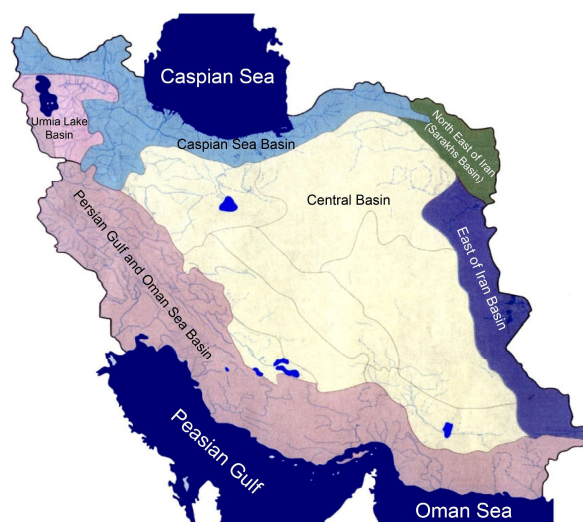
Fig. 1 Main Hydrological basins of Iran (Hashemi Mukhtar, 2008).
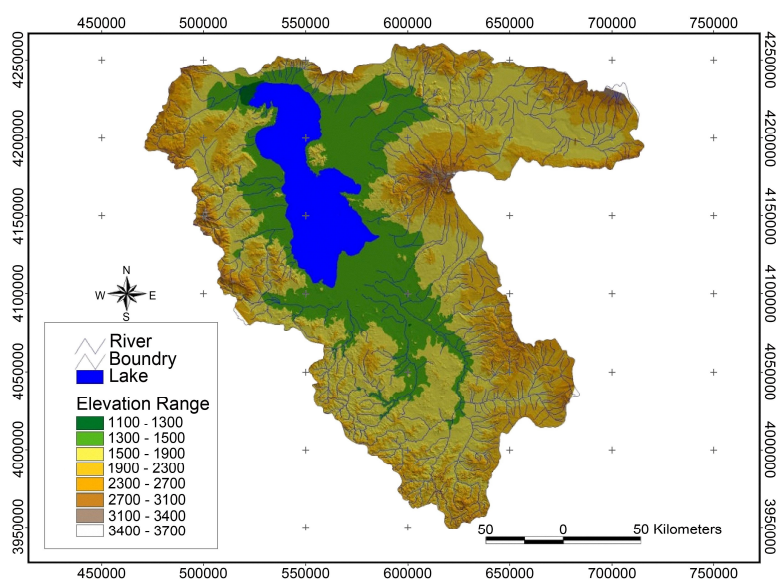
Fig. 2 Elevation distribution of Urmia lake basin (Jihade-e-Keshavarzi, 2002).

Although some stakeholders (for example, farmers) were not directly represented at the workshop, their interests were interpreted by others, such as Jihad-e-Keshavarzi representatives, and NGOs. The workshop concluded that the most influential stakeholders for Urmia Lake are the decision-making organizations from government or are affiliated to the government. Although there are other groups (such as NGOs and individuals) who use the Lake directly, with some impacts on the ecosystem, their roles in the decision-making process is currently small.

3 DEFINITIONS OF STAKEHOLDER GROUPS

A large number of governmental and non-governmental organizations, and groups of individuals, which fall into the definition of stakeholders given above, were identified. These were classified into 13 categories of stakeholder groups, as shown in Table 1.

Table 1 Stakeholder groups of Uremia Lake and the surrounding wetlands.

No.	Stakeholder group	Organisations/individuals included
1	Environmental protection	• Department of the Environment • Provincial Directorates of DOE • Environmental NGOs
2	Hunting	• Hunting organisations and individual hunters
3	Salt harvest	• Industrial and village salt harvesters
4	Water resource management	• The Ministry of Energy • Provincial Water Boards • Companies using water irrigation system • The Water and Sewage Companies and affiliated offices in provincial cities
5	Artemia harvest	• The Fishery offices (Shilat) • The Artemia research centre • Artemia fishermen
6	Reed harvest	• Reed harvesters and users of reed
7	Aquaculture/ fishing	• The Fishery offices (Shilat) • Owners/workers at the fishfarms
8	Tourism	• The Ministry of Culture and Islamic Guidance • Tour and Travel Agencies/operators • Hotels, guesthouses, health spas, etc • Tourists (national and international)
9	Transport	• The Ministry of Roads and Transportation • Offices of Ports and Shipping • Provincial Road and Transportation offices • Transport users
10	Industry	• The Ministry of Industry and Mines • Industry and Mines Provincial Organizations • Privately owned industries
11	Agriculture	• The Jihad-e-Keshavarzi • The provincial Jihad Agriculture Organization • The provincial Veterinary offices • The provincial Forest and Rangeland offices • All farmers/livestock owners, etc.

Table 1 (Continue)

12	Municipal/people groups	• Governor's office • The Ministry of Housing and Urban Development • The Ministry of Education • The Ministry of Science, Research and Technology • Universities and Higher Education Centers • The Ministry of Health, Treatment and Medical Education • Management and Planning Organization • Local and Islamic councils • Religious groups
13	The public	• Urban and rural dwellers

The stakeholder groups include people directly using the Lake and surrounding wetlands (e.g. *Artemia* and salt harvesters) as well as many groups living and working in the surrounding towns and villages throughout the basin. Many stakeholder groups from beyond the basin, such as Ministries located in Tehran, were also included as well as certain international stakeholders, such as foreign tourists who visit the Lake or those from other countries who appreciate the migratory water birds that use of the Lake as part of their annual migratory cycles.

4 STAKEHOLDER BENEFITS

During the workshop, various stakeholder groups identified 16 benefits derived from the Lake and surrounding wetlands. Thse fall into three main classes:

• Ecosystem benefits, which include climatic moderation, biodiversity support, landscape and scenery, and soil conservation.

• Wetland products, which include *Artemia*, reed and salt harvesting, vegetation/livestock grazing, waterbird hunting, and the use of therapeutic muds associated with health spas.

• Services include groundwater recharge, preventation of saltwater intrusion, tourism and ecotourism, education and research, and sediment/nutrient/pollution retention.

In addition to the above benefits, two negative aspects of the lake were identified as constraints posed by the Lake to groundway transportation and saltwater intrusion. The list of stakeholder groups as well as a quantitative assessment of the benefits (scored) that each group obtained from the Urmia Lake and its surrounding areas are summarized in Table 2. The aim of this analysis is to highlight the collective utilization and benefits received from the Lake.

Stakeholder groups receiving the most benefits are environmental protectionists and groups associated with tourism, agriculture, municipalities, and the public. Lower level benefits are received by hunters, the water resource management sector, aquaculture and fishing interests, and harvesters of *Artemia,* reeds, and salt.

For the *Artemia* and salt harvesters, it is notable that, although the number of benefits they receive is relatively low, their activities are entirely dependent on Lake resources. The stakeholder groups receiving the lowest level of benefits from the Lake are the transport and industry groups.

Table 2 Benefits derived by the stakeholders from Urmia lake and the surroundng wetlands.

Stakeholder groups	Benefits																Total score for ranking the stakeholder groups
	Climate moderation	Biodivesity support	Landscape and scenery	Soil conservation	Artemia harvest	Vegetation/livestock grazing	Water bird hunting	Reed harvest	Salt harvest	Therapeutic muds/ health	Fishing	Groundwater recharge	Prevention of saltwater intrusion	Tourism and ecotourism	Education and research	Sediment/nutrient/ pollution retention	
1 Environment-al protection	1	3	2	1	1	0	1	0	0	0	0	2	2	1	2	2	18
2 Hunting	1	3	0	0	0	0	3	0	0	0	0	0	1	0	0	0	8
3 Salt harvest	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	5
4 Water resource management	2	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	8
5 Artemia harvest	1	3	0	0	3	0	0	0	0	0	0	0	0	0	2	1	10
6 Reed harvest	1	3	0	0	0	0	0	3	0	0	0	1	1	0	0	0	9
7 Aquaculture/ fishing	1	2	0	0	0	0	0	0	0	0	3	0	1	0	0	1	8
8 Tourism	2	2	3	0	0	0	1	0	0	3	0	0	0	3	0	0	14
9 Transport	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
10 Industry	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	3
11 Agriculture	3	0	0	2	0	2	0	0	0	0	0	3	3	0	0	1	14
12 Municipal/ people groups	3	2	2	1	0	0	0	0	0	2	0	0	0	0	2	2	14
13 General public	3	2	2	1	0	0	0	0	0	2	0	0	0	3	2	1	16
Total score for ranking the importance of benefits	18	20	9	5	4	2	5	3	5	7	3	8	10	9	8	13	

Note: 3=very important; 2=of medium importance; 1=of low importantance; 0=not important.

The most important benefits, from the point of view of all stakeholders, are climate moderation, biodiversity support, and sediment and pollution retention. Landscape and scenery, soil conservation, groundwater recharge, prevention of saltwater intrusion, and education and research are of medium importance, and the remaining eight benefits are evaluated as of low importance.

It should, however, be mentioned that the assessment of the importance of benefits requires further research.

5 RESULTS AND DISCUSSION

The impacts on the Lake ecosystem caused by the activities of the stakeholders were identified in a workshop. The various stakeholder groups have negative impacts on the Urmia Lake ecosystem, depending on the activities they conduct. It is important to evaluate their impacts in terms of the critical situation of the Lake and for the stakeholders themselves to know about these impacts.

During the workshop, eight categories of impacts on the ecosystem were identified:

• Loss/conversion of natural habitats;

• Changes to water quantity;

• Changes to water quality (particularly in terms of sediment and salinity);

- Changes to water and soil quality (pollution);
- Changes to Lake hydrodynamics;
- Effects on flora and fauna;
- Disturbance to wildlife (fauna);
- Changes to scenery/ landscape.

Stakeholder groups and a quantitative assessment of the negative impacts of each group on the Lake ecosystem are listed in Table 3. The environmental protection group causes no negative impacts. Salt- *Artemia-* and reed-

harvesters, tourism, and hunting groups have low level impacts on the Lake and surrounding areas. Medium-level impacts are associated with the activities of aquaculture/fishing, transport, industry, municipal/people groups, and the public. The highest impacts on the Lake ecosystem stem from agriculture and water resource management activities that are undertaken in the Urmia Lake basin.

Table 3 Negative impacts of socio-economic activities on the Urmia Lake ecosystem.

	Stakeholder groups	Loss/ conversion of habitats	Changes to water quantity	Changes to water quality (sediment)	Changes to water and soil quality (pollution)	Changes to Lake hydrodynamics	Effect on flora and fauna	Disturbance to wild life(fauna)	Changes to scenery/ landscape	Total score for ranking the stakeholders groups
1	Environmental protection	0	0	0	0	0	0	0	0	0
2	Hunting	0	0	0	0	0	2	3	0	5
3	Salt harvest	1	0	0	0	0	0	0	1	2
4	Water resource management	2	3	2	1	3	3	0	2	16
5	Artemia harvest	0	0	0	0	0	1	1	0	2
6	Reed harvest	0	0	0	0	0	1	1	1	3
7	Aquaculture/ fishing	1	1	0	1	0	1	1	1	6
8	Tourism	1	0	0	1	0	0	1	1	4
9	Transport	1	0	0	0	2	1	0	2	6
10	Industry	1	1	0	2	0	1	0	2	7
11	Agriculture	3	3	3	3	1	2	1	1	17
12	Municipal/ people groups	2	1	0	1	0	1	0	2	7
13	The public	1	1	0	1	0	1	1	1	6

Note: 3=very important; 2=of medium importance; 1=of low importantance; 0=not important.

This does not mean that because of the conservation of the Lake ecosystem, such activities should be terminated. Instead, it means that an environmental assessment of these activities is required to prevent and/or mitigate impacts by monitoring these activities, so as to maintain sustainability with regard to the future use of the Lake ecosystem in terms of people and wildlife. An awareness that many impacts are interrelated is important as synergistic effects can serve to amplify adverse effects on the Lake ecosystem. For example, habitat loss forces wildlife to move to smaller and smaller areas, whilst hunters also become increasingly concentrated in these areas; therefore the effects of hunting disturbance can be be exacerbated.

Similarly, the combination of agricultural, domestic and industrial pollutants can have greater impacts than would be the case for any single pollutant source. It is thus necessary to investigate the combined effects of these pollutants rather than to simply address those that influence the Lake the most.

6   CONCLUSIONS

This stakeholder analysis is one of the first of to be undertaken in Iran. It has been demonstrated that the benefits derived from Urima Lake and impacts are shared by multiple stakeholder groups and the analysis has raised an awareness that other users also benefit from the Lake. The future management of the Lake ecosystem must therefore be a shared responsibility between different stakeholder groups, with the aim of minimizing impacts and optimizing multiple benefits.

Attention has often focused on the question of which groups have the greatest direct negative impacts on the Lake. This raised considerable debate in the workshop and clearly has to be handled with sensitivity, so as to avoid alienation of various stakeholders. It is important to raise environmental awareness among stakeholders so that they can find ways to reduce their own negative impacts.

In responding to these challenges, the integrated approach, whereby different stakeholder groups work together to identify common solutions, is considered to be very powerful. Holding workshops can offer the opportunity for all stakeholders to become familiar with the concept of ecosystem-based management and come to a shared sense of responsibility and objectives. Such workshops also greatly facilitate coordination and cooperation between stakeholders. The inclusion of international examples can also help stakeholders to internalize the concept much better.

The role of environmental NGOs and their voluntary cooperation in the conservation of the Urmia Lake ecosystem is important for mobilizing public opinion. In the follow-up to the workshop and publication of these reports, NGOs can play a special role in the implementation of the management plan.

Recognizing that all stakeholders affect the Lake in one way or another is an important concept, the corollary of which is that the future management of the Lake must be a shared responsibility between all stakeholders.

This analysis reflects the contributions of only some stakeholders and requires further development through scientific research. The purpose of such an analysis is to identify priorities and to reach a common ground for common action. Most importantly, it demonstrates that all stakeholders must contribute to the conservation of the Lake ecosystem and contribute towards adopting appropriate standards in terms of their own activities. Without such a coordinated action, the future sustainability of this important natural resource, and all the benefits that it brings to the people of the basin and beyond, cannot be guaranteed.

7 REFERENCES

Akhani, H., Leroy, A. S., Stevens, L., Alizadeh, H. and Brewer, S. A late Pleistocene long pollen record from Lake Urmia, NW Iran. Quat. Res. 2008; 62: 413–420.

Bagherzadeh Karimi, M. and Rouhany, M. Directory of Iranian Wetlands Designated under the Ramsar Convention. Tehran, Iran:Nashr-e-No, 2007; 167 pp.

Barbier, E. B. Economic valuation of wetlands: a guide for policy makers and planners, Ramsar Convention Bureau, Gland, Switzerland, 1997; 63 pp.

Balvanera. P. Applying community structure analysis to ecosystem function/ Ecological Applications, UN, NO: 2005; 360–373.

Ghaheri, M. An introduction to Iranian lakes: Urmia Lake. Proceedings of Lacar '97 Conference, Lacar, Argentina, ILEC. 1997.

Gregory. R. and Wellman. K. stakeholder values into environmental policy choices: A community-based estuary case study. Ecol. Econ. 2001; 39: 37–52.

Hashemi Mukhtar, M. The Status of Water Resources in the Lake Uromiyeh Watershed / UNDP/GEF "Conservation of Iranian Wetlands" Project, 2008; 68 pp.

Jihad-e-Keshavarzi Iran, Yekom Consulting Engineers, Management Plan for the Urmia Lake Ecosystem. Report 1 of the C-IIP Environmental Management Project for Urmia Lake, 11 chapters, 2002; 144 pp.

National Iran statistic center of Iran. general accounting of human and bulding, west and east Azarbaijan. 2007.

Ramsar convention Bureau. Information sheet on Ramsar Wetlands, Gland, Switzerland. 1975.

Scott, D. A. (ed.). A Directory of Wetlands in the Middle East, IUCN, Gland, Switzerland and IWRB, Slimbridge, U.K., 1995; 560 pp.

Simonovic, S. P. Sustainability Criteria for Possible Use in Reservoir Analysis. In: Sustainable Reservoir Development and Management', K. Takeuchi *et al.* (ed.), IAHS Publ. 1998; 251 pp. 55–58.

تحلیل نقش ذی‌نفعان در مدیریت جامع مناطق حفاظت شده (مطالعه موردی: دریاچه ارومیه، ایران)

مسعود باقرزاده کریمی[1]، رامیز ممدوف[2] و فریبا فتحی سقزچی[3]

۱- سازمان حفاظت محیط زیست، تهران، ایران

۲- آکادمی ملی علوم، باکو، آذربایجان

۳- دانش‌آموخته کارشناسی ارشد مدیریت برنامه‌ریزی محیط زیست، دانشگاه تهران، ایران

چکیده دریاچه ارومیه و تالاب‌های اقماری آن تحت تأثیر خشکسالی شدید سال‌های ۱۳۷۷ تا ۱۳۸۲ قرار گرفته است و در اثر این پدیده جریان‌های ورودی به دریاچه کاهش یافته و کلیه اجزای زیست بوم آن به شدت تحت تأثیر قرار گرفته‌اند. مدیریت یکپارچه زیست بومی می‌تواند یک مدل مدیریتی مناسب برای استفاده خردمندانه از منافع تالاب و حفاظت از تنوع زیستی آن به شمار آید. در فرآیند توسعه مدل مدیریت جامع زیست بومی دریاچه ارومیه تشخیص و تعیین نقش ذی‌نفعان از مهم‌ترین و اساسی‌ترین گام‌هاست. در این پژوهش تحلیل ذی‌نفعان به عنوان یک ابزار مدیریتی موثر در دریاچه ارومیه مورد استفاده قرار گرفته است. تحلیل نتایج نشان داد که اغلب ذی‌نفعان منافع متعددی به صورت مستقیم و غیر مستقیم از دریاچه ارومیه می‌برند. هم‌چنین اغلب ذی‌نفعان بر زیست بوم دریاچه تأثیرگذار هستند و در بسیاری موارد فعالیت‌های آنها دور از دریاچه و در سطح حوزه آبریز اتفاق افتاده است. گروه‌های محیط زیستی ذی‌نفعانی هستند که بیشترین منافع را به دریاچه ارومیه رسانده و کمترین آسیب را به آن وارد کرده‌اند. مدیریت منابع آب ذی‌نفعانی هستند که کمترین منافع را به دریاچه ارومیه رسانده و بیشترین آسیب را به آن وارد کرده‌اند. نتیجه مهم اینکه تشخیص نقش‌های متمایز همه ذی‌نفع‌ها یک امر کلیدی در مدیریت مناطق حفاظت شده بوده و در آینده باید مدیریت این گونه مناطق با مشارکت و مسئولیت‌پذیری همه ذی‌نفعان صورت پذیرد.

کلمات کلیدی: تحلیل ذی‌نفعان، دریاچه ارومیه، ذخیره‌گاه زیست کره یونسکو، مدیریت یکپارچه